**Attachment—Additional Questions for the Record**

**Subcommittee on Energy**
**Hearing on**
**"The Fiscal Year 2023 DOE Budget"**
**Thursday April 28, 2022**

The Honorable Jennifer M. Granholm, Secretary, U.S. Department of Energy

QUESTIONS FROM THE HONORABLE FRANK PALLONE, JR. (D-NJ)

Q1. In the Department of Energy's budget materials, it highlights that at the Office of Energy Efficiency and Renewable Energy, the Emerging Technologies office will move some programs out of it and into other DOE programs. For example, the budget materials mention you have already moved the solid-state lighting program. Specifically it says, "BTO has transitioned those investments into other BTO subprograms."
Can you tell me where in DOE the solid-state lighting program has moved and what the goals of the program are now?

A1. DOE's Building Technologies Office, Emerging Technologies (ET) Program, has utilized appropriated resources to significantly improve the performance and reduce the cost of solid state lighting (SSL), which has and will continue to have long-term benefits for the United States. For most lighting applications, excellent SSL solutions are now available due to these investments. While there are still some applications with technology gaps that can benefit from continued ET funding for innovation, the larger need is to help in deployment and market uptake of innovative SSL technologies. The FY 2023 budget request moves some SSL activities within the Building Technologies Office from the ET subprogram to the Commercial and Residential Building Integration subprograms. We will continue our strong commitment to the success of SSL technologies with appropriated funds.

Within the ET R&D program, an ongoing opportunity is improving whole lighting systems, including controls (versus individual SSL "bulbs"). The success of BTO's investments in solid state lighting have already resulted in substantially driving down lighting energy use in buildings, in many cases to less than 3% of a home's energy use. The residential and commercial buildings integration programs will work to scale many

lighting applications that have the technical solution but lack sufficient customer knowledge, and effective demonstrations of how well they work in all the disparate US building types and applications.

The goals around this refocused effort are to help achieve greater and faster deployment of innovative SSL technologies into the market. This renewed focus on SSL into Residential and Commercial programs was reflected in our comments on the transition of work.

Q2. Does the United States have the necessary infrastructure in place to take advantage of our abundant wind resources and, if not, can you please submit for the record your recommendation as to how that might be achieved?

A2. Achieving the terawatt-scale land-based and offshore wind deployment required to decarbonize the grid and move toward a net-zero economy over the next few decades would deliver significant benefits to climate and public health as a result of reduced air pollution, create hundreds of thousands of wind-related jobs, and help stabilize energy prices for families and businesses by increasing domestic clean energy production and reducing vulnerability to volatility in fuel prices. To realize these benefits, the United States will need significant additional investment in research and development to reduce costs and barriers to deployment and to ensure effective integration with the grid. Additional infrastructure investment will also be crucial, including ports and vessels for offshore wind, and transmission for both land-based and offshore wind. These and other needs are outlined in the wind energy supply chain deep dive assessment that DOE released as part of *Securing America's Clean Energy Supply Chain.*[1]

- Ports: To achieve the Administration's 30 gigawatt by 2030 offshore wind deployment goal, the United States would need to install on the order of 2,100 wind turbines and foundations and more than 6,000 miles of submarine cable. Specialized port infrastructure is needed to handle all of these components and the vessels to install them. A recent DOE-funded report, *The Demand for A Domestic Offshore*

[1] Securing America's Clean Energy Supply Chain, https://www.energy.gov/policy/securing-americas-clean-energy-supply-chain

*Wind Energy Supply Chain*,[2] indicates that few U.S. ports currently have sufficient capabilities to fully support offshore wind, and that substantial additional investment to upgrade ports on both the East and West Coasts is needed.

- Vessels: 30 gigawatts of offshore wind deployment by 2030 will also likely require a substantial numbers of specialized vessels— dedicated wind turbine installation vessels, cable-laying vessels, "feeder vessels" to shuttle components from ports to offshore wind farm sites, and others to perform tasks such as installing turbine foundations and scour protection, and supporting operations and maintenance of offshore wind farms.[3] Only one U.S.-flagged turbine installation vessel is under construction, and foreign-flagged vessels are in short supply, in high demand globally, and subject to Jones Act restrictions. Support for the construction of additional U.S.-flagged offshore wind vessels would be needed to achieve the 30 gigawatts by 2030 target and ensure a robust offshore wind industry going forward.
- Transmission: Substantial transmission expansion will be needed to realize both the Administration's 2030 offshore wind deployment goals and the levels of land-based wind energy required to decarbonize the power sector and put the nation on a path to a net-zero carbon economy. Recent studies on the future of the U.S. power system indicate that fully decarbonizing the grid by 2050 would require at least twice as much transmission as the United States has today,[4] and that not significantly expanding transmission capacity would make decarbonization much more expensive. Support is needed to improve transmission planning and generation interconnection processes.[5] Additional challenges include uncertainty in transmission permitting timelines and supply chain shortages for power equipment.

Q3. Does the budget allocate sufficient resources to DOE to support full implementation of the electric vehicle charging provisions in the bipartisan infrastructure law?

A3. DOE is working closely with the U.S. Department of Transportation (DOT) to execute $300 million from Federal Highway Administration (FHWA) over five years allocated in

[2] The Demand for A Domestic Offshore Wind Energy Supply Chain, https://www.nrel.gov/docs/fy22osti/81602.pdf
[3] The Demand for A Domestic Offshore Wind Energy Supply Chain, https://www.nrel.gov/docs/fy22osti/81602.pdf
[4] ESIG, Transmission Planning for a 100% Clean Electricity, https://www.esig.energy/wp-content/uploads/2021/02/Transmission-Planning-White-Paper.pdf.
[5] Interconnection Innovation e-Xchange, Interconnection Innovation e-Xchange | Department of Energy.

the Bipartisan Infrastructure Law (BIL) for the DOE and DOT Joint Office of Energy and Transportation. There are no funds allocated to DOE for the Joint Office of Energy and Transportation in the Fiscal Year (FY) 2023 DOE budget request, however, we expect ongoing needs for the successful support and deployment of the national EV charging network.

Q4. During this time of great uncertainty around energy supplies and prices, in your opinion, is a continued major expansion of domestic renewable energy, like wind and solar, the best way for us to ensure secure, reliable American energy?

A4. Uncertainty in electricity prices is driven in significant part by volatility in the price of fuels such as natural gas. Because wind and solar have no ongoing fuel costs and low, predictable operating costs, the cost of electricity from wind and solar projects is stable once they are in service, and continued expansion of wind and solar can play an important role in helping to stabilize electricity prices over the long term. Further, grid operators have successfully maintained grid reliability as wind and solar generation have grown over the past decade. For example, the Southwest Power Pool (SPP), one of the seven Independent System Operators in United States, operated their grid last year with 34.8% of electricity generated from wind and solar.[6] Daily or hourly wind and solar penetration in SPP is often much higher, with a record of 88% in March this year. DOE is aggressively pursuing research and development activities to ensure that the grid can continue to operate reliably as the penetration of variable renewables like wind and solar continues to increase.

Q5. In 2021, America wasted two thirds of the energy that it consumed. Cutting energy waste now and in the future is one of the best ways we can achieve our emissions reduction goals. Does DOE have plans to encourage the use of energy efficiency and battery storage?

A5. DOE has a robust portfolio of programs promoting energy efficiency across several different offices.[7] The Building Technologies Office (BTO) works to enable high-performing, energy-efficient and demand-flexible residential and commercial buildings, in support of an equitable transition to a decarbonized energy system by 2050, starting

[6] Fast Facts – Southwest Power Pool (spp.org), https://spp.org/about-us/fast-facts/
[7] Energy Efficiency | Department of Energy

with a decarbonized power sector by 2035. BTO encourages those interested in energy efficiency to get involved in improving the efficiency of the nation's homes, buildings, and plants through the Better Buildings Initiative. Buildings and manufacturing plants account for about two-thirds of carbon dioxide emissions in the United States. Organizations can set goals and partner with DOE to increase energy efficiency and reduce GHG emissions through the Better Climate Challenge.

The DOE Advanced Manufacturing Office (AMO) has a long history of technology development and analysis aimed at encouraging and improving energy efficiency in the industrial sector. The AMO Technical Partnerships program supports the deployment of energy efficient technologies and approaches by working directly with manufacturers to accelerate decarbonization in the short term. Activities include voluntary partnership programs such as Better Plants and the Better Climate Challenge, Industrial Assessment Centers, and energy management programs, including the 50001 Ready and Superior Energy Performance 50001 programs supporting compliance with the ISO 50001 standard on energy management systems. Additionally, the Combined Heat and Power Deployment program and District Energy program help transition manufacturers, commercial, residential, and other facilities and communities to more energy efficient energy generation and distribution. In addition, AMO provides technical assistance and engages with stakeholders to facilitate adoption of onsite energy technologies, including combined heat and power and district energy, which help transition manufacturers and communities to cleaner and more energy-efficient systems.

AMO's research, development, demonstration, and deployment (RDD&D) program aims to make transformational changes to industrial processes and technologies to achieve deep decarbonization of the industrial sector in the future. The program specifically targets energy efficiency improvements in the most energy- and carbon-intensive sectors, including chemicals, petroleum refining, iron and steel, cement, forest products, and food and beverage. RDD&D of technologies with crosscutting applicability (across multiple industrial sectors) are also being pursued, guided by analysis and stakeholder engagement, including the Industrial Decarbonization Roadmap and Industry Roundtable activities. By targeting technologies that directly reduce energy consumption in key

industrial processes, AMO is driving the industrial sector to prioritize energy efficiency and decarbonization.

In addition, AMO's investments will accelerate RDD&D of energy efficient battery manufacturing technologies needed to achieve emissions reduction goals. Leveraging these efforts, AMO considers advancing energy storage for emissions reduction in two ways: battery use for energy-effective manufacturing; and advanced manufacturing for batteries. AMO has increased its investment in advanced processing/manufacturing areas for electric vehicle batteries and long-duration energy storage needed to achieve emissions reduction goals. However, AMO recognizes that battery use for energy-effective manufacturing is a critical area to invest in, and the office is considering multiscale multi-facility/regional flexible battery storage systems using manufacturing facility flexibility/storage/conversion as a key part. With the increasing electrification of manufacturing processes, an emerging area of interest would be the adaptation of manufacturing facilities, possibly in combination with embedded battery storage systems to ensure more flexibility and efficient use of energy in the industrial sector.

Q6. Before the signing of the IIJA, DOE had established the "Hydrogen Energy Shot" that aimed to produce $1 for one kg clean hydrogen in one decade. The Hydrogen shot was launched June 7, 2021 at the DOE Hydrogen Program Annual Merit Review. As part of the process, DOE executed a stakeholder engagement process and an RFI. The findings of the RFI identified regional clusters and geographical locations for possible hydrogen projects.[8]

As part of DOE's Hydrogen Energy Shot, regional and geographical factors were identified for possible hydrogen hubs. It appears from the RFI analysis that the MidAtlantic, including my home state of New Jersey, was not identified as a possible region for consideration. New Jersey, along with New York, Connecticut and Massachusetts just announced a regional partnership to explore the potential for a regional clean energy hydrogen hub. Will the Department recognize this regional collaboration regardless of the Hydrogen Earth Shot conclusions?

A6. On December 8, 2021, the DOE held a public H2IQ webinar titled "DOE Update on Hydrogen Shot, RFI Results, and Summary of Hydrogen Provisions in the Bipartisan Infrastructure Law,"[4] which included a summary of responses received through a Request

[8] Department of Energy, *#H2IQ Webinar*, *See* slide 14 (www.energy.gov/eere/fuelcells/articles/doe-update-hydrogen-shot-rfi-results-and-summary-hydrogen-provisions) (December 9, 2021).

for Information (RFI) issued on July 1, 2021.[9] In cases where there were no or minimal RFI responses from States, there was limited information in the slide deck. Responding to this RFI is not a requirement to apply for future DOE Funding Opportunity Announcements.

On February 15, 2022, the DOE issued another Request for Information[10] to obtain public input regarding the solicitation process and structure of a DOE Funding Opportunity Announcement (FOA) to fund regional clean hydrogen hubs (H2Hubs), in accordance with the Bipartisan Innovation Act (BIL). On June 6, 2022, DOE also released[11] a Notice of Intent (NOI),[12] that provides a high-level preliminary plan for DOE's current vision to meet the BIL requirements for the H2Hubs program. Neither the RFI related to the regional clean hydrogen hubs nor the NOI restricts eligibility to specific regions, States, or group of States.

[9] DOE Hydrogen Program Request for Information, https://www.energy.gov/eere/fuelcells/articles/doe-hydrogen-program-request-information-de-foa-0002529.
[10] DOE RFI on Clean Hydrogen Hubs, https://oced-exchange.energy.gov/Default.aspx#FoaIdb2ae7a4e-b071-4e77-9694-dba3c9ab0333.
[11] DOE press release: NOI for Clean Hydrogen Hubs, https://www.energy.gov/articles/doe-launches-bipartisan-infrastructure-laws-8-billion-program-clean-hydrogen-hubs-across.
[12] NOI Clean Hydrogen Program, https://oced-exchange.energy.gov/Default.aspx#FoaId4e674498-618c-4f1a-9013-1a1ce56e5bd3.

QUESTION FROM THE HONORABLE BOBBY L. RUSH (D-IL)

Q1. A question for us here in Congress remains how to appropriately store the nation's high-level nuclear waste for the long term. A related question, equally important, is what should be done with the waste in the interim. In the past you have referred to the Blue Ribbon Commission on Nuclear Waste, which 10 years ago recommended action but yet the issue remains unresolved. Absent a license to operate Yucca Mountain or some other permanent repository soon – what does the Department of Energy propose in Fiscal Year 23 to advance other viable solutions by using, exploring, or initiating other technological approaches besides the near surface tunnel approach proposed at Yucca Mountain? Is the DOE considering other technologies for interim storage such as retrievable deep wellbore geologic storage?

A1. The Nuclear Waste Policy Act of 1982, as amended, establishes the Federal responsibility to permanently dispose of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) in geologic repositories. Geologic disposal remains the scientifically and technically preferred option for managing SNF and HLW in a manner that protects people and the environment and does not burden future generations.

Deep borehole disposal is one concept for geologic disposal that requires further technical development, but that could be considered as a disposal option for smaller waste forms such as some of the high-level radioactive waste managed by the Department of Energy. The Department does not have an active deep borehole disposal research and development program. The large inventory of commercial spent nuclear fuel and the potentially large size of waste packages for future disposal mean that deep borehole disposal would likely not be practical alone.

Until disposal is available, SNF can be safely and securely stored in dry cask storage systems certified by the U.S. Nuclear Regulatory Commission. Currently, there are over 70 utility-operated independent spent fuel storage installations (ISFSIs) in 35 states. Twenty of these facilities are at nuclear power plant sites that no longer have an operating reactor. Although SNF is safely stored at these facilities, the communities that host them never expected to do so long-term. U.S. taxpayers are paying the costs of storage via payments from the Judgment Fund due to the Department's partial breach of the Standard Contract when it failed to begin accepting commercial SNF in 1998. Judgment Fund

payments to date have totaled more than $9 billion and will continue to increase until DOE begins accepting SNF.

DOE's Spent Fuel and Waste Science and Technology subprogram has a robust program to develop the technical and scientific basis for safe permanent disposal of SNF and HLW. In FY23, the Department of Energy proposes research and development (R&D) to advance understanding of the long-term performance of repository systems in three main host rocks: clay, salt, and crystalline. The Department also will leverage international collaborations to integrate information and capabilities that benefit the U.S. program.

In FY21 and FY22, Congress appropriated $20 million for each of these fiscal years for DOE to focus on establishing a Federal consolidated interim storage capability using a consent-based siting process. In addition, in FY21 and FY22, Congress appropriated $18 million in each fiscal year to DOE's Integrated Waste Management System (IWMS) subprogram, which is currently focusing on implementation of a Federal interim storage capability, including associated transportation, as components of an integrated waste management system. For FY23, DOE has requested $53 million in appropriations (an increase of $15 million from the previous $38 million, which was comprised of $20 million for interim storage and $18 million for IWMS) to ramp up activities related to implementing Federal consolidated interim storage. DOE conducts a variety of activities to prepare for consent-based siting of an interim storage facility, including a funding opportunity announcement (FOA) that was released on September 20, 2021 to enable interested organizations and communities to learn more. DOE will continue planning and conducting R&D for SNF storage and transportation, including:1) engaging with Tribal and State officials regarding future SNF transportation; 2) planning for a full-scale package performance test of a rail-sized SNF cask; and 3) conducting technical activities to develop interim storage facility design concepts and system analysis tools.

DOE continues to partner with National Laboratories, universities, and industry for many of the activities in the Spent Fuel and Waste Science and Technology and the IWMS subprograms.

QUESTIONS FROM THE HONORABLE PAUL TONKO (D-NY)

Q1. The Energy Policy Act of 2020 authorized $50 million per year for DOE's Advanced Turbine program.

Q1a. What is the Department's research priorities for the Advanced Turbine program for Fiscal Year 2023 and beyond?

A1a. In fiscal year 2023, research, development and demonstration priorities are (1) to enable deployment of near-zero-emission advanced turbines fueled by high hydrogen blends with natural gas (80-100% H2 by volume), (2) to develop hydrogen-fueled rotating detonation combustion for stationary power generation, and (3) to issue the biannual University Turbine System Research Program with a focus on materials including ceramic matrix composites that would support more efficient gas turbines with a lower cost of electricity (COE) across a range of sizes.

Pre-commercial demonstrations of 100% hydrogen-fueled turbines and rotating detonation combustion for stationary power generation are priorities for beyond FY23.

Q1b. What is the importance of this program for our energy future?

A1b. In 2021, natural gas turbines provided 38% of the Nation's electricity, the largest single source of electricity for the United States. In the near-term, natural gas combined cycle (NGCC) power plants with post combustion carbon capture and storage (NGCC w/CCS) could provide nearly carbon free electric power with a competitive cost of electricity (COE) that can be dispatched or base loaded. Increasing the efficiency of these gas turbines (with research and development) will further reduce COE. In the mid-term, NGCC w/CCS using low- or zero-carbon fuels (hydrogen or synthetic natural gas) while minimizing NOx emissions provide options for carbon negative electric power. The COE of this approach can be further improved with research, development and demonstration (RD&D) to increase gas turbine efficiency.

As more and more renewable resources (wind and solar) are deployed, dispatchable low-carbon power generation technology will be required. This need can be effectively met with highly efficient gas turbines fueled with hydrogen, hydrogen and natural gas blends,

or natural gas. Energy storage can enable greater penetration of renewable assets into the power generation market. Current thinking suggests that generating and storing large volumes of hydrogen could supply the energy storage needed. Currently and into the future, gas turbines are viewed as a dispatchable, load-following resource able to couple with hydrogen storage delivering a low COE.

For these reasons, gas turbines have an important role in our carbon-free energy future. With RD&D, these machines can use low- or zero-carbon fuels (like hydrogen), improve their overall performance and reduce the COE. Lowering the cost of electricity while improving local air quality are important considerations in the transition to a zero-carbon energy future in a just and equitable manner.

QUESTIONS FROM THE HONORABLE KATHY CASTOR (D-FL)

Q1. What additional tools does the Department of Energy (DOE) need to help upgrade and expand the electric grid?

A1, Transmission infrastructure can unlock the enormous benefits and opportunities that the clean energy transition presents, from spurring economic growth, to revitalizing domestic manufacturing, to creating millions of good jobs for American workers. Studies often find that the benefits of transmission exceed the costs by enabling access to low-cost generation, helping to maintain reliability and avoid power outages, and supporting clean energy supply.

DOE has a critical role to play in supporting transmission investment.

The Department of Energy is acting within pre-existing authorities to catalyze nationwide development of new and upgraded high-capacity transmission lines through its 'Building a Better Grid' initiative[13]. Under this initiative, DOE will work with states, tribes, industry, unions, local communities, and other stakeholders to identify critical national transmission needs and support the buildout of transmission facilities that meet those needs through collaborative transmission planning, innovative financing mechanisms, coordinated permitting, and continued research and development.

The Bipartisan Infrastructure Law contains new DOE financing programs and authorities to help kick-start transmission investments. Among others, these include a $2.5 billion transmission facilitation program and revised authorities for the designation of national electric transmission corridors. The Inflation Reduction Act includes additional, critical programs, such as: a $2 billion transmission loan program, a program to offer grants to facilitate the siting of interstate electricity transmission lines, and funding for interregional and offshore wind electricity transmission planning, modeling, and analysis. Each of these programs builds on DOE's strengths in supporting investment, leading

[13] DOE Launches New Initiative From President Biden's Bipartisan Infrastructure Law To Modernize National Grid | Department of Energy

effective planning, and working with diverse stakeholders in support of national priorities.

Q2. In a recent letter to FERC, I urged the Commission to encourage the use of advanced transmission technologies to help modernize the existing electric grid. DOE also issued a report on grid-enhancing technologies. As DOE moves forward to implement the Bipartisan Infrastructure Law, how does the agency plan to encourage the use of modern technologies to increase the existing grid's capacity, efficiency, and flexibility?

A2. Through the Bipartisan Infrastructure Law under Section 40107 for the Smart Grid Investment Matching Grants Program, DOE will provide funding opportunity announcements for eligible entities to propose projects such as grid enhancing technologies for deployment on the U.S. electric grid. Eligible entities can also propose projects including grid enhancing technologies as a feature of the transmission infrastructure approaches under the Section 40103(b) Program Upgrading Our Electric Grid and Ensuring Reliability and Resiliency.

Q3. High voltage direct current (HVDC) converter stations have proven to be economical for transferring bulk power over long distances. What does DOE need to initiate research, development, demonstration, and deployment efforts on reducing the costs of HVDC converter systems?

A3. DOE has initiated efforts aimed at developing characterization methods and tools to evaluate reliability, transient stability, and economics of large-scale HVDC architectures in alternating current (AC) grids. Additionally, DOE recently organized a workshop to discuss HVDC transmission technologies and their application in the North American electric grid. In order to further expand research, development, demonstration, and deployment efforts on reducing the costs of HVDC converter systems, DOE is developing an HVDC Technology Roadmap as a guiding document on critical HVDC research and development (R&D) gaps, and as an important tool to assist the Department in the prioritization of specific R&D efforts. The scope of the activities required to significantly reduce HVDC converter system costs will likely exceed the scope of existing OE and DOE programs.

Q4. Consumers and businesses are increasingly demanding better information about energy to make purchasing decisions that align with their needs and values. The Bipartisan Infrastructure Law directed the Energy Information Administration (EIA) to collect more

granular real-time data on emissions and resource mixes for all U.S. electricity balancing authorities, which will enable a vast array of climate-aware projects and purchasing decisions for individuals and businesses. How could increased and improved data from the EIA support corporate climate commitments and help accelerate the decarbonization of the electric sector?

A4. EIA's independent, impartial perspective is crucial in helping to inform the energy policy dialogue, including around issues related to the decarbonization of the electric sector. In 2021, EIA submitted a report to the Appropriations Committees of both Houses of Congress (per the Joint Explanatory Statement accompanying the Consolidated Appropriations Act of 2021) that outlined a potential approach for collecting and publishing more granular data on emissions related to electricity generation. As an initial step, EIA proposed a study to determine the feasibility of expanding its existing electric power surveys to collect more localized emissions data. EIA intends to initiate that study later this year, which will inform any subsequent work in this area. EIA's ability to provide more granular information on electricity supply, resource mix, and related emissions would be highly valuable to policymakers, industry, and consumers in their respective decision-making processes by providing a reliable and policy-neutral benchmark for current emissions levels and for assessing periodic changes in those levels over time.

Q5. The Bipartisan Infrastructure Law included provisions to enhance EIA's ability to provide accurate, transparent, and harmonized data on our nation's energy system. Two important provisions, Sections 40412 and 40419, directed the EIA to create a publicly available dashboard with energy and emissions information and to harmonize this data between the EIA and other relevant federal agencies, including the Environmental Protection Agency. What is the EIA's current progress on implementing the Bipartisan Infrastructure Law and how does the Administration's budget support these ongoing efforts?

A5. EIA has been working to provide more near real-time data to its stakeholders, especially in the area of electric grid operations. EIA's Hourly Electric Grid Monitor, an online dashboard tool launched in 2016, already addresses many of the Bipartisan Infrastructure Law's (BIL) requirements for data on the operation of the U.S. power system by providing information on electricity demand, forecast demand, net generation, total interchange, and electricity generation by energy source. EIA's Administrator has made

improved data accessibility and usability a priority; therefore, EIA is developing plans to expand the Grid Monitor to include additional information on grid operations and new data on regional emissions as called for in the BIL, and to make this data available on a dynamic, web-based platform. EIA staff are also actively collaborating with their EPA counterparts to address the data harmonization issue, which should yield more clarity to stakeholders concerning any data discrepancies between the two agencies.

The BIL identified several other areas where expanded EIA information would be of considerable value to policymakers, market participants, and the public at large. EIA is developing plans for all of these items; however, because no funding was directed to EIA under the BIL, these efforts remain mostly in the planning stages. The President's FY 2023 Budget Request includes an increase for EIA, which would, if enacted, enable substantive progress on the BIL items.

QUESTIONS FROM THE HONORABLE TOM O'HALLERAN (D-AZ)

Q1. Does the Department have adequate resources to administer the Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization in a way consistent with the Working Group's goals as outlined in its report released by the group on April 23, 2021?

A1. The Interagency Working Group (IWG) on Coal and the Power Plant Communities and Economic Revitalization was established under Executive Order 14008, *"Tackling the Climate Crisis at Home and Abroad"* in January 2021, and the IWG efforts have been funded using available resources under the Office of Fossil Energy and Carbon Management's Program Direction program. The FY 2023 Budget Request for the IWG is $3 million.

Q1a. In the report, the IWG planned to publish a follow-up report recommending "changes to federal policy and programs to enhance federal capabilities to deliver economic revitalization to Energy Communities." When will the Working Group release the follow-up report?

A1a. The Initial Report to the President released in April 2021 (Initial Report to the President on Empowering Workers Through Revitalizing Energy Communities (doe.gov)) includes steps to foster economic revitalization in Energy Communities. The follow-up report is under development and will be published in the last quarter of calendar year 2022.

Q2. In December 2020, Congress passed the bipartisan Energy Act of 2020. It included the EASE Act, which created an energy storage and microgrid program for electric cooperatives. Can you provide an update on the progress the Department has made to implement this program?

A2. No appropriations have yet been provided to fund Section 3202 of the Energy Act of 2020, and so DOE has not begun activities to implement this program.

QUESTIONS FROM THE HONORABLE KIM SCHRIER, M.D. (D-WA)

Specifically, as it relates to DOE's Regional Clean Energy Hubs:

Q1. Have there been any outlined parameters for organization governance models that are preferred from DOE from applicants? WA State chose to incorporate a new public private partnership (non-governmental) entity – the Pacific NW Hydrogen Association which will be the lead applicant from our state. The general proposed governance model would include representation from tribes, environmental justice, labor, community and H2 project lead organizations (like utilities and private firms). Is there any problem with this type of organization being the lead applicant?

A1. DOE issued a Notice of Intent[14] (NOI) on June 6, 2022, providing a high-level preliminary overview for how DOE plans to execute the Regional Clean Hydrogen Hubs (H2Hubs) provision under the Bipartisan Infrastructure Law (BIL). The language in the NOI does not restrict eligibility to a specific entity type or governance model. Per the NOI, DOE anticipates issuing a Regional Clean Hydrogen Hubs Funding Opportunity Announcement (FOA) in fall 2022. The FOA, when issued, will specify eligibility requirements.

Q2. Is there a preferred method for distribution of funds to project leads, i.e. would DOE prefer to reimburse funds to the applying entity who then reimburses to the project leads – or would DOE consider passing funds directly to project leads?

A2. Per the NOI, DOE anticipates providing awards to Regional Clean Hydrogen Hub teams that are led by a single entity and may include numerous key partners or sub-recipients that will bring together diverse technologies with the ability to produce and utilize large amounts of hydrogen. DOE envisions awarding financial assistance awards in the form of cooperative agreements. Under this financial assistance award mechanism, all funding would flow through the prime applicant/recipient. The term "Recipient" is defined in 2 CFR 200.1 as "an entity, usually but not limited to non-Federal entities that receives a Federal award directly from a Federal awarding agency. The term does not include subrecipients or individuals that are beneficiaries of the award."

[14] NOI Additional Clean Hydrogen Programs, https://oced-exchange.energy.gov/Default.aspx#FoaId4e674498-618c-4f1a-9013-1a1ce56e5bd3.

Q3. Would DOE entertain a portion of funds being set up to incentivize uptake of H2 fuel cell uses? For example, large scale truck fleet conversions or maritime vessel fuel cell conversions? The concept being that increasing the demand side will also help the market develop – just as is the case with EV purchases.

A3. Section 40314(b)(2) of the Bipartisan Infrastructure Law (Public Law 117-58) specifies that the H2Hubs will demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen. The Bipartisan Infrastructure Law also requires, to the maximum extent practicable, at least one H2Hub shall demonstrate the end-use of clean hydrogen in the electric power generation sector, one in the industrial sector, one in the residential and commercial heating sector, and one in the transportation sector (42 U.S.C. 16161a(c)(3)(B)). As stated in the NOI, clean hydrogen and related technologies, such as fuel cells, can play a key role in decarbonizing many sectors, including medium- and heavy-duty transportation. The funding opportunity announcement, when issued, will include additional information about potential end-uses.

Q4. How clearly do all the projects need to be connected in supply chain? There are some on the west side of our state that are already connected but others that are not as explicitly connected but will add value to the system by increasing supply, transportation, usage and storage capacity. How clearly do we need to demonstrate that supply chain connection to higher demand / populated areas?

A4. With respect to the supply chain of hydrogen within a hub, H2Hubs will demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen (See 42 U.S.C. 16161a(b)(2)). Per the NOI, matching the scale-up of clean hydrogen production to growing regional demand will be key to achieving large-scale, commercially viable hydrogen ecosystems and avoiding stranded assets. H2Hubs can enable this pathway by locating supply and demand in close proximity.

Q5. Should applicants orient toward fewer, more capital intensive but large-scale projects – or a greater number of more modest-sized projects that are distributed more widely? Or put another way, is it preferred to have five big projects that are large scale producers/users that have significant impact OR 25 smaller projects that have smaller individual impact but are more capable of increasing market development in a broader geographic region?

A5. H2Hubs will need to demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen, but the language in the NOI does not give preference to number of

projects within a hub. To ensure regional impact and scale, DOE expects that hydrogen production technologies integrated into H2Hubs will be capable of producing impactful quantities of clean hydrogen at a minimum rate of at least 50 to 100 metric tons (MT) per day, and in-line with proposed project budget. In rare circumstances, DOE may consider smaller H2Hubs that may have geographic or other size limitations preventing them from reaching the minimum production rate, but significant justification must be provided. Each H2Hub should leverage regional resources as appropriate, including water, renewable energy, nuclear energy, and fossil fuels (particularly natural gas with carbon capture and storage). The FOA, when issued, will include additional information about these requirements.

Q6. How "shovel ready" do projects need to be?

A6. Per the NOI, DOE anticipates that H2Hubs will be implemented over four phases: Phase 1 – Detailed Project Planning; Phase 2 – Project Development, Permitting, and Financing; Phase 3 – Installation, Integration, and Construction; and Phase 4 – Ramp-Up and Sustained Operations. DOE anticipates that these phases will be executed over approximately 8-12 years, depending on the size and complexity of the H2Hub. The FOA, when issued, will include additional information about these phases and the period of performance.

Q7. How would DOE view multi state partnerships?

A7. On February 15, 2022, DOE issued a Request for Information (RFI)[15] to obtain public input on the Regional Clean Hydrogen Hubs implementation strategy. The RFI stated that a region could be defined as a city, a state, multiple states, tribal communities, or a geographic area, and requested input on how regions should be defined for the purposes of this FOA. The NOI language does not define what is considered a region or restrict hubs to a single state.

[15] RFI Regional Clean Hydrogen Hubs implementation strategy, https://oced-exchange.energy.gov/Default.aspx#FoaIdb2ae7a4e-b071-4e77-9694-dba3c9ab0333.

Specifically, as it relates EM funding for Hanford:

Q8. The State of Washington conducted an analysis to determine how much funding the Department of Energy needs in Fiscal Year 2023 to meet its legally mandated obligations and hit the milestones they are bound to by the **Tri-Party Agreement.** A compliant budget for FY23 is $3.3 Billion. The Department's budget request this year is $2.5 ($2.52) Billion. This budget is not sufficient for the Department of Energy to meet its obligations to the people of Washington, federally recognized Tribes with reserved rights, or the nation. Each year, Energy requests a budget that leaves the people of Washington, the Columbia River, and salmon at risk. And each year, Congress appropriates more than requested. This year's request does not even meet level funding for what Congress appropriated in Fiscal Years: 22', 21, '20, and '19.

Q8a. What constraints should congress be aware of that prevents DOE from requesting a compliant budget under the Tri-Party Agreement?

A8a DOE is committed to working with Congress to ensure DOE can deploy substantial resources to advance cleanup commitments at Hanford, while balancing other national security, energy and environmental priorities. A key challenge at the Hanford site is project management, where the Waste Treatment and Immobilization Plant is decades behind schedule and billions over planned costs.

This year DOE began treating Hanford tank waste for the first time ever on an industrial scale. This request builds upon that historic achievement by supporting work to begin turning tank waste into glass, while at the same time supporting ongoing risk reduction work led by the Richland Operations Office.

With decades of cleanup to go and a projected lifecycle cost in the hundreds of billions, DOE is investing significantly at Hanford each year while working collaboratively with the State of Washington and the EPA to safely achieve cleanup earlier and at a practical cost.

QUESTIONS FROM THE HONORABLE CATHY MCMORRIS RODGERS (R-WA)

Q1. The Hanford site and adjacent Pacific Northwest National Lab are true national assets in the Department's complex. For Hanford, which is conducting world-class engineering to clean up Cold War waste, there is tremendous infrastructure available for future private energy development – human capital, physical infrastructure, and a supportive community.

Q1a. What are you doing to ensure the site is implementing a long-term, strategic vision to move rapidly from clean-up to the deployment of innovative clean energy technologies, like advanced nuclear, that would thrive in the area?

A1a. The Department is committed to addressing the environmental legacy and paving the way for a vibrant future in communities like the Tri-Cities that supported national defense needs for so many decades. The Tri-Cities has served as one of our strongest partners in moving the Hanford cleanup mission forward and leading the way in key areas like scientific innovation, STEM education, and clean energy.

These areas of expertise will continue to be critical assets as our nation moves to deploy innovative energy technologies. For example, X-energy, one of two Advanced Reactor Demonstration Program (ARDP) projects being administered by the Department, plans to construct its reactor in Central Washington State. X-energy and its partners have evaluated several promising sites within the region, including one on the Hanford site, along a range of economic, environmental, and geographic factors important for advanced nuclear deployment.

DOE is committed to continuing to work collaboratively with Tribal Nations and the local community to chart a course for sustainable risk-based cleanup that sets the stage for responsible stewardship, suitable restoration, and enduring economic opportunities.

Q1b. Is this long-term strategic vision outlined in planning documents? If so, please identify them.

A1b. In March 2022, the Department issued the EM Strategic Vision: 2022–2032 to provide a concise high-level summary of the progress the Department anticipates over the coming decade. EM engaged in a concerted outreach effort with Tribes, regulators and

stakeholders that included dialogue with EM senior leadership, to inform the Strategic Vision. In parallel, EM sites routinely engage with stakeholders to solicit input and feedback on site-level cleanup plans and strategies.

The Strategic Vision outlines the coming decade of transformational progress in cleanup activities across the EM program, including initiating radioactive tank waste treatment at Hanford, as well as completing significant risk-reduction activities.

Q2. As Secretary of Energy, you have authorities under the Atomic Energy Act, the Department of Energy (DOE) Organization Act, and in recent laws enacted by Congress to take action to address immediate and long-term nuclear fuels supply vulnerabilities.

Q2a. Describe all actions the Department is taking to identify and address current and potential nuclear fuel supply disruptions, including, but not limited to, implementation of recommendations of the U.S. Nuclear Fuels Working Group's 2020 report and contingency planning to address short-term shortages and capacity gaps caused by loss of access to Russian-sourced nuclear fuels.

A2a. The Department shares your concern about nuclear fuel availability. Without expansion of the domestic fuel cycle capacity, the U.S. cannot securely support the low enriched uranium (LEU) needs of today's reactor fleet or make high-assay LEU (HALEU) available for advanced reactors, research reactors, and medical isotope production. The Secretary has established a Tiger Team to develop a strategy for uranium supply chain needs to meet both industry and Government demands. Prior to Russia's invasion of Ukraine, the Department was already working to address HALEU needs. The National Nuclear Security Administration (NNSA) is working with the DOE Office of Nuclear Energy to implement a domestic uranium reserve. The Department recently issued a request for proposals (RFP) for a competitively awarded cost share procurement to complete construction of and operate the centrifuge cascade at Piketon, Ohio, with options periods to continue to operate the cascade subject to appropriations. The President's Fiscal Year 2023 budget request proposes to make available small quantities of HALEU from limited DOE inventories, to continue to operate the cascade at Piketon to produce limited quantities of HALEU and support the private sector in its design and establishment of commercial U.S. HALEU production and supply chain capability in the long term.

DOE created the American Assured Fuel Supply (AAFS), a reserve of LEU, to serve as a backup supply of LEU available to foreign end-users to be supplied through U.S. persons, or to domestic recipients, in the event of a supply disruption in the nuclear fuel market. This reserve of LEU as a backup supply supports DOE's nuclear nonproliferation and civil nuclear energy objectives. As described in the Federal Register notice published on December 2, 2013 (78 FR 72071), utilities must submit an application to request LEU from the AAFS, and the Secretary of Energy approves withdrawal from the AAFS at the recommendation of the AAFS Committee, which consists of DOE and NNSA offices. The first 40 MT is available for delivery within 30 days of a written DOE request. DOE may request a second 40 MT within the 90-day restocking period. Proceeds from AAFS sales are paid to the Department of Treasury. Currently, no mechanism exists to resupply the AAFS once all the material is withdrawn.

Q2b. Provide current Energy Information Administration (EIA) data and your assessment of the domestic market for enriched fuels and potential gaps if Russian-sourced supplies cease or are curtailed. Include in this assessment the total domestic demand, Russian-sourced supply, domestic production capacity, commercial inventories, U.S. government inventories, and any other appropriate information and market considerations to provide a full picture of the domestic supplies, domestic capacity, and the potential gaps and economic impacts.

A2b. From EIA's *2021 Uranium Marketing Annual Report* (May 2022), the total amount of enriched uranium purchases in 2021 for the United States was 14,217,000 separative work units (SWUs). Of that, 2,736,000 SWUs were from U.S. sources, and 3,953,000 SWUs were from Russia. The Secretary of Energy has established a Tiger Team to develop a potential strategy for uranium supply chain needs to meet both industry and Government demands.

Q2c. Provide a list of authorities and budget and other resources, including uranium resources, at the Department's disposal to support planning to respond to any supply disruptions and assist the long-term development of private, domestic fuel cycle infrastructure.

A2c. Section 102 of the Department of Energy Organization Act broadly gives the Department of Energy (DOE) the authority to prepare for and mitigate against supply disruptions. Specifically, it states that the purposes of the Act, among others, are to "provide for a

mechanism through which a coordinated national energy policy can be formulated and implemented to deal with the short-, mid- and long-term energy problems of the Nation; and to develop plans and programs for dealing with domestic energy production and import shortages;" "facilitate establishment of an effective strategy for distributing and allocating fuels in periods of short supply and to provide for the administration of a national energy supply reserve;" and "promote the interests of consumers through the provision of an adequate and reliable supply of energy at the lowest reasonable cost." 42 U.S.C. § 7112(3), (8)-(9). Section 1014(a) of the Energy Policy Act of 1992 gives the Secretary "a continuing responsibility for the domestic uranium industry to encourage the use of domestic uranium." 42 U.S.C. § 2296b-3(a). Finally, section 2007 of the Energy Act of 2020 amended section 3112A of the USEC Privatization Act to clarify that it is the "policy of the United States. . .(2) to reduce reliance on uranium imports in order to protect essential national security interests; (3) to revive and strengthen the supply chain for nuclear fuel produced and used in the United States; [and] (4) to expand production of nuclear fuel in the United States." 42 U.S.C. § 2297h-10a(b).

The Atomic Energy Act of 1954, as amended (AEA), provides broad authority to DOE to acquire and distribute special nuclear material (SNM).[16] Specifically, section 55 authorizes DOE "to purchase. . .and to take, requisition, condemn, or otherwise acquire any special nuclear material or any interest therein." 42 U.S.C. § 2075. Section 161(u) of the AEA also provides DOE the authority to enter into contracts "for the purchase or acquisition of reactor services or services related to or required by the operation of reactors," or for "the purchase or acquisition of any supplies, equipment, materials, or services required by" DOE. 42 U.S.C. § 2201(u). Section 53 of the AEA gives DOE specific authority to "distribute" SNM domestically for various research and development activities, for use under a commercial license for a utilization or production facility, or "for such other uses as [DOE] determines to be appropriate to carry out the purposes of [the AEA]." 42 U.S.C. § 2073(a)(iii). Section 53 further specifies that DOE may only

[16] Section 11(aa) defines SNM as: "(1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which [DOE]. . .determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material." 42 U.S.C. § 2014(aa). Because low-enriched uranium (LEU) and high-assay LEU (HALEU) are "uranium enriched. . .in the isotope 235," they are SNM.

distribute SNM by sale. 42 U.S.C. § 2073(c)(1). Such sale is also subject to the applicable requirements of Section 3112 of the USEC Privatization Act. 42 U.S.C. § 2297h-10. One exception to this requirement falls under section 2001 of the Energy Act of 2020, which exempts the provision of HALEU under that section from compliance with most of the requirements of section 3112. 42 U.S.C. § 16281(a)(3)(A)-(B). Finally, section 54 of the AEA permits DOE to "cooperate with any nation or group of nations by distributing special nuclear material and to distribute such special nuclear material, pursuant to the terms of an agreement for cooperation to which such nation or group of nations is a party and which is made in accordance with [Section 123]" of the Act. 42 U.S.C. § 2074(a).

Additionally, section 2001(a)(1) of the Energy Act of 2020 provides specific authority to "establish and carry out. . .a program to support the availability of HA–LEU for civilian domestic research, development, demonstration, and commercial use." 42 U.S.C. § 16281(a)(1).

In terms of budget, NE was appropriated $45 million in Fiscal Year 2022 and has requested $95 million in Fiscal Year 2023 for the HALEU Availability Program.

The AAFS and Uranium Reserve, as currently constituted, are addressed in responses 2d and 2e.

Q2d. Describe the status of the Department's implementation of the American Assured Fuel Supply. Do you believe the Department needs additional approval from Congress to use, replenish, or expand the American Assured Fuel Supply?

A2d. The American Assured Fuel Supply (AAFS) is operational and available as intended. The Department has broad authority to acquire and distribute special nuclear material subject to compliance with the USEC Privatization Act to support our domestic nuclear reactor fleet or our 123 Agreement partners in the event of a supply disruption. Pursuant to the original appropriations for the AAFS the Department has the authority to make distributions of special nuclear material from the AAFS subject to compliance with the USEC Privatization Act, however that authority did not allow the Department to replenish or expand the AAFS with proceeds from the distribution of the AAFS

materials. Further authority would be required to re-invest the AAFS proceeds, and further appropriations would be required to expand the AAFS.

Q2e. Describe the status of the Department's implementation of a domestic uranium reserve and revitalization of domestic uranium conversion services.

A2e. The Department of Energy, through the National Nuclear Security Administration and DOE's Office of Nuclear Energy, is working to establish a uranium reserve. In August 2021, NNSA issued a Request for Information (RFI) to solicit stakeholder input. In January 2022, NNSA posted a summary of the over 26,000 submissions received in response to the RFI. On June 30, 2022, the Department issued a Request for Proposal (RFP) for domestic uranium. Concurrently, the Department issued a Notice of Intent (NOI) for a sole source procurement of conversion services from ConverDyn, the only U.S. uranium conversion facility. Proposals have been received for domestic uranium, and the RFP for conversion services was issued to ConverDyn on September 8, 2022. In response to the RFP for domestic uranium, the Department intends to make awards as soon as possible and complete the contracts by the end of CY2022.

Q2f. Describe the status of the Department's implementation of section 2001 of the Energy Act of 2020, including efforts, given current events, to accelerate implementation of the program.

A2f. The Department is in the early stages of implementing the HALEU Availability Program that was authorized by Congress in the Energy Act of 2020. Subject to appropriations, the Department will work to make available small quantities of HALEU from limited DOE uranium inventories in coordination with the National Nuclear Security Administration (NNSA) and leverage HALEU enrichment capability at Piketon, Ohio, in the short term, and work with the private sector to build out commercial U.S. HALEU production and supply chain capability for the long term.

The Administration requested $95 million for the Program in FY 2023. This is $50 million more than DOE received in FY 2022, the first year of Program funding. With that increase, the Department would anticipate: (1) initiating the recovery and down-blending of limited quantities of DOE non-defense uranium inventories, (2) supporting the

continued operation of the HALEU enrichment facility in Piketon, Ohio, and (3) addressing critical near-term supporting elements of the Program, such as cost-effective HALEU transportation and processing the HALEU to the various fuel forms needed. In addition, the National Nuclear Security Administration requested $51 million in the FY 2023 Budget Request to make HALEU scrap material available for advanced reactors while reducing NNSA's material and safety risk at Y-12.

Q3. On May 5, 2020, DOE announced a long-term replenishment plan for the Strategic Petroleum Reserve (SPR). The announcement stated that the buyback process will begin with a call for bids to repurchase a third of the 180 million barrels released as part of President Biden's mitigate the adverse political effects of record high gasoline prices. As part of the buyback plan, DOE announced it would modify its regulations to allow for a competitive, fixed-price bid process as an alternative to the index-pricing that is traditionally used.

Q3a. Will the intended rulemaking process be complete before the planned solicitation in the Fall of 2022?

A3a. Yes, the intended rulemaking is expected to be completed ahead of the planned solicitation this fall to begin replenishing the SPR.

Q3b. DOE's buyback plan announcement references 180 million barrels; however, the current plan includes selling 190 million barrels under emergency authorities. Is it DOE's intent to purchase 190 million barrels to replenish the reserve?

A3b. It is DOE's intention to ensure we have a robust SPR that can respond to emergencies when called upon. How much will ultimately be purchased may depend on various factors, including the methods used to replenish the SPR.

Q3c. Does DOE believe it has the authority to issue a regulation that allows for fixed-price bids without explicit congressional authorization? If so, please explain.

A3c. Yes. DOE believes it has the authority to issue a regulation that allows for fixed-price bids when conducting petroleum acquisition for the Strategic Petroleum Reserve (SPR). Section 159(f) of the Energy Policy and Conservation Act (EPCA) grants broad powers to the Secretary of Energy to develop, operate, and maintain the SPR. Section 159(f) specifically authorizes the Secretary to issue regulations.

All acquisitions of petroleum products for the SPR are subject to the provisions in Section 160 of EPCA, which lists objectives for any such acquisition and its associated procedures.

DOE believes that updating its acquisition regulations in Part 626 to allow the option to use fixed-price bidding—as an addition to the price index historically used—is in alignment with the objectives listed in EPCA Section 160.

Q3d. As you know, there are several congressionally mandated sales that are required. Between fiscal year 2023 and 2027, 173 million additional barrels are scheduled to be sold. Has DOE considered re-programming sales proceeds from the emergency sales to pay for the planned mandatory sales?

A3d. Yes, DOE has considered using upcoming congressionally mandated sales as an opportunity to replenish the SPR, but legislative action will be required. For example, one possibility is to legislatively change the timing of mandatory sales from within specific given years to simply "by the end of" the last in the range of those same given years. This would increase flexibility for DOE in planning for sales in future years. Alternatively, a legislative change allowing DOE to transfer emergency drawdown proceeds in the SPR Petroleum Account to the General Treasury in lieu of conducting congressionally mandated sales would serve multiple purposes. First, it would keep the SPR from releasing and receiving barrels at the same time, which physically cannot be accomplished at a given SPR storage site. Additionally, it would reduce the wear and tear on the caverns by reducing the number of times they are used, which ultimately reduces the cost of maintaining the SPR.

Q3e. During the hearing you committed to providing the Committee a written plan for replenishing the SPR, please include that plan here.

A3e. It is still premature to provide a written plan for replenishing the SPR, as we are still considering the full scope of options that maintain the long-term integrity of this energy security tool. I promise to provide the plan within 30 days of our finalizing it.

Q4. List all proposed rules and rules under development by the Environmental Protection Agency for which DOE has provided technical assistance or comment relating to the impact on electricity generating units and electric reliability or resilience.

A4. The Department of Energy reviews significant proposed and final rules of other Federal agencies, including the Environmental Protection Agency, through the interagency review process. For all significant proposed and final rules, Executive Order 12866 requires OIRA review before the actions take effect and assigns OIRA the responsibility of coordinating interagency Executive Branch review of significant regulations before publication. Through that review process, the Department of Energy has the opportunity to provide comment on any rules sent to the Department for interagency review.

Q5. You recently announced the beginning of DOE's implementation of the Transmission Facilitation Program, authorized recently by Congress. Please explain what:

Q5a. DOE interprets as its authorities relating to anchor tenant relationships in transmission in new infrastructure,

A5a. Under the Transmission Facilitation Program (TFP), DOE may purchase transmission capacity from an eligible project for a term of not more than 40 years and for not more than 50 percent of the total proposed transmission capacity of an eligible project, as provided for in 42 U.S.C §181713(f)(3). DOE anticipates that it will seek to enter into capacity contracts with shorter terms and for lower amounts of capacity where possible, consistent with the intent of the authorizing legislation.

Q5b. Its plans to implement those provisions, and;

A5b. DOE issued a Notice of Intent and Request for Information on Transmission Facilitation Program on May 12, 2022. 87 FR 29142 (May 12, 2022)[17] (NOI/RFI). Reflecting public comment on the NOI/RFI, DOE is currently drafting a Request for Proposal (RFP) for projects to participate in the capacity contract vehicle under the TFP. DOE will evaluate and select projects to be awarded a capacity contract by the TFP program based on the proposals received from potential transmission project developers in response to the RFP and in accordance with the requirements established by the authorizing legislation.

Q5c. Its assessment of the impacts of the transmission facilitation program on State Integrated Resource planning, incumbent baseload and fuel secure electricity generation, and what will be necessary to assure retail rates are not increased as a result of increased

[17] https://www.govinfo.gov/content/pkg/FR-2022-05-12/pdf/2022-10137.pdf

transmission charges and increased intermittent generation sources delivered over DOE subsidized transmission.

A5c. As required by statute, in implementing the TFP program, DOE will prioritize projects that, among other objectives, will improve the resiliency and reliability of an electric power transmission system and will facilitate interregional transfer capacity that supports strong and equitable economic growth. In addition, DOE will consult with the relevant transmission planning regions to minimize, to the extent possible, duplication or conflict with the transmission planning region's needs determination and selection of projects that meet such needs. In sum, a project that is supported by the TFP program should be consistent with and complementary to the State Integrated Resource planning and rate setting process and contribute to a resilient, reliable, and cost effective electric grid.

Q6. List all DOE rulemakings and other policy decisions proposed or promulgated since January 2021 that have used Social Cost of Greenhouse Gas Estimates, including Interim Estimates pursuant to E.O. 13990.

A6. DOE has not factored the social cost of greenhouse gas emissions—including the Interim Estimates—into its determination of whether the relevant statutory standards are met in its rulemakings. DOE only uses the interim estimates for the social cost of greenhouse gases issued under Executive Order 13990 (Interim Estimates) for the purpose of informing the cost-benefit analyses required by Executive Order 12866.

Q7. Do you support declaring a public health emergency in connection to Climate Change risks? And, why or why not?

A7. The Department of Energy has no authority to declare a public health emergency. The Secretary of the Department of Health and Human Services (HHS) is responsible for declaring public health emergencies. In the event that a public health emergency were declared related to climate change, the Department of Energy would respond as appropriate.

QUESTIONS FROM THE HONORABLE MICHAEL BURGESS, M.D. (R-TX)

**Nuclear**

Q1. In your written testimony, you express the Departments request of $1.675 billion for the Office of Nuclear Energy but more specifically, to support nuclear energy related research and development activities. While I am supportive of research development activities, many companies in the US have moved beyond that point.

Q1a. What is the Department doing about the nuclear technologies that we can build and deploy by 2023?

A1a. The Department of Energy (DOE) is working aggressively to accelerate the timeline for the development and demonstration of domestic nuclear technology. Through the Advanced Reactor Demonstration Program (ARDP), DOE is supporting two United States (U.S.)-designed advanced reactor demonstrations that are on schedule to be licensed, built, and operated in the 2028 timeframe to meet goals established by Congress. It should be noted that these projects have been managed under the new DOE Office of Clean Energy Demonstrations since mid-2022, where they are being managed to the same schedules while maintaining the support of the Office of Nuclear Energy (NE) and gaining the benefit of additional funding certainty through the Bipartisan Infrastructure Law. NE is also supporting the NuScale First-of-a-Kind Demonstration Readiness Project, which supports the reduction of first-mover's risk to deploy a domestic light water small modular reactor (SMR) by cost-sharing site-specific characterization, licensing, and planning efforts needed to demonstrate a NuScale SMR. Further, NE's ARDP Risk Reduction projects and the Advanced Reactor Concepts – 20 (ARC-20) projects are supporting activities to resolve technical, operational, and regulatory challenges to enable potential future demonstration of a diverse set of advanced reactor designs with demonstration horizons about 5-15 years beyond the initial ARDP projects. Additionally, NE is working to establish the Microreactor Applications, Research, Validation, and Evaluation (MARVEL) nuclear test bed at the Idaho National Laboratory (INL). MARVEL will serve as a unique nuclear test platform to demonstrate microreactor operations and end-use applications. NE has also been supporting the Department of Defense (DoD) since 2018 on DoD's development of microreactor technologies. DoD plans to demonstrate a mobile microreactor at the INL by the mid-2020's.

Through the combination of these projects, the U.S. is poised to demonstrate advanced reactors on a timeline that maximizes the impact of U.S. designs on future energy markets, both domestically and globally.

However, first-of-a-kind technical, financial, and licensing risks must be overcome to enable broad commercial deployment of advanced nuclear reactors. NE is speeding deployment by continuing to support research and development with universities, National Laboratories, and industrial partners toward additional innovation across a myriad of reactor classes. Additionally, NE's Advanced Reactor Regulatory Development program is coordinating with the Nuclear Regulatory Commission (NRC) and industry to address and resolve key regulatory framework issues that directly impact the "critical path" to advanced reactor demonstration and deployment.

Q1b. Will you commit to working with me and my office to reform the Nuclear Regulatory Commission's funding structure to increase permitting capacity of clean nuclear energy?

A1b. DOE suggests this question be directed directly to the Nuclear Regulatory Commission which is an independent regulatory agency.

Q2. This past December, the Administration issued Executive Order 14057, which requires agencies to use their scale and procurement power to achieve 100 percent carbon pollution free electricity on a net annual basis by 2030.

Q2a. Is it possible to reach these carbon reduction goals without the 24/7 carbon-free electricity provided by nuclear power?

A2a. No, we cannot achieve our carbon reduction goals without nuclear energy. Nuclear power currently provides half of U.S. clean electricity and is an essential component to our carbon reduction goals, particularly achieving 100 percent carbon pollution free electricity on a net annual basis by 2030. Nuclear energy can provide clean, safe, reliable power alongside renewables and energy storage to help achieve national carbon reduction goals.

Q2b. Are there other countries moving forward more quickly with Small Modular Reactors (SMR) technology than the United States?

A2b. Many countries, including the United States, are working aggressively to develop and deploy advanced Small Modular Reactor (SMR) technologies in support of their future energy needs and climate goals. The timelines for deployment, for each country, are based on a number of factors, including country-specific policies, finances, and future energy needs. The United States Government is working with its international partners to encourage them to consider United States technologies for their future nuclear deployments.

Q2c. What is happening in these other countries that is allowing them to beat us to punch?

A2c. Small Modular Reactor (SMR) developers, both domestically and abroad, have aggressive timelines for the deployment of SMR technologies. These timelines are based on planning assumptions that have the potential to affect the ultimate amount of time required to deploy each technology. The largest of these assumptions is the availability of resources, including government funding, to support the development and deployment of nuclear technologies. Many other countries have state-backed programs providing significant resources, including infrastructure development and project financing, that can greatly reduce the risk and time required to achieve design and deployment of SMRs.

Q2d. What is your understanding of what is at stake for the U.S., particularly in terms of supply chain opportunities, by not being the first to deploy this technology?

A2d. The consequences of Small Modular Reactors (SMRs) and other advanced reactor technologies being deployed internationally vary based on whether the technology being deployed is a domestic U.S. technology or one developed by another country. If it is a U.S. domestic technology being deployed internationally, the United States will gain economic advantages, market share, and nuclear energy leadership.

If the technology deployed is owned by another country, the United States will not only lose that economic advantage, but may also lose some nuclear energy leadership and influence necessary to ensure that the technologies deployed around the world will meet the highest safety and nonproliferation standards for nuclear power.

The Department continues to work with our international partners, in collaboration with our interagency partners, to encourage them to consider United States technologies for their

international deployments. For example, this outreach has led to an agreement on SMR development with Romania announced in November 2021 and $14 million from the U.S. Government for a Front-End Engineering and Design (FEED) study for SMRs in Romania announced in June 2022 under the Partnership for Global Infrastructure and Investment (GPII).

Q3. The Tennessee Valley Authority recently announced a partnership with Ontario Power Generation (OPG) to allow the two entities to explore efficiencies and optimization relative to SMR standard design, construction, operation, licensing, and project management. The Canadian and Ontario governments have provided significant support for OPG's Darlington SMR project, and OPG has a target date for the first Darlington SMR to be operating as early as 2028. Acting as a first mover of SMR technology is a significant global leadership opportunity for Ontario and Canada.

Q3a. Are there any opportunities for DOE to learn from what the Canadian government is doing in this case and apply the lBiscardis learned to its approach to SMR deployment in the United States?

A3a. Small Modular Reactor (SMR) developers, both domestically and abroad, are establishing aggressive timelines for the deployment of SMR technologies. As an example, Canada has developed an SMR Action Plan for the development, demonstration, and deployment of SMRs for multiple applications both within Canada and abroad. Canada's SMR Action Plan brings together essential enabling partners, including the federal government, provinces and territories, Indigenous Peoples and communities, power utilities, industry, innovators, laboratories, academia, and civil society, and describes the concrete set of actions they are taking to enable SMR deployment. Additionally, Ontario Power Generation (OPG) announced their partnership with GE-Hitachi (GEH) to deploy the BWRX-300 at their Darlington site and, more recently, the Tennessee Valley Authority (TVA) announced it also entered into an agreement with GEH to explore deploying the same reactor technology at their Clinch River site in Tennessee.

Overall deployment timelines are based on planning assumptions, which have the potential to affect the ultimate amount of time required to deploy each technology. The largest of these assumptions is the availability of resources, including government funding, to support the development and deployment of nuclear technologies.

It is important for the United States to secure a significant portion of the international market for advanced reactors and SMRs. This will support the development of the domestic supply chain and significant U.S. jobs. First deployment in the United States of these new reactors may increase the likelihood that U.S. companies are able to sell and export the designs to the international marketplace. Some U.S. developers may succeed in deploying their new designs initially outside the United States in locations such as Romania and Canada. While domestic deployment can be an important milestone, other countries may have more accelerated timelines than the United States to meet their energy needs and climate goals. Both scenarios will have positive economic impacts in the United States and help bolster U.S. market share abroad.

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

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

**SPR**

Q4. Madam Secretary, the Biden administration also announced the largest release from the Strategic Petroleum Reserve in history, 1 million additional barrels per day for the next six months, a total of over 180 million barrels.

Q4a. How is this decision helping the American people during the current energy crisis?

A4a. As stated in an SPR Fact Sheet released by the White House on July 26, with these releases, the President has executed a drawdown of unprecedented size and scope to respond to the global energy supply disruptions posed by Russia's further invasion of Ukraine, and his actions are having an impact. It is, as one leading analyst noted at the time of announcement, "hard to overstate the scale of this intervention."

And those actions have accomplished the goal of avoiding physical supply failures and additionally helped to mitigate the Putin price hike. In fact, the Department of the Treasury estimates that as a result of these drawdowns both domestically and internationally, the price at the pump for Americans is up to 40 cents per gallon lower than it otherwise would have been.

Q4b. Will you commit to refilling the Strategic Petroleum Reserve?

A4b. Yes, I will commit to replenishing the SPR to ensure we have a robust SPR able to respond to emergencies when called upon, provided sufficient resources are made available.

Q4c. Why did we not fill the Strategic Petroleum Reserve in the beginning of 2020 when the price of oil was at the lowest we have seen in recent memory?

A4c. The SPR did not have sufficient funds in the SPR Petroleum Account at that time to partially refill the reserve by purchasing barrels. However, the SPR did complete a first ever Exchange for Storage Program where the SPR received barrels from U.S. oil producers that did not otherwise have an outlet, and then returned the barrels once prices returned to more typical levels, minus a small amount of barrels retained by the SPR to cover the cost of storage.

**Carbon Capture**

Q5. Carbon capture, utilization, and sequestration technologies are poised to play a critical role in creating and maintaining jobs as the U.S. transitions to a lower carbon economy.

Q5a. Can you commit to ensuring that the Departments carbon management programs direct pilot and demonstration funding toward the carbon capture and storage technologies that show the greatest promise for lowering costs, thereby enabling more deployment of these technologies and ultimately more CO2 being captured?

A5a. Yes, the Department is committed to issuing competitive funding opportunity announcements for applicants to compete for funding and ensure taxpayer funding goes to projects with the greatest likelihood of success. Cost is just one of several factors to consider when funding carbon capture and storage pilot and demonstration projects. Supply chain accessibility for components (which can differ based on the type of capture technology), carbon storage site permitting and accessibility, project financing, and community engagement and support are also important factors to consider when selecting projects.

Q6. Texas is leading the way in carbon conversion technologies. There are several innovative companies headquartered in my state that have the technology to convert captured CO2 into valuable products, such as industrial petrochemicals and carbon-neutral liquid fuels. These are products that Americans will rely on for many decades to come, which can be made in a more sustainable way by using captured CO2 as a feedstock.

Q6a. Will you commit to support the innovators finding new ways to utilize carbon dioxide by converting it into value-added products?

A6a. The Office of Fossil Energy and Carbon Management's Carbon Dioxide Conversion program supports innovative technologies that convert carbon dioxide ($CO_2$) into valuable products, such as fuels and chemicals. The FY 2023 Budget Request includes $50 million for Carbon Dioxide Conversion to complement the $310 million provided by the Infrastructure Investment and Jobs Act (of which $65.25 million is provided for FY 23). Together, this funding will support continued investments in these technologies.

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

Q1. In DOE's budget materials, it highlighted that at EERE the Emerging Technologies office will move some programs out of it and into other DOE programs. For example, the budget materials mention moving the solid-state lighting program. Specifically it says, "BTO has transitioned those investments into other BTO subprograms". Congress just provided up to $40 million in FY22 for the program and DOE did not make the Committee aware of the desire to move the program.

Q1a. Madam Secretary, can you tell me where in DOE the solid-state lighting program has moved and what are now the goals of the program? Just last year, the Department was touting the program which if successful in its goals, could save 78 quads of energy, equivalent to $890 billion in avoided energy costs and 5.9 billion tons of avoided CO2 emissions. At a time of increased costs for Americans, it worries me that DOE has moved a successful program that could lead to lower costs for consumers.

A1a. DOE's Building Technologies Office, Emerging Technologies (ET) Program, utilized appropriated resources to significantly improve the performance and reduce the cost of solid state lighting (SSL) which has and will continue to have long term benefits for the U.S. For most lighting applications, excellent SSL solutions are now available due to these investments. While there are some niche applications with technology gaps that can benefit from continued ET funding for innovation, the larger need is to help in deployment and market uptake of innovative SSL technologies. This will be handled primarily through the Commercial Buildings Integration program, with some work in the Residential Integration Program, after transferring a significant portion of responsibility for SSL advancement from Emerging Technologies. We will continue our strong commitment to the success of SSL technology with the appropriated funds.

Within the ET R&D program, an ongoing market opportunity is improving whole lighting systems including controls (versus individual SSL "bulbs"), which is a separate subcategory of work in BTO. The success of BTO's investments in Solid State lighting have already resulted in substantially driving down lighting energy use in buildings, in many cases to less than 3% of a home's energy use. The residential and commercial buildings integration programs will work to scale many market lighting applications that have the technical solution but just lack sufficient customer knowledge, and

demonstrations of how well they work in all the disparate U.S. building types and applications.

The goals around this refocused effort are to help achieve greater and faster deployment of innovative SSL technologies into the market. This renewed focus on SSL into Residential and Commercial programs was reflected in our comments on the transition of work.

Q2. Last year, Congress passed, and the President signed into law, two bills that I have worked on with my colleague, the gentleman from California Mr. McNerney, that would establish a Cyber Sense Program and also facilitate and encourage public-private partnerships to address and mitigate physical and cybersecurity risk of electric utilities. In DOE's budget request, the Department is asking for $125 million to fund Risk Management Tools & Technologies within the CESER Office.

Q2a. If Congress approves this appropriations level, will you commit to using the funding to swiftly implement the Cyber Sense Program and provide my office with an update on the progress of implementation?

A2a. The U.S. Department of Energy's (DOE) Office of Cybersecurity, Energy Security, and Emergency Response (CESER) has made supply chain security and risk management one of its priority focus areas. Section 40122 of the Infrastructure Investment and Jobs Act (IIJA) directed the establishment of the Energy Cyber Sense program, but the legislation did not provide funding to implement the provision. However, DOE recognizes the importance of the provision and plans to start implementing it using funding in CESER's FY23 Risk Management Tools & Technologies budget request, subject to congressional appropriations. CESER will gladly provide updates on the implementation of the Energy Cyber Sense program.

Q3. During the hearing, you expressed concern about the investigation being conducted by the Department of Commerce on solar panels imports from China and Asia and the impact of that adjudication on meeting the Administration's climate goals.

Q3a. What is the basis of your concerns?

A3a. Prior to the 24-month bridge provided by the President in June, the unavailability of solar PV cells and modules started to cause serious harm to the U.S. economy and climate goals, threatening 12 to 15 gigawatts of near-term solar deployment and putting more

than 50,000 jobs at risk. In addition, and in combination with other factors, it caused challenges in maintaining a low-cost and reliable electricity supply. The 24-month bridge is a temporary emergency action to give the domestic solar industry an ability to import certain solar equipment free of duties for the period of time it will take to build domestic solar supply chains here at home. The bridge does not impact the important investigation currently being undertaken by the Department of Commerce on whether there is circumvention of anti-dumping and countervailing duties.

Q3b. Why should ratepayers strengthen China or Chinese-affiliated companies in Asia at the expense of domestic manufacturers?

A3b. Domestic manufacturers have capacity to supply roughly one-quarter of our demand for solar panels, and it takes one to four years to build new manufacturing capacity in the United States[18]. It is critical that we scale up domestic manufacturing and support ethical supply chains while continuing to deploy enough solar energy to meet the President's ambitious decarbonization goals and to support a low-cost and reliable electricity supply.

Solar manufacturers may be eligible to receive capital support through new Bipartisan Infrastructure Law programs, such as the Advanced Energy Manufacturing and Recycling Grant Program. However, ongoing support to offset the higher cost of domestic manufacturing can also help. Refundable manufacturing production tax credits such as those included in the Inflation Reduction Act are one mechanism that should offset those costs and enable significant growth of domestic solar manufacturing.

[18] https://www.energy.gov/sites/default/files/2022-02/Solar Energy Supply Chain Report - Final.pdf

QUESTIONS FROM THE HONORABLE DAVID B. MCKINLEY (R-WV)

**Carbon Capture**

Q1. The Intergovernmental Panel on Climate Change's (IPCC) recently concluded that achieving net-zero emissions would be "virtually impossible" without carbon capture, utilization, and storage (CCUS) technologies, and the U.S. Department of Energy (DOE) plays a critical role in supporting the development, deployment, and commercialization of CCUS technologies. As technologies advance towards commercialization, funding and research support is critical, including the support provided for in the Infrastructure Investment and Jobs Act (IIJA).

Q1a. What is DOE's role in making sure that CCUS technologies continue to reduce emissions across all sectors of the U.S. economy?

A1a. The Department of Energy (DOE) plays a critical role in supporting the development, deployment, and commercialization of carbon capture, utilization, and storage (CCUS) technologies. The Department's role is to implement CCUS research, development, demonstration, and deployment programs, including the historic funding for CCUS in the Infrastructure Investment and Jobs Act (IIJA). DOE also supports interagency efforts to develop the policy, legal and regulatory framework for CCUS, including providing technical support to the Department of Treasury on Section 45Q tax credit and the Environmental Protection Agency on Class VI permitting, as well as efforts under way to implement the Utilizing Significant Emissions with Innovative Technologies (USE IT) Act.

Q2. Will you ensure that emerging technologies like carbon capture receive the adequate funding necessary to advance towards commercialization, particularly when compared to technologies that are already well-established in the market?

A2. The Department has prioritized carbon management technologies, and in particular carbon capture, in the Office of Fossil Energy and Carbon Management (FECM) budget request. The FY 2023 Budget Request includes $162.9 million for point source carbon capture, which was the largest budget control point item in FECM's request. Additionally, the Department is implementing an additional $3.5 billion for carbon capture and storage demonstration and large pilot projects as part of the Bipartisan Infrastructure Law.

Q3. What steps do you think DOE can take to advance the use of CCUS technologies in the power sector to reduce emissions while also ensuring that electricity is reliable and affordable?

A3. The Department of Energy maintains information related to the cost, performance, and modeling of carbon capture, utilization, and storage (CCUS), and has been involved in the Grid Modernization Initiative, with the goal of coordinating research and development for enabling a reliable, affordable future electricity system.

CCUS can support cleaner, dispatchable, firm power generation, which can contribute to the reliability and stability of the electricity grid. Work by the Office of Fossil Energy and Carbon Management on developing modeling representation of such technologies will help system modelers and planners integrate CCUS as part of a reliable stable grid into the future.

Q4. What role will the IIJA funding play in the commercialization of CCUS technologies?

A4. Infrastructure Investment and Jobs Act funding plays an important role in commercialization of carbon capture, utilization, and storage (CCUS) technologies. The $2.5 billion in CCUS demonstration funding will help expand the deployment of technologies in the power and industrial sectors. The nearly $1 billion in large-scale carbon capture pilot funding will help advance lower cost technologies. The $2.5 billion in carbon storage validation and testing funding will expand the number of geological storage sites that can be available. Additionally, the $2.1 billion available for loans and grants for carbon dioxide ($CO_2$) transport and infrastructure will help develop the necessary infrastructure to connect $CO_2$ sources and storage sites. Finally, the $310 million for carbon utilization will help advance the technology and provide opportunities to build interest on the demand side for $CO_2$-derived products through the grant program.

Q5. Will you commit to fully supporting the carbon capture demonstration and pilot project programs funded by the IIJA?

A5. Yes. To fully support these efforts, the Department of Energy (DOE) established the Office of Clean Energy Demonstrations (OCED) in December 2021 with the mission to deliver clean energy demonstration projects funded by the Infrastructure Investment and

Jobs Act (IIJA) in partnership with the private sector. OCED established both the Carbon Capture Demonstration Projects Program and Carbon Capture Large Scale Projects Program to demonstrate transformational carbon capture technologies at scale that will improve their efficiency, effectiveness, costs, emissions reductions, and environmental performance. OCED in collaboration with the Office of Fossil Energy and Carbon Management intends to issue two separate funding opportunity announcements to support these efforts by the end of calendar year 2022.

Q6. Section 10633 of the House-passed America COMPETES Act directs DOE to a demonstration project management program to conduct independent oversight of the execution of demonstration projects.

Q6a. If this provision becomes law, and DOE cancels a demonstration project, will that funding be redistributed to a demonstration project using the same fuel source and technology?

A6a. Across all demonstration program provisions, the DOE will strive to actively manage all awards to achieve project milestones that are negotiated on a project-by-project basis to produce the best possible balance between project outcomes and DOE risk exposure. Throughout the lifecycle of a project, DOE will review and evaluate progress and deliverables of a given project. In the event a project does not meet the requirements of a provision or solicitation, DOE will review how and in what manner to reevaluate the use of those funds for more appropriate purposes, including within the same demonstration provision.

Q7. If this provision becomes law, will you confirm that DOE will adhere to Congressional intent when redistributing funding?

A7. In general, any obligation of de-obligated funds from a previously terminated project will be consistent with requirements set out by Congress in law.

Q8. If this provision becomes law, will DOE publish for public consumption the metrics used to evaluate its decision-making process?

A8. DOE has publicly published a high-level description of the gating process planned for use for demonstration projects and plans on providing more information concerning project management oversight in future Funding Opportunity Announcements. DOE further

plans to perform its project management oversight process with as much transparency as possible, with the exception of information that may be proprietary or otherwise protected from public disclosure.

Q9. If this provision becomes law, and DOE cancels a demonstration project, will DOE make publicly available the justification for termination?

A9. DOE cannot comment on a hypothetical project termination. DOE will maintain transparency with regard to project status and use of funds.

Q10. Given that this program is intended to conduct "independent oversight," if this provision becomes law, will you commit to hiring individuals to run the program that support an all-of-the-above energy strategy and do not hold any bias against fossil fuels?

A10. Oversight and project management of awards is the responsibility of senior officials within DOE who are career government employees and who will make decisions based on the governing legislation, regulations, and other processes developed to ensure the integrity of the selection, oversight, and, if needed, termination of the projects based on monitoring data from the projects. This includes a range of energy sources and technologies that are currently authorized for relevant financial assistance programs by Congress.

Q11. Given that this program is intended to conduct "independent oversight," if this provision becomes law, how will you ensure that the management program remains independent?

A11. Please refer to the response above.

Q12. The United States has had one of the most reliable and low-cost electricity production and delivery systems in the world but has recently experienced significant challenges in many areas of the country with electricity grid reliability and stability.

We are also hearing concerns and warnings from our electricity transmission system operators that there will be insufficient electricity during periods of peak electricity demand which may lead to increased incidences of blackouts – much of this is directly attributable to increased use of intermittent renewables. Meanwhile, the United States has abundant coal and natural gas resources that can deliver on-demand, reliable power with zero or even net-negative CO2 emissions.

Q12a. Does DOE have a funded program to convert the existing coal fleet to coal, biomass, and CCUS to deliver on-demand, reliable net-negative CO2 emission electricity, using our existing infrastructure? If no, why not?

A12a. The Department of Energy (DOE) has made significant investments in carbon capture, utilization, and storage (CCUS) research, development, and demonstration for coal-fired power generation, and is now currently focusing efforts on natural gas and industrial sources. Additionally, DOE has programs, which are investigating the repurposing of retiring fossil energy assets to other uses, such as energy storage, to ensure the electricity transmission system operates reliably. Decisions on whether the existing coal fleet should switch to other feedstocks, power generation options, or deploy CCUS technologies is best determined by industry and the various stakeholders involved in this sector.

Q13. Industrial activity is one of the hardest sectors to decarbonize and requires innovative solutions to reduce its emissions. Despite this need, DOE's spending on industrial decarbonization innovation is well behind other sectors.

Q13a. How does DOE intend to reduce decarbonize the industrial sector?

A13a. The Department of Energy (DOE) is supporting cross-cutting efforts to reduce greenhouse gases from hard-to-decarbonize industrial sectors such as iron and steel, cement, and chemical manufacturing. DOE has identified four key strategies to accelerate industrial emissions reductions in these sectors including (i) improvements in energy efficiency; (ii) deployment of industrial electrification; (iii) utilization of low-carbon fuels, feedstocks; and (iv) carbon capture, utilization, and storage. The Office of Energy Efficiency and Renewable Energy's Advanced Manufacturing Office and the Office of Fossil Energy and Carbon Management, in collaboration with the newly formed Office of Clean Energy Demonstrations, are investing in research, development, demonstration, and deployment of new technologies to accelerate decarbonization of the industrial sector.

Q14. Direct air capture (DAC) is another important energy technology.

Q14a. What is DOE doing to help deploy DAC technologies this decade?

A14a. The Department of Energy (DOE) is implementing a multi-office, crosscutting strategy to accelerate the development and deployment of Direct Air Capture (DAC) technologies and, more broadly, carbon dioxide removal (CDR) technologies. First, DOE is using the $3.5 billion in Infrastructure Investment and Jobs Act funding for DAC Hubs to accelerate deployment of DAC technologies. DOE intends to issue the funding opportunity announcement to solicit applications for the DAC Hubs provision in the fourth quarter of fiscal year 2022. Furthermore, DOE launched the Carbon Negative Shot—the U.S. Government's first major effort in CDR. The Carbon Negative Shot is an all-hands-on-deck call for innovation in CDR pathways, including DAC that will capture $CO_2$ from the atmosphere and store it at gigaton scales for less than $100 per net metric ton of $CO_2$-equivalent. To reach the Carbon Negative Shot targets, DOE is making significant investments in developing DAC materials and processes that reduce the cost of deployment, energy requirements, water and/or land use.

Q15. Will DOE commit to ensuring that it does not prioritize one energy technology over another?

A15. DOE is working to create family-sustaining jobs, support domestic manufacturing, strengthen supply chains, insulate Americans from high prices caused by global energy market disruptions, and reduce climate pollution. DOE supports a wide array of energy technologies that help achieve these national objectives.

Q16. Last year, you answered that CCUS technologies are critical to research a "zero-carbon economy" and that you support secure, long-term, regional carbon storage, which is integral to that. This Administration, however, has slow-walked the approval of primacy applications for a number of States that want to set up storage programs for carbon dioxide due to concerns such as environmental justice. While DOE does not have jurisdiction over these applications, your agency does administer the CarbonSAFE Initiative out of NETL, which compliments the work being done in States on this issue.

Q16a. Do you agree with the construction of the Safe Drinking Water Act, which governs the Class VI well program for carbon dioxide storage and recognizes the concept of cooperative federalism – that state and national governments should share power and collaborate on overlapping functions?

A16a. Both the federal government and state governments have an important role to play to ensure safe and effective carbon dioxide storage. To successfully achieve the

Department's historic carbon management goals, Class VI permits will be needed from both the Environmental Protection Agency (EPA) and state permitting agencies. The Infrastructure Investment and Jobs Act (IIJA) could support 20-40 commercial carbon management projects that could require up to 100 Class VI permits and 200 stratigraphic/monitoring wells. Collaboration between the federal government and states is crucial because permitting timelines remain critical to the success of projects.

To facilitate effective permanent sequestration, the IIJA provides grant funding for states with UIC Class VI primary enforcement authority (primacy) or to States seeking primacy. IIJA also provides additional funding for implementation of the EPA Class VI Underground Injection Control (UIC) Program. The Department recommends that further questions regarding the implementation of the Safe Drinking Water Act be directed towards EPA.

Q17. Do you agree that states are in the best position to administer Class VI well programs for the secure geologic storage of carbon dioxide, given the unique geology of each state?

A17. The Department of Energy (DOE) suggests that questions regarding the administration of Class VI well permitting be directed towards the U.S. Environmental Protection Agency (EPA). The Safe Drinking Water Act requires states to apply to EPA for approval to implement the Class VI permitting program. DOE has recognized the regional variation of subsurface geology and developed a successful approach to regional cooperation that has been a model for characterization, validation, and development of geologic storage resources for decades.

The Department looks forward to continuing working with states and EPA to share data and expertise gained through decades of work in our research, development, and demonstration programs.

Q18. Will you commit to encouraging EPA to increase the speed at which it reviews and decides on state primacy applications?

A18. The Department of Energy will continue to partner with the Environmental Protection Agency (EPA) to share data, collaborate, and communicate to expedite the Department's

carbon sequestration projects. Expedient permitting and other regulatory processes are critical to the success of Infrastructure Investment and Jobs Act CCUS programs. The Department will also support EPA and states to help build technical capacity to implement the Class VI program.

Q19. How does this Administration plan to commercialize clean energy technologies if environmental justice concerns continuously get in the way?

A19. The long-term viability and value of clean energy technologies is contingent on their ability to mitigate environmental harms and reduce cumulative greenhouse gas emissions. Addressing the environmental justice concerns of deploying a new technology is part of building acceptance from potentially impacted communities and the general public at large. Previous instances where energy technologies did cause significant environmental damages or harms underpin many of these ongoing concerns. DOE is working to establish community engagement processes to ensure communities are part of the planning and deployment processes. If done properly, DOE believes that the commercialization of newer clean energy technologies and the furtherance of environmental justice efforts can be achieved simultaneously. Ultimately, the commercialization of new forms of clean energy technologies should be compared against existing alternatives available in the current marketplace. The ability for new technologies to succeed depends on their ability to provide a superior solution that accounts for key factors such as environmental impact.

Q20. To that end, this Administration set up a "White House Environmental Justice Advisory Council," which issued recommendations in May 2021 that listed examples of projects that will not benefit a community.

Q20a. Do you agree with the Council's recommendation that CCUS will not benefit a community?

A20a. Carbon Capture, Utilization, and Storage (CCUS) is a critical component of the Administration's broad efforts to meet net-zero $CO_2$ emissions by 2050. The Department supports research and development of tools to assess the environmental fitness and safety of and predictability of future capacity within proposed geologic storage sites. CCUS, particularly the transport and long-term geologic storage of carbon dioxide ($CO_2$), has yet

to be deployed at the anticipated scale proposed in DOE's FY 2023 Budget Request. Communities in surrounding CCUS deployment areas bear the potential risks of CCUS projects and associated industrial activities. Adding carbon capture technology to a system can drive further reductions in criteria air pollutants such as sulfur oxides, nitrogen oxides, and particulate matter relative to unabated operations. However, point-source carbon capture can also increase the net emission profile of a facility, for example, if post-combustion carbon capture requires dedicated steam generation. Projects can be designed to maximize net co-benefits, such as reductions in non-$CO_2$ pollutants. Demonstration-scale research funded under the Bipartisan Infrastructure Law is expected to generate higher quality empirical data for better quantifying benefits and harms. If proper benefit agreements and mechanisms are established to ensure CCUS projects yield tangible and direct benefits to surrounding communities, CCUS projects can result in positive outcomes for communities. In particular, fossil energy communities that express interest in such projects can see longer term economic benefits through job creation and participation within the CCUS economy. But their benefit to both communities and society is contingent on CCUS's ability to systemically reduce $CO_2$ and other forms of pollution.

Q21. Do you agree with the Council's recommendation that direct air capture will not benefit a community?

A21. Direct air capture can generate community benefits if deployed strategically and with support from surrounding communities. Direct air capture is expected to be necessary to compensate for ongoing residual emissions from hard-to-abate sectors such as agriculture or aviation, per the United States Long-Term Climate Strategy. This means that some benefits are collective climate benefits that may not be specific to particular communities. On the local level, direct air capture facilities can provide opportunities for high-quality jobs. Concerns with the risks of $CO_2$ transport and storage, which also apply to point-source carbon capture, require adequate monitoring and oversight to address. Concerns with the construction and operations of direct air capture facilities, like other industrial facilities, also require robust monitoring and actions to mitigate impacts, as well as community engagement, which can help in the realization of benefits.

Q22. Do you agree with the Council's recommendation that "research and development" will not benefit a community?

A22. Research and development (R&D) is an integral part of DOE's mission to develop the best possible suite of energy technologies and strategies that help advance our nation. Research and development across the DOE ecosystem can result in the greatest societal outcome when all communities are able to benefit from the latest innovations. In instances where the R&D stage progresses towards pilot studies, additional considerations are needed to ensure proper testing and evaluation. Such research can yield positive benefits, but require consent, partnership, and approval from communities.

**Hydrogen**

Q23. Hydrogen can play an important role in helping the U.S. decarbonize. Natural gas reforming with CCUS allows for producers to use an established process – steam methane reforming – with CCUS technology to produce clean hydrogen. DOE and the Office of Fossil Energy and Carbon Management have the opportunity to play an important role in developing this production pathway and expanding on demonstration activities that support the adoption of clean hydrogen in a variety of end uses.

Q23a. Does DOE have a funded program to advance production of hydrogen with net-negative CO2 emissions? If no, why not?

A23a. Yes. The Office of Fossil Energy and Carbon Management (FECM) manages the Advanced Gasification Program, which is enabling gasification of mixed streams of biomass with waste streams including unrecyclable plastics and coal waste, paired with carbon capture and storage. Co-firing with biomass can make the process carbon negative when paired with carbon capture and storage. Funding Opportunity Announcement 2400 includes areas of interest on gasification aimed at achieving net-zero or net-negative carbon dioxide ($CO_2$) emissions. FECM also collaborates with the Office of Energy Efficiency and Renewable Energy (EERE)'s Biomass Energy Technology Office on biomass pathways to hydrogen with net-negative $CO_2$ emissions.

Q24. Do you support the expansion of hydrogen research at the Office of Fossil Energy and Carbon Management and across DOE?

A24. Yes. Fossil-based hydrogen production pathways, when paired with a carbon abatement strategy, are currently the lowest cost methods for clean hydrogen production.

Q25. Do you support continued funding for the RD&D program established in FY22 that would fund activities related to producing clean hydrogen with natural gas?

A25. Yes. Natural gas reforming with carbon capture and storage (CCS) is currently the lowest cost option for clean hydrogen production and presents an opportunity for clean hydrogen to reach large scales quickly. Further research, development and demonstration planned under Funding Opportunity Announcement 2400 (Clean Hydrogen Production, Storage, Transport, and Utilization to Enable a Net-Zero Carbon Economy) could identify production pathways and methods for reducing costs while producing hydrogen with a lower carbon intensity than conventional reforming methods with carbon capture and storage.

Q26. The IIJA provided significant funding for the U.S. hydrogen economy and section 40315 directed DOE to establish a definition of "clean hydrogen" that is based on carbon intensity and incorporates all sources of hydrogen, including fossil fuels with carbon capture and sequestration, nuclear energy, and renewable energy sources. This definition and standard is due later this month.

Q26a. How does DOE plan to leverage IIJA investments in electrolyzer RD&D, regional hydrogen hubs, and other programs to advance the hydrogen economy in the U.S.?

A26a. DOE will prioritize three key strategies to ensure that clean hydrogen is developed and adopted as an effective decarbonization tool for maximum benefits for the United States. The information below is from the DOE National Clean Hydrogen Strategy and Roadmap RTC. DOE will:

(1) ***Target strategic, high-impact uses for clean hydrogen.*** This will ensure that clean hydrogen will be utilized in the highest value applications, where limited deep decarbonization alternatives exist. Specific markets include the industrial sector, heavy-duty transportation, and long-duration energy storage to enable a clean grid. Long-term opportunities include the potential for exporting clean hydrogen or hydrogen carriers and enabling energy security for our allies.

(2) ***Reduce the cost of clean hydrogen.*** The Hydrogen Energy Earthshot launched in 2021 will catalyze both innovation and scale, stimulating private sector investments,

spurring development across the hydrogen supply chain, and dramatically reducing the cost of clean hydrogen to the goal of $1 per 1 kilogram in 1 decade. Efforts will also address critical material and supply chain vulnerabilities and design for efficiency, durability, and recyclability.

(3) ***Focus on regional networks.*** This includes regional clean hydrogen hubs to enable large-scale clean hydrogen production and end-use in proximity, enabling critical mass infrastructure, driving scale, and facilitating market lift off while leveraging place-based opportunities for equity, inclusion, and sustainability. Priorities will include near term impact, creating jobs - including good paying union jobs - and jumpstarting domestic manufacturing and private sector investment.

Q27. How will DOE ensure that investments made through the appropriations process are complimentary to DOE's implementation of the IIJA?

A27. FY23 funding will amplify Infrastructure Investment and Jobs Act (IIJA) investments. The Department recognizes the tremendous impact IIJA funding can have on clean energy deployment. This funding complements base appropriations and avoids programmatic duplication. We expect recipients to use the IIJA funds to catch up on critical energy infrastructure modernization needs. IIJA funding provides a specific injection of funds for DOE programs to help the many states, communities, and individuals address a wide range of energy challenges.

Q28. Will DOE commit to pursuing a "color-neutral" approach to supporting hydrogen RD&D?

A28. Yes. The Department of Energy (DOE) focuses on the carbon intensity of produced hydrogen, not on the "color" of the resource and technology pathway utilized to produce it. DOE also strives to use the term "clean hydrogen" instead of the various colors of hydrogen in public fora and publications. The Hydrogen Energy Earthshot (Hydrogen Shot) aims to reduce the cost of clean hydrogen to $1 per 1 kilogram in 1 decade. As embodied in the Hydrogen Shot, research, development, and demonstration across DOE includes all pathways to clean hydrogen, including low-carbon pathways using diverse, domestic resources coupled with carbon capture and storage; through splitting of water

using nuclear energy and renewable energy sources, such as wind, solar, geothermal and hydro-electric power; and from biomass through biological processes.

Q29. Would gas or coal with CCUS qualify as "clean hydrogen" in DOE's initial standard?

A29. DOE is still developing the Clean Hydrogen Production Standard in consultation with the Environmental Protection Agency.

Q30. Would renewable natural gas that is blended at the site of production qualify as "clean hydrogen" in DOE's initial standard?

A30. DOE is still developing the Clean Hydrogen Production Standard in consultation with the Environmental Protection Agency. The ability of renewable natural gas to qualify depends on how the standard will account for emissions of biogenic carbon dioxide at the site of production and whether the facility is paired with carbon capture and storage.

**Exports & Foreign Policy**

Q31. In 2019, the National Energy Technology Laboratory Report, "Life Cycle Greenhouse Gas Perspective on Exporting Liquified Natural Gas from the United States," found that European natural gas imported from Russia has 41 percent higher GHG emissions than LNG exported from the U.S. Gulf Coast.

Q31a. If the United States follows through on its commitment to helping Europe reduce its reliance on Russian gas imports by delivering an additional 15 bcm of U.S. LNG to Europe in 2022, and 50 bcm of additional U.S. LNG through 2030, how much will GHG emissions be reduced?

A31a. The 41% reduction noted would be the GHG reduction from U.S. LNG in Europe replacing regional coal for power production in Europe as modeled in the NETL "Life Cycle Greenhouse Gas Perspective on Exporting Liquified Natural Gas from the United States" report, Exhibit 6-7, on a 20-year global warming potential basis. Based on the data from that exhibit, U.S. LNG GHG emissions through power show a range of reductions relative to Russian Yamal pipeline delivery to Europe – 116 to 482 kg CO2e/MWh lower. On average, emissions are expected to be 28% lower. Scaling that result to match the quantities of LNG exports (15 and 50 bcm), on average those reductions are 21 and 71 million metric tons carbon dioxide equivalent reductions, respectively.

Q32. While DOE has recently approved some pending LNG export applications, two applications to export U.S. natural gas from Mexico to markets in Asia have been pending since September and November 2020, respectively.

Q32a. Why has taken DOE taken more than 18 months to review these applications? Please provide a timeline for when DOE expects to act on the pending licenses.

A32a. Currently, every operating or project under construction has approvals from DOE to export to its fully authorized capacity to any country not prohibited by U.S. law or policy, and all operating export projects are exporting at or near their authorized capacities.

DOE has granted exports up to the fully authorized capacity of 19 U.S. projects. Among the projects with DOE export approvals, six are currently operating (Sabine Pass, Cove Point, Corpus Christi, Cameron LNG, Elba Island, and Venture Global Calcasieu Pass). One project is temporarily offline (Freeport LNG, expected to return to service in November 2022). Three projects have reached a final investment decision and are currently under construction or expanding (Golden Pass, Venture Global Plaquemines, and Corpus Christi Stage III). The remaining projects with export approvals are awaiting a final investment decision.

DOE has also granted exports of U.S. natural gas as LNG from proposed liquefaction facilities in Canada and Mexico. To date, DOE has granted exports of U.S. natural gas as LNG to non-free trade agreement (FTA) countries in a cumulative volume of over 48 billion cubic feet per day.

There are currently two applications from proposed liquefaction facilities in Mexico, including one that would expand a proposed project, Phase II of Energia Costa Azul, by 0.44 billion cubic feet per day. DOE previously granted all the requested volumes of exports from Energia Costa Azul to free trade agreement countries and has also approved the majority of the requested volumes for export to non-FTA countries, with only the expansion application for 0.44 billion cubic feet per day of additional exports from Energia Costa Azul Phase II to non-FTA countries remaining.

The second pending application for exports of U.S. LNG from proposed liquefaction facilities in Mexico is from the Vista Pacifico project seeking to export up to 0.55 billion cubic feet per day of U.S. natural gas as LNG. DOE has granted the requested volumes for export to free trade agreement countries from Vista Pacifico, with the application to export to non-free trade agreement countries still pending.

In July 2022, DOE announced that Environmental Assessments (EAs) are being undertaken to examine the environmental impacts from the two pending applications for exports to non-FTA countries from Energia Costa Azul Phase II and Vista Pacifico. The EAs are being undertaken to progress DOE's reviews of the applications and are set to be finalized by the end of October 2022. Energia Costa Azul Phase II and Vista Pacifico are expecting to be operational in 2028/2029 and 2027, respectively, pending a positive final investment decision.

All but one of the remaining pending non-FTA applications are for applications still undergoing environmental review at the Federal Energy Regulatory Commission or the Maritime Administration within the U.S. Department of Transportation. DOE acts on applications to non-FTA countries once the environmental review of the application is complete.

FERC recently approved an "uprate" for the capacity of Freeport LNG, the terminal that is temporarily offline. DOE is actively reviewing that related non-FTA application that would increase Freeport's peak export capacity by 0.24 Bcf/d. We note that Freeport will not be able to export their full peak capacity until the facility has completely returned to service and can operate all of its equipment and loading docks. Freeport does not expect to be able to operate at its full capacity when it initially restores export operations.

Q33. You have touted increased cooperation with Canada to thwart "petro-dictators" like Putin, proposed a Marshall plan for clean and "secure" energy, launched a "Net-Zero Producers Forum" of major oil and gas producing nations, and coordinated with our IEA allies to release from strategic oil reserves. Domestic gasoline prices, however, remain untenably high, the price of a barrels of oil and LNG cargoes are skyrocketing, and energy security in Europe amongst our NATO allies grows increasingly more perilous with every day (particularly in light of Russian gas cutoffs in Poland and Bulgaria).

Q33a. When can the U.S. expect to see results from these diplomatic efforts?

A33a. In Europe, we are already seeing results from our bilateral and multilateral engagement. We have seen an uptick in engagement with Germany on research into hydrogen as an energy source; Central and Eastern European governments are turning away from Russia as a supplier of nuclear fuel and toward the United States; and governments throughout Europe are moving forward with plans to construct Floating Storage and Regasification Units (FSRUs) to import more LNG to fuel their domestic needs. Additionally, DOE continues to work through fora such as the US/EU Energy Council and the Partnership for Transatlantic Energy and Climate Cooperation to bring the private sector into conversations about reducing reliance on Russian energy supplies and hastening the clean energy transition.

Q34. What are the primary objectives and what can concretely be achieved via these partnerships?

A34. The Department of Energy's bilateral and multilateral partnerships are part of an effort to keep energy prices affordable, drive decarbonization, and assure reliable supplies of energy to partners and allies. Russia has chosen to create a challenging situation for Europe – one that has implications on global energy markets and needs to be addressed in both the short and long term. In the short term, the United States is exporting every molecule of natural gas it can to the globe, but particularly to Europe, and we are advising European partners on natural gas and energy efficiency strategies. For the longer-term, we are analyzing Europe's plans to break its Russian energy dependencies, providing constructive feedback to enable a clean energy future, and facilitating public-private sector partnerships, all of which will enable decarbonization, ensure energy diversification, and create jobs on both sides of the Atlantic.

Q35. What role can the U.S. oil and gas industry play in these efforts?

A35. As the world's largest oil and gas producer, U.S. industry has a critical role to play in supplying oil and gas for our country and the world. DOE leadership has been in close contact with the CEOs of U.S. and international oil and gas companies to encourage them

to increase production and gather their input on production bottlenecks, including access to financing and supply and labor shortages.

The industry is already responding to the current short supply situation by increasing production and exports. The Energy Information Administration projects that U.S. crude oil production will average 11. 86 million barrels per day in 2022 and rise to 12.70 million barrels per day in 2023, and U.S. dry natural gas production will average 96.59 billion cubic feet per day in 2022 and rise to 100.02 billion cubic feet per day in 2023.

The U.S. is now the top global exporter of LNG, and U.S. LNG exports have increased by 12 percent in the first half of 2022, averaging 11.2 billion cubic feet per day. Much of this supply has gone to our European allies. With the current capacity under construction, U.S. LNG export capacity is set to reach nearly 20 billion cubic feet per day later this decade.

Q36. Where can the U.S. oil and gas industry be supportive in these efforts?

A36. Both climate concerns and market conditions demand that the domestic and global oil and gas industry take a close look at its practices and make every effort to make its system as leak-tight as possible to mitigate hydrocarbon waste and associated environmental impacts. Many U.S. companies are already leaders in methane emissions mitigation, but more could be done to reduce the flaring of natural gas and minimization of leaks throughout the system. The support of U.S. companies continues to be welcome in our international efforts to work with partner countries to optimize delivery of responsibly sourced oil and gas to consumers.

Q37. What have U.S. allies said in regard to their desire to see a healthy and robust American oil and gas sector?

A37. The U.S. is a major global energy supplier and has recently become the top global LNG exporter. In the past several months, particularly since the Russian invasion of Ukraine, U.S. energy supplies have become an even bigger component of global energy security, with approximately 70% of U.S. LNG exports landing in Europe in 2022.

The Administration has been clear in calls for increased domestic production that can support domestic demand and help our allies. The latest short-term projections from the U.S. Energy Information Administration show that the U.S. is expected to achieve record-setting oil and gas production levels in 2023.

While oil and natural gas have a clear role to play to satisfy the acute global energy shortages that have been brought forward by Putin's unprovoked war of aggression, this reality gives greater weight to accelerating decarbonization efforts and encouraging investments in clean energy technologies that will make the world less vulnerable to energy dictators. And given the continued, central role of U.S. LNG during the managed energy transition, DOE is doing everything possible to accelerate natural gas decarbonization efforts and improve the emissions profile of our natural gas supply chain. DOE's technical role in supporting a leak-tight natural gas supply chain includes supporting the development of materials, sensors, and approaches to ensure the integrity of natural gas infrastructure both at home and abroad.

At the same time, DOE is also investing in clean energy and efficiency technologies that will help the U.S. and our allies transition away from fossil fuels, reducing exposure to price volatility, increasing energy security, and reducing greenhouse gas emissions and other pollution.

Q38. How does DOE anticipate the U.S. will meet the energy security needs of both our Asian and European allies?

A38. The U.S. is exporting every molecule of gas possible, with more than 70% of LNG exports going to Europe in the first half of this year. The Freeport LNG facility is also expected to see a partial restart in November after being taken offline in June after a fire, so the resumption of volumes from that facility will also add to supply.

DOE is also working on longer-term solutions through the US-EU Energy Council and through the Partnership for Transatlantic Energy and Climate Cooperation (P-TECC).

- Under the US-EU Energy Council, DOE provides technical support to discussions under the Energy Security Working Group and is the lead USG agency for both the

Energy Policy and Energy Technology and Innovation Working Groups. DOE is also engaged in the National Security Council-led U.S.-EU Task Force on European Energy Security to ensure efforts are complementary, and to support both acquisition of additional energy resources and reducing demand for energy through pragmatic measures.

- Under P-TECC, DOE has engaged its European partners on decarbonization and diversification solutions, including but not limited to assessments of climate vulnerability in selected member countries and in-depth, hands-on workshops focused on strengthening cybersecurity.

In Asia, the U.S. continues to be an important and reliable source of both LNG and oil for our allies and partners across the region. As these resources fill an important need amid the excessively tight commodity markets brought on by Russia's invasion of Ukraine, DOE is also working with our partners to decrease the region's reliance on energy commodities from unreliable and unstable parts of the world. This includes supporting the safe and secure operation of nuclear power reactors, exploring pathways for the rapid deployment of renewable power generation, and joint research and development on next generation energy systems. DOE is pursuing these efforts both bilaterally, as well as in multilateral forums such as APEC, ASEAN, and the Quad. This includes new workstreams and strategic coordination with our Quad partners – Australia, India, and Japan. The Secretary of Energy and the Quad energy ministers met together for the first time in July to promote clean energy and energy security across the Indo-Pacific.

Q39. Where will the additional LNG capacity needed to serve Asian markets come from?

A39. The U.S. is currently the top global liquefied natural gas (LNG) exporter with seven operating export projects currently operating and three LNG projects under construction or expanding. The operating projects are Sabine Pass, Cameron, and Venture Global Calcasieu Pass in Louisiana; Freeport and Corpus Christi in Texas; Cove Point, Maryland; and Elba Island, Georgia. Additional capacity continues to come online, with Golden Pass LNG in Texas, Venture Global Plaquemines in Louisiana, and Corpus Christi Stage III in Texas currently under construction. There remain several additional

fully permitted projects in the United States for which a final investment decision has not yet been made.

Q40. The United Nations continues to treat China as a "developing nation" for the purposes of international climate treaties, including the Paris Agreement, and the World Bank projects that China will become a "high-income" country in 2023.

Q40a. Do you believe China is still a developing nation?

A40a. No, the Department of Energy does not view the People's Republic of China as a "Developing Nation."

Q41. Will DOE commit to working with the U.S. Special Presidential Envoy for Climate and other countries to end China's classification of "developing nation?" If no, why not?

A41. The Department of Energy is aligned with the rest of the U.S. Government in holding that the People's Republic of China is not a "Developing Nation". The Department will continue to work with our interagency partners such as the State Department to uphold this position.

Q42. Last year, you answered a question with, "when evaluating pipeline creation, expansion, or maintenance, it is important to look at the entire cycle, including upstream and downstream as well as resource extraction."

Q42a. Do you agree that it is also important to consider energy security and supply chain issues when evaluating pipeline creation, expansion, or maintenance?

A42a. Yes, it is also important to consider energy security and supply chain issues when evaluating pipeline creation, expansion, or maintenance. This is one of the reasons our Office of Petroleum Reserves (OPR) assesses its distribution capability every year. It is also a reason why the Department has moved OPR to the Office of Cybersecurity, Energy Security, and Emergency Response (CESER). This reorganization will provide synergies in the Department of Energy's energy security and emergency response capabilities. Additionally, the Department has stood up a new Office of Manufacturing and Energy Supply Chains (MESC) responsible for strengthening and securing manufacturing and energy supply chains needed to modernize the nation's energy infrastructure and support

a clean and equitable energy transition. MESC coordinates closely with offices, including CESER, across all of DOE's programs on manufacturing and supply chain issues.

Q43. This Administration has continuously and inappropriately relied on the SPR to alleviate global fuel shortages in light of Russia's invasion of Ukraine. Yet, in an answer to a question posed last year by Representative Upton, you stated "the SPR relies on private sector commercial pipelines and marine terminals to distribute crude oil."

Q43a. How does this Administration plan to replenish the SPR and distribute crude oil if it is also hindering the development of new pipeline capacity?

A43a. The Administration and the Department of Energy (DOE) have taken bold, decisive action in conducting a historic release from the SPR to alleviate the very real petroleum supply disruption caused in part by Russia's invasion of Ukraine and ease the pain Americans have been feeling at the pump due to Putin's war of choice. While DOE is not taking any action to hinder the development of new pipeline capacity, it is true that the SPR relies on commercial pipeline and marine terminals, in addition to pipelines and terminals owned by DOE. With the domestic production increases of the past decade and increased Canadian crude flowing to the Gulf Coast region, commercial pipelines are being used much more than they were decades ago when the SPR distribution system was planned. This is why the SPR performs an annual assessment of its distribution capability. The fact that the SPR has released historic amounts of crude oil into the U.S. Gulf Coast crude oil market demonstrates the SPR's capability to distribute crude oil into the existing infrastructure, even while the U.S. crude oil sector is producing at high levels.

Q44. You also responded, "with the domestic production increases of the past decade and increased Canadian crude flowing to the Gulf Coast region, commercial pipelines are being used much more than they were decades ago when the SPR distribution system was planned."

Q44a. So, do you agree with the White House Environmental Justice Council's recommendation that "pipeline creation, expansion, or maintenance" will not benefit a community?

A44a. DOE is dedicated to putting the principles of energy and environmental justice at the center of its work, as required by President Biden's Executive Order issued in January 2021 on Tackling the Climate Crisis at Home and Abroad. While DOE is not involved in

pipeline permitting, we are working to ensure that the expansion of energy infrastructure does not result in the inequitable distribution of negative impacts on local communities, particularly disadvantaged communities, while ensuring domestic energy supply and meeting the global energy security needs of our allies.

Q45. Given that you point out commercial pipelines are being used significantly more than a decade ago and that they are integral to SPR operations, should the Administration have taken these factors into consideration when revoking the cross-border permit for the Keystone XL pipeline?

A45. While it is true that the SPR relies on commercial pipeline for distribution, the Keystone XL pipeline would not have benefited SPR operations since the pipeline would have run north to south. The SPR is connected via pipelines to 27 refineries in the Gulf Coast region and to four marine terminals with a combined capacity of 2.6 million barrels per day.

Q46. If no, then why is the Administration considering bringing in crude oil from Canada via rail, which is costlier and has a higher emissions profile, to alleviate global fuel shortages?

A46. Canada has been exporting crude oil by rail to the United States for many years. Exports of Canadian crude by rail to the United States declined from a high of about 300,000 barrels per day in 2019 to an average of about 130,000 barrels per day in May 2022, according to the U.S. Energy Information Administration.

Q47. Should the U.S. do that when inflation is at the highest it's been in 40 years?

A47. As of April 2022, exports of Canadian crude oil by rail to the United States are lower than they have been since 2016 (except for a brief period during the pandemic in 2020), averaging about 130,000 barrels per day.

Q48. This week, gas prices hit a record $4.40/gallon. Yet this past November, during a Bloomberg Interview, you laughed when asked about this Administration's plan to increase oil production in America and said, "that is hilarious."

Q48a. Is it still hilarious?

A48a During the moment you reference, I was responding to the notion that any Secretary of Energy can have a significant impact on oil production. As pointed out later in the interview, I noted that prices at the time were already sufficiently high to incentivize oil companies to try and produce more; and, in fact, oil production is up significantly since that interview in November 2021 and average gas prices have fallen for 6 straight weeks and are nearly 70 cents below where they were in June.

Q49. If it is a global market controlled by OPEC, as you stated, then why did you directly ask U.S. oil and gas companies to increase production in March 2022 to alleviate supply issues?

A49. As I stated in March, we can all do our part, including oil companies, where possible. The exact quote was: "We are on war footing. That means releases from the strategic reserves all around the world. And that means you [oil companies] producing more right now if and when you can. I hope your investors are saying this to you as well. In this moment of crisis, we need more supply." The situation called for all entities coming to the table, and U.S. oil production has increased since March.

Q50. How are they expected to increase production if this Administration continues to take anti-fossil fuel actions, such as cancelling the oil and gas lease opportunity in the Cook Inlet of Alaska, which would have provided the potential to drill for oil in over 1 million acres?

A50. The U.S. Energy Information Administration, in its latest Short-Term Energy Outlook, expects U.S. crude oil production to increase from 11.6 million barrels per day this April to 12.5 million barrels per day by the end of 2022. This increase of nearly 1 million barrels per day in just 9 months is evidence that the industry can significantly increase production when the necessary signals are present.

Q51. Would it make more sense to relax the regulatory barriers constricting domestic fossil fuel production?

A51. With U.S. oil production expected to increase substantially from April through the rest of this year, it appears that current regulations are not significantly constricting domestic crude oil production. The Energy Information Administration estimates that we are currently producing 11.9 million barrels (MM bbl) a day and that U.S. oil production is

set to reach a record 12.8 MM bbl a day by 2023. There is nothing standing in the way of domestic oil and gas companies increasing production. As the President said on July 22, industry holds more approved permits for production on Federal lands than companies can possibly use. We are encouraging companies to use those permits. I have also reached out to industry to make certain that Americans have access to the energy they need. Furthermore, I have sat down with refiners to discuss how to expand U.S. fuel supply and bring down prices.

**Domestically Produced Fuels**

Q52. Do you agree with the White House Environmental Justice Council's recommendation that "fossil fuel procurement, development, infrastructure repair that would in any way extend lifespan or production capacity, transmission system investments to facilitate fossil-fired generation or any related subsidy" will not benefit a community?

A52. If such investments help remediate legacy pollution while reducing any associated pollutants and producing positive economic benefits, they could benefit a community, as long as the community supports such investments. The expansion of existing fossil fuel infrastructure and power generation should be assessed against other relevant technologies to determine the full scale of community benefits.

Q53. Do you agree with the Council's recommendation that "the procurement of nuclear power" will not benefit a community?

A53. Nuclear energy is a key element of the President's plan to put the United States on a path to net-zero emissions by 2050. America's nuclear energy sector provides approximately 50 percent of the nation's annual clean electricity production and generates about 20 percent of U.S. electricity from a fleet of 92 operating units in 28 states. Nuclear energy is also the most reliable energy source in the U.S., operating at full capacity more than 92% of the time in 2020. The Office of Nuclear Energy is leading the effort to move new and innovative advanced reactors, small modular reactors, and microreactors with advanced safety features and more versatile deployment options from the conceptual and development stages into the commercial energy sector. As an example, microreactors are uniquely suited to service non-traditional energy markets such as off-grid communities, remote industrial locations, forward military bases and disaster relief missions. Nuclear

energy can provide low-cost energy to communities and reduce emissions and pollutants. The Department is also working on a consent-based siting process for the storage of spent nuclear fuel. Consent-based siting is an approach to siting facilities that focuses on the needs and concerns of people and communities. Communities participate in the siting process by working carefully through a series of phases and steps with the Department to determine whether and how hosting a facility to manage spent nuclear fuel is aligned with the community's goals.

Q54. Do you agree with the Council's recommendation that "industrial scale bioenergy" will not benefit a community?

A54. DOE's investments in cutting-edge technologies designed to produce biofuels and bioproducts are expanding the viability of the Nation's abundant biomass and waste resources, including forest and agriculture residues, municipal solid waste (MSW), herbaceous and woody energy crops, and algae. Industrial scale bioenergy can particularly benefit rural and agricultural communities that face other fuel and infrastructure constraints to access energy supplies. The deployment of industrial scale bioenergy requires careful strategic deployment to ensure both the direct and indirect effects, such as land use change, food prices, air pollution, and water contaminant, are mitigated.

Q55. Last year, I asked if you believe that coal should remain part of the U.S. energy mix moving forward. In your response, you avoided answering that question, and focused on the investments DOE is making in CCUS technologies for existing fossil plants generally.

Q55a. Again, do you believe that coal, specifically, should remain part of the U.S. energy mix moving forward?

A55a. Coal remains a significant part of our nation's energy mix, particularly in some regions. It also plays a dominant role in many emerging economies, such as China and India, where deep emissions reductions from coal-based energy production will be essential to meeting global climate goals. Therefore, DOE will continue to implement broadly bipartisan authorities and funding intended to help develop and deploy technologies like carbon capture and storage that can reduce emissions from coal.

Q56. This March, at CERAWeek, you referred to industry complaints that President Biden's energy policy was hampering production and causing oil prices to spike as "the same old D.C. B.S."

Q56a. Do you believe there is anything this Administration can do to help minimize the burdens, regulations, and pressures on our hardworking oil and gas producers, or is DOE content to sit back and merely "urge" them to "ramp up" production in a market and political environment that is hostile towards their efforts?

A56a. DOE does not believe that the current regulatory environment is hindering oil and gas production, and the Department recognizes that fossil fuels, will continue to be necessary as we transition to a clean energy economy. As industry has shown, there is a capacity to increase crude oil production when and where possible. I have also reached out to industry to make certain that Americans have access to the energy they need. President Biden took bold and unprecedented action when he directed the SPR to release as much as 1 million barrels a day in response to the energy shortages created by Russia's further invasion of Ukraine and to act as a bridge for domestic production to ramp up. This is by far the largest release in SPR's 47-year history. Additionally, I have sat down with refiners to discuss how to expand U.S. fuel supply and bring down prices.

Q57. Could you please provide examples of where this Administration can alleviate permitting backlogs and provide regulatory certainty?

A57. DOE conducts research to develop the science and technologies to effectively recover oil and natural gas resources while minimizing the adverse environmental effects of production activities. However, permitting of oil and natural gas production activities is overseen by the U.S. Department of the Interior on Federal Lands, and by the individual states for private or state lands. DOE has no regulatory role in permitting production operations.

Q58. What is DOE doing to ensure that some of these subsurface-exploration activities are being addressed simultaneously in a strategic and coordinated manner?

A58. DOE provided the research and technologies that underpin the unprecedented rise in U.S. oil and natural gas production in recent years. We continue to provide world-class

research and technology development to support our energy security, but we do not have a role in coordinating subsurface exploration activities conducted by private industry.

**Strategic Petroleum Reserve**

Q59. Do scheduled releases from the strategic petroleum reserve (SPR) serve as a long-term solution to quell gas prices?

A59. The Administration believes that the SPR is designed to respond to short-term supply disruptions. With the substantial disruption in crude oil supplies from Russia's invasion of Ukraine, the SPR was used as a bridge until the domestic oil industry could produce more crude oil. This is indeed occurring. With the increase in domestic oil production expected by the end of this year, absent an additional unforeseeable crisis, no further emergency sales from the SPR should be needed.

Q60. What are the broader long-term repercussions of the government continuously tapping into the SPR as a "piggy bank?"

A60. While sales from the SPR are sometimes used, at the direction of Congress, to offset funding expenditures needed for other programs, it is important to remember that the SPR is intended to offset supply disruptions and not as a "piggy bank" to fund other programs. Continuing to use the SPR in this fashion will reduce the scenarios in which the SPR can effectively mitigate impacts from supply disruptions. Specifically, congressionally mandated sales to fund other programs result in increased wear and tear of the SPR facilities and infrastructure and can contribute to reducing our drawdown rate.

Q61. What other tools does this Administration have to combat high energy prices?

A61. DOE leadership has been in close contact with the CEOs of U.S. and international oil and gas companies to encourage them to increase production and gather their input on bottlenecks to production, including access to financing and supply and labor shortages. We have also been coordinating with our allies to encourage them to maximize their own production and state leaders to ensure a proactive and coordination approach to ensure supply meets demand. Already, our actions and the releases from the Strategic Petroleum Reserve are having an effect. According to EIA, average weekly gasoline prices during

the week of October 3 were down to $3.78 per gallon, over one dollar less than they were at their high point on June 13 ($4.84 per gallon.)

**Electricity**

Q62. There is a lot of discussion in this Administration about swiftly transitioning U.S. electricity production to renewables and transition our energy use in the industrial, commercial, residential and transportation sectors from fossil fuels to either electricity or hydrogen.

Q62a. Has DOE determined the cost to U.S. consumers, and WV consumers, of meeting the President's greenhouse gas reduction targets?

62ai. If yes, what is that cost?

A62ai. Many factors influence electricity prices, including the cost to build, finance, maintain, and operate power plants and the electricity grid. Some for-profit utilities also include a financial return for owners and shareholders in their electricity prices. Impacts to household energy expenditures depend on policy decisions, including by state governments and utility commissions.

Studies of net-zero emissions generally examine the total system cost and investment needed as a fraction of total economic activity. Multiple studies reviewed by the National Academies of Sciences, Engineering, and Medicine (NASEM) estimate that achieving net zero emissions would cost less as a fraction of GDP than the United States has historically spent on energy.[19] Additionally, reducing air pollution through clean energy will avoid 85,000–300,000 premature deaths and health and climate damages of $1–3 trillion through 2050 in the United States.[20]

As an example of the impact of policy choice on household costs, a study from Princeton on the impacts of the Inflation Reduction Act showed that the clean energy tax credits and investments in that Act would lower annual U.S. energy expenditures by at least 4% in 2030. In addition, that study estimates that reductions in oil and natural gas demand due to the Act would also reduce crude oil prices by approximately 5% and natural gas

[19] https://nap.nationalacademies.org/read/25932/chapter/1
[20] https://netzeroamerica.princeton.edu/img/Princeton_NZA_Interim_Report_15_Dec_2020_FINAL.pdf; https://www.rff.org/publications/reports/global-energy-outlook-2021-pathways-from-paris/

prices by 10% – 20%.[21] A separate analysis from West Virginia University found that increasing the share of clean energy in West Virginia's electricity mix would reduce exposure to financial risk, diversify the state's economy, create thousands of jobs, and avoid billions in regional healthcare costs.[22]

i. If no, why not?

Q63. Has DOE determined the impact that higher domestic energy costs will have on our ability to be competitive in a global market?

Q63a. If yes, what is that impact?

A63a. Vladimir Putin's actions have sent global oil and gas markets reeling, raising energy costs around the world. Costs are even higher elsewhere. Average U.S. retail gasoline prices are $3.91 per gallon now (10/14/22), nearly half their levels in the U.K. ($7.13/gal) and Singapore ($7.31/gal), and well below levels in France ($6.06/gal). The U.S. benchmark natural gas price is $6.64 per million British Thermal Units (/mmbtu)—several times lower than benchmarks in the U.K. ($30.15/mmbtu), Netherlands ($41.47/mmbtu), and Asia ($34.84/mmbtu).

According to an analysis by the Department of the Treasury, gasoline prices are as much as 40 cents per gallon lower than they might have otherwise been were it not for Biden Administration actions to release oil from the Strategic Petroleum Reserve and to lead other countries to make strategic petroleum stock drawdowns as well.

The situation in Ukraine and the impact on gas prices has highlighted the economic and national security importance of DOE's energy investments. DOE's FY23 Budget Request prioritizes domestic clean energy resources that reduce high energy prices and exposure to volatile global fuel markets.

Q63b. If no, why not?

Q64. Has DOE determined the loss of manufacturing jobs due to higher energy costs on a state-by-state basis, including in West Virginia?

[21] https://repeatproject.org/docs/REPEAT_IRA_Prelminary_Report_2022-08-12.pdf
[22] https://energy.law.wvu.edu/west-virginias-energy-future/findings

Q64a. If yes, what is the job loss?

A64a. Manufacturing plays a significant role in the U.S. economy, generating 11 percent of U.S. gross domestic product (GDP) and employing more than 12 million Americans. Manufacturing composes three-quarters of the U.S. industrial sector, which has an annual energy bill of about $200 billion and consumes roughly one-third of primary energy in the United States. Since the start of the COVID-19 pandemic, U.S. manufacturing jobs declined by 471,000 jobs (2019–2021).[23] This rebounded in 2021, when U.S. manufacturing as a whole increased by 179,000 jobs. Energy manufacturing jobs declined by 187,000 jobs in 2020, but the sector added back 120,000 jobs in 2021.[24]

West Virginia lost 2,600 manufacturing jobs from 2019 to 2020. While there was a gain of 1,000 jobs from 2020 to 2021, this was not enough to make up for the 2020 declines. Energy manufacturing in West Virginia increased by 245 jobs from 2019 – 2021. While there were also declines from 2019 – 2020, strong growth—an increase of 868 jobs (+11%)—drove the overall increase. None of these changes, however, can be directly attributed to changes in energy costs; rather, a myriad of factors—including but not exclusively costs—contribute to changes in labor markets.

DOE's FY23 Budget Request prioritizes support for U.S. manufacturing and developing key energy industries and supply chains here at home to improve U.S. energy security and create good-paying jobs in communities across the country, including in West Virginia. The request reflects the importance of strategically supporting the U.S. domestic manufacturing base through innovation, technical assistance, and training. The request funds a new Manufacturing USA institute and increases support for Industrial Assessment Centers, helping small- and medium-sized U.S. manufacturers save energy, improve productivity, and reduce waste by providing no-cost technical assessments.

Q64b. If no, why not?

[23] Total economy-wide employment data is from the Bureau of Labor Statistics Current Employment Survey. The most recent annual data is from 2021.
[24] Energy employment data comes from the Department of Energy United States Energy and Employment Report (USEER). The most recent data available is for 2021.

Q65. Has DOE determined the potential for overall increase in greenhouse gas emissions when U.S. manufacturing is outsourced to other countries, such as China and other developing economies, that do not focus on emissions control?

A65. DOE is working to expand domestic production of clean and low-carbon products, to protect U.S. manufacturing from unfair competition, and to expand U.S. manufacturers' access to global clean energy markets. Last year, the Administration announced the world's first carbon-based sectoral agreement on steel and aluminum trade with the European Union, which will counter the flood of cheap steel by other countries such as China. Together, the United States and European Union will work to restrict access to their markets for dirty steel and limit access to countries that dump steel in our markets, contributing to worldwide over-supply. This would protect American jobs and industry and provide them with an advantage moving forward, while also encouraging other nations to adopt stronger emissions standards.

More recently, this past February, to support implementation of the Bipartisan Infrastructure Law, DOE launched the new Office of Manufacturing and Energy Supply Chains to secure energy supply chains needed to modernize America's energy infrastructure and support the transition to clean energy.

Q66. Has DOE determined the impact that this Administration's greenhouse gas reduction targets will have on global greenhouse gas emissions, given that developing economies will continued to use unabated fossil fuels for decades to come?

A66. The United States is the second-largest source of global annual GHG emissions, emitting nearly 6 billion metric tons of carbon dioxide equivalent in 2020, or about 11 percent of global emissions. Meeting the Administration's goal of net zero emissions by 2050 will help the United States address its share of global climate pollution, while also encouraging faster global action and expanding global markets for clean energy. U.S. leadership in climate mitigation was key in securing the commitments of 192 parties under the Paris Agreement—including developing economies, many of which are actively transitioning away from fossil fuels. As of August 2022, 89 countries accounting for 74% of global GHG emissions have communicated a net zero target. This number is up from 59 countries just one year ago. Transitioning to clean energy is a priority for

many countries around the world, and innovative technology solutions are central to these efforts. The global clean energy markets are expected to reach $23 trillion by the end of the decade.[25] These markets—including in developing economies—present enormous business opportunities for the United States.

Q67. What data and metrics did this Administration use to determine that the United States needs to reach net-zero emissions by 2035? Please provide that information for review.

A67. The most recent National Climate Assessment vividly illustrates, with robust scientific confidence, the need to limit warming to 1.5ºC to avoid severe climate impacts.[26] Achieving this target requires reaching global net-zero GHG emissions by 2050, or soon after, and moving to net negative emissions thereafter. To meet these milestones, the United States has committed to achieving a 50- to 52-percent reduction below 2005 levels in economy-wide net greenhouse gas emissions by 2030; creating a carbon pollution-free power sector by 2035; and achieving net zero emissions economy-wide by no later than 2050. *The Long-Term Strategy of the United States* lays out multiple pathways to meet these targets and shows how driving down GHGs will spur investments that modernize the American economy, improve public health in every community, and reduce the severe costs and risks from climate change.[27]

**Hydropower**

Q68. The Energy Act of 2020 including the RIVER Act, which reauthorized key hydropower production and efficiency incentives through 2036, including Section 242 of EPACT 2005. DOE is tasking with managing this program, and several others, which have long-term appropriated funding from both the IIJA and Consolidated Appropriations Act, 2022.

Q68a. How does DOE manage multiple funding streams for the same program?

A68. In Fiscal Year (FY) 2021 and FY 2022, the Water Power Technologies Office (WPTO) allocated $7 million and $6.7 million, respectively, for the purposes of funding the Hydropower Production Incentive under Section 242 of the Energy Policy Act of 2005.

[25] IFC, Climate Investment Opportunities in Emerging Markets, 2016. https://www.ifc.org/wps/wcm/connect/59260145-ec2e-40de-97e6-3aa78b82b3c9/3503-IFC-Climate_Investment_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES&CVID=lBLd6Xq
[26] https://www.globalchange.gov/nca4
[27] https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf

In FY 2022, WPTO was appropriated $125 million under the Bipartisan Infrastructure Law (BIL) for long-term funding of the Section 242 program. Each funding stream will be utilized to fund calendar-year (CY) specific solicitations. For example, the non-BIL funds appropriated in FY 2021 and FY 2022 will be used to fund the current Section 242 solicitation for Calendar Year (CY) 2020 hydropower production (opened December 27, 2021; closed February 10, 2022). The long-term BIL funding stream will be used to fund the next Section 242 solicitation for CY 2021 hydropower production, currently scheduled for December 2022, and all future Section 242 solicitations, until the funds are expended. Starting with CY 2021, the Section 242 incentive will be administered by the Grid Deployment Office (GDO) and will no longer be a WPTO program.

Q69. Will DOE use the full amount of funding appropriated for the Section 242 program in both the IIJA and Consolidated Appropriations Act, 2022? If no, why not?

A69. Since 2014, the Section 242 program has been funded annually between $3.6 million and $7 million. In every year, the total eligible hydropower production exceeded the level of payout funding by approximately $2 million to $5 million. Therefore, payouts since 2014 (for CY13 to CY19 hydropower production) were prorated and reduced to ensure that all eligible entities received payments.

Under the current solicitation, however, we estimate that the combined FY 2021 and FY 2022 funds ($13.7M) should allow, for the first time, full funding of all eligible applications for CY 2020 hydropower production under the Section 242 statute. As noted above, beginning with the Section 242 solicitation for CY 2021 hydropower production, we will begin utilizing the $125 million provided by the Bipartisan Infrastructure Law. Given historical numbers of Section 242 applications, we expect full funding of all applications in the near-term.

Q70. Are there other programs at DOE that were funded by both bills that DOE does not intend to fully expend?

A70. There are no programs currently funded by both appropriations (regular and IIJA) that DOE expects not to fully expend.

**Cybersecurity**

Q71. This March, at CERAWeek, you proclaimed that the U.S. is now on "war footing" as a result of Russia's invasion of Ukraine.

Q71a. With gas prices already soaring, what is DOE doing to preemptively protect our oil and gas pipeline and refining infrastructure from cyberwarfare?

A71a. As the sector risk management agency and lead agency for energy emergency response, the Department of Energy (DOE) leads Federal efforts to secure the nation's energy infrastructure against all hazards, reduce the risks and impacts of cyber and other disruptive events, and support restoration and response. DOE's Office of Cybersecurity, Energy Security, and Emergency Response (CESER) works closely with industry partners through the Oil and Natural Gas Subsector Coordinating Council (ONG SCC), which includes owners and operators and 26 trade associations covering the entire oil and gas supply chain across the U.S. and Canada, to address evolving cyber threats to the nation's oil and gas infrastructure.

DOE has been proactively providing energy companies, including oil and natural gas companies, with information on cyber threats and mitigation measures. Prior to Russia's invasion of Ukraine, DOE hosted a webinar for approximately 1,000 energy sector owners and operators on cyber threats and mitigation measures to address those threats. Since then, DOE continues to work with the energy sector to strengthen the cyber resilience of the sector through efforts such as the launch of the Cybersecurity Capability Maturity Model (C2M2) and providing Analysis of Risks in the Energy Sector (ARES) reports.

Russia's unjustified, unprovoked, and unconscionable war against Ukraine, and its ongoing destructive military campaign, has had a profound impact on global and domestic energy markets. As a result of Russian actions, public pressure on international economic engagement with Russian businesses, and the international community's imposition of sanctions on Russia's financial system and energy sector, the global supply of crude oil has been disrupted. Even small, sudden reductions in imports and supply can have an outsized impact because the global oil market was already strained prior to

Russia's actions in Ukraine. Additionally, several factors have led to an imbalance in supply and demand, including a reduction in U.S. refining capacity over the past two years; increase in the price of crude oil, a global commodity; a decrease in imports; and strong demand as the U.S. continues to recover from the pandemic.

Due to ongoing concerns about below-average stocks of fuel (gasoline, diesel, and jet fuel), DOE has been engaged with a wide range of partners over the past several months, including the ONG SCC, Electricity Subsector Coordinating Council (ESCC), National Association of State Energy Officials, the Federal Emergency Management Agency, and the Environmental Protection Agency. DOE has also been engaged with pipeline companies, terminal operators, and trade associations and will remain in close contact with all industry and interagency partners. DOE engagement to address global energy market constraints began prior to Russia's invasion of Ukraine and have included historic releases from the Strategic Petroleum Reserve to help lower prices at the pump and address a lack of supply around the world.

DOE and CESER remain committed to working closely with the oil and natural gas sector.

Q72. Where are some of the major cyber vulnerabilities in our energy infrastructure that DOE has identified?

A72. Given the diversity of systems, cybersecurity in the energy sector faces unique challenges, including both information technology and operational technology; dispersed geographic infrastructure; interdependencies; and the reliance on energy delivery, with low tolerance for downtime. While many energy sector companies have sophisticated cybersecurity programs, resources vary by size and segment of the sector. Further, cyber threats to the energy sector range from cybercriminals looking to exploit access for a profit, to advanced persistent threats from nation-state adversaries working to leverage access to gain intelligence and the ability to cause disruptive effects. As noted in the 2022 Annual Threat Assessment of the U.S. Intelligence Community, "China almost certainly is capable of launching cyber attacks that would disrupt critical infrastructure services within the United States, including against oil and gas pipelines and rail systems" and

"Russia is particularly focused on improving its ability to target critical infrastructure, including underwater cables and industrial control systems, in the United States as well as in allied and partner countries, because compromising such infrastructure improves and demonstrates its ability to damage infrastructure during a crisis."

Coordination between government and the energy sector is key to addressing and mitigating the cyber threats to the energy sector. This coordination is led by the U.S. Department of Energy (DOE), as coordinating agency for Emergency Support Function (ESF) #12, under the National Response Framework, and the Sector Risk Management Agency (SRMA) for the energy sector, pursuant to Presidential Policy Directive (PPD) 21, PPD 41, Executive Order 13636, and the FAST Act. Overall, DOE works to support industry, interagency, state, local, Tribal, and territorial partners in their efforts to prepare and respond to all-hazards, including cyber. Within DOE, these responsibilities are led by the Office of Cybersecurity, Energy Security, and Emergency Response (CESER), with support from the Office of Intelligence and Counterintelligence (IN).

CESER has a range of tools and technologies to help strengthen and improve energy sector cybersecurity, including the Cybersecurity Capability Maturity Model (C2M2), which helps organizations understand cyber risks to their information technology (IT) and operational technology (OT) systems and measure the maturity of their cybersecurity capabilities. CESER's Cyber Testing for Resilient Industrial Control Systems (CyTRICS) program helps strengthen the supply chain cybersecurity of critical energy equipment through partnerships with some of the largest industrial control systems manufacturers in the world. Further, through the Cybersecurity for the Operational Technology Environment (CyOTE) initiative, CESER is developing tools and capabilities that help energy asset owners and operators proactively secure OT systems.

CESER is also helping to ensure cybersecurity is built into renewable technologies and architectures at the start of the design and development process through the Clean Energy Cybersecurity Accelerator (CECA), managed by the DOE's National Renewable Energy Laboratory (NREL) and sponsored by CESER and utility industry partners in collaboration with the Office of Energy Efficiency and Renewable Energy.

Q73. What work is DOE doing to ensure the Federal government does not impose duplicative cyber incident reporting requirements on the energy sector at this crucial time?

A73. The Department of Energy's (DOE) Office of Cybersecurity, Energy Security, and Emergency Response (CESER) is working with the Cybersecurity and Infrastructure Security Agency (CISA) and other agencies to streamline reporting requirements and avoid duplicative requirements that could be confusing for energy sector stakeholders or counterproductive in responding to and recovering from cybersecurity events. DOE has had long-established reporting requirements, including requirements related to cyber incidents for the electricity sector through the DOE-417 Electric Emergency Incident and Disturbance Report. Over the past several years, DOE has worked closely with the Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC), and the Electricity Information Sharing and Analysis Center (E-ISAC) to ensure reporting requirements are aligned, minimizing the burden on industry, while ensuring that vital information is shared in a timely manner.

Additionally, DOE has a close relationship with industry partners and works to ensure that all segments of the energy sector are comfortable sharing information about incidents with the Department. Sharing incident information ensures that DOE has situational awareness of any emergency incidents or disturbances that could impact the energy sector, which enables the U.S. Government to take steps to help address disruption and respond to any impacts as appropriate.

DOE is currently working with CISA on implementation of the Cyber Incident Reporting for Critical Infrastructure Act (CIRCIA) of 2022 to ensure that DOE, as the Sector Risk Management Agency (SRMA) for the energy sector, remains the key point of contact for energy stakeholders after an energy cybersecurity incident. DOE has a robust and productive working relationship with energy sector stakeholders, and we remain in close contact with these entities on energy security for information-sharing purposes. After an incident, it is critical that these entities contact DOE immediately while continuing to address the event so that DOE can mitigate potential energy supply impacts. Upon notification, DOE will share the incident details with CISA to coordinate across other

sectors and government stakeholders as needed. This avoids confusion for energy stakeholders, who are accustomed to working with DOE as the SRMA on energy-related issues and allows stakeholders to focus on addressing the impacts from the incident rather than duplicative reporting requirements.

**Electric Vehicles**

Q74. In May of last year, you claimed that "if you drove an electric car, this cyber-attack would not be affecting you, clearly."

Q74a. Are you suggesting that an attack on utilities is more or less attractive to our adversaries if our country is entirely reliant on the electric grids for energy?

A74a. The Department of Energy (DOE) works with industry to protect against, respond to, and recover from physical and cyber attacks. It is our mission to secure the distribution and transmission of oil, gas, electricity, and all other forms of energy. The Department remains vigilant in protecting American energy infrastructure and consumers of energy through all attacks, threats, or perceived threats.

We acknowledge the seriousness of any threat to our national energy supply, whether electric, gas, or otherwise. As we continue our transition to clean, secure energy and economy-wide electrification, DOE will continue to elevate the efforts of the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) and all other security and resilience efforts across the Department to protect our energy resources from both cyber and physical threats.

Q75. Is there any economic and/or national security benefit to having more broadly diversified energy sources, or is it in the United States' interest to have a domestic energy mix focused solely on renewables?

A75. The United States has set targets to achieve 100% clean electricity by 2035 and net zero emissions economy-wide by no later than 2050. Nuclear, fossil fuels with carbon capture and sequestration, clean hydrogen, and renewable sources like solar, wind, geothermal, and hydropower, alongside storage, will all play a key role in decarbonizing the power sector and providing clean, affordable, reliable, and resilient electricity to all Americans.

Expanding clean energy has a clear economic and national security benefit. Today, the nation's economic security is highly exposed to volatility in the price of fossil fuels such as natural gas and petroleum. This volatility has been exacerbated by the Russian invasion of Ukraine. In contrast, because wind and solar have no ongoing fuel costs and low, predictable operating costs, the cost of wind and solar projects is stable once they are in service. Further, continued expansion of wind and solar into the nation's power grid can play an important role in helping to stabilize electricity prices over the long term and reduce the reliance on foreign producers of oil, particularly those in unstable parts of the world or under the influence of our adversaries. These stable prices will be increasingly important as the share of electric vehicles grows, which will also further insulate Americans from fossil fuel price volatility.

Q76. However, during the Texas freeze last year, the price of electricity increased to $9,000 MWhr.

Q76a. So, if everyone is forced to drive electric vehicles, how are first responders, such as firefighters, police officers, and EMTs, supposed to be able to afford to charge their vehicles and respond to emergencies at times of crisis?

A76a. All Americans, including first responders, can expect cost savings charging an electric vehicle (EV) compared to fueling a gasoline- or diesel-fueled vehicle. According to a study by Consumer Reports, EV drivers can already save $6,000-$10,000 over the vehicle's lifetime, thanks to reduced fuel and maintenance costs.[28] Additionally, developments in battery and charging technology, the auto industry's release of a wider range of increasingly affordable EVs, and additional support from the Administration for the EV domestic supply chain are all expected to contribute to a decrease in the upfront purchase costs of EVs. All fuel sources, including gasoline and diesel, are subject to extreme fluctuations during crisis and natural disasters, as demonstrated by the price spikes earlier this year following Russia's invasion of Ukraine. In fact, natural gas and petroleum are in general much more vulnerable to price fluctuations than electricity. The Texas price spikes were unusual, short-lived, largely not passed along to electricity customers, and extremely unlikely to occur in other parts of the country, which have different market designs than in Texas. DOE is actively researching, developing, and

[28] https://www.consumerreports.org/hybrids-evs/evs-offer-big-savings-over-traditional-gas-powered-cars/

demonstrating stationary battery storage and renewable grid integration to improve grid resilience in times of high demand to improve cost and reliability for all Americans. Further, major automakers including Ford and GM have enabled their EV batteries to operate independently from the electric grid to support energy demands during times of emergencies.

Q77. If commuters are stuck on a highway in the middle of a blizzard or hurricane, what are they supposed to do if their electric vehicles run out of battery power and they're dozens or hundreds of miles from the nearest charging station?

A77. The median driving range of electric vehicles (EVs) on the market today is over 230 miles, and new EVs are generally targeting a range over 300 miles. DOE research indicates that the majority of EV charging will take place at home, enabling EV owners to maintain a full charge. Mobile charging units are available for road-side and other temporary charging uses and offer an experience similar to roadside refueling when a consumer runs out of gas on the highway. Also, EVs do not draw as much energy as internal combustion engine vehicles while standing still which essentially further improves their range in this type of long-dwell situation.

In addition, the U.S. Department of Transportation's Federal Highway Administration (FHWA) announced in February Program Guidance for the National Electric Vehicle Infrastructure (NEVI) program and in June a Notice of Proposed Rulemaking (NPRM) which includes a goal (among others) of EV charging access at least every 50 miles across America's Alternative Fuel Corridors and Interstates. The Joint Office of Energy and Transportation was established to provide technical assistance and resources to help states successfully complete their deployment plans and access NEVI formula funding to build out the charging network. The Joint Office of Energy and Transportation is reviewing infrastructure deployment plans from the states, Washington D.C. and Puerto Rico that were submitted in August. These plans required risk mitigation strategies to address resilience, emergency evacuation, and snow removal or seasonal needs.

Q78. Even if someone happens to be close to charging station during a severe weather event, a typical electric car with a 60kWh battery takes almost 8 hours to charge from empty to full, from a 7kw charging point.

Q78a. What are everyday Americans supposed to do when dozens of electric cars are in line for a charger and they're in imminent danger?

A78a. The Department of Energy (DOE) has historical and ongoing work funded by the Vehicle Technologies Office reducing the barriers to electrification, including improving the technology of electric vehicles and EV charging. The majority of EV charging will take place at home and allow consumers to maintain their vehicle charge without having to wait in line or drive to a gas station. For charging away from home, DOE has a goal of decreasing the charge time of an EV to 15 minutes or less and is actively supporting technologies to support drivers without reliable access to home charging, including by evaluating opportunities for vehicle-based photovoltaics. In addition, the new Joint Office of Energy and Technology supports the Bipartisan Infrastructure Law investments for a national EV charging network that it is convenient, reliable, and equitable. The U.S. Department of Transportation's Federal Highway Administration announced in February Program Guidance for the National Electric Vehicle Infrastructure program and in June a Notice of Proposed Rulemaking which includes a goal (among others) of EV charging access at least every 50 miles across America's Alternative Fuel Corridors and Interstates.

**National Labs**

Q79. The National Energy Technology Lab (NETL) – particularly its location in Morgantown, West Virginia, focuses on applied research for the production and use of U.S. domestic energy resources, including coal, oil, and natural gas. In particular, it has the task of maturing technologies for the capture and use of carbon dioxide. Like other industries, NETL is facing a significant workforce challenge, which will make the work it has been tasked with through the Energy Act of 2020 and IIJA even more difficult.

Q79a. How will DOE alleviate this issue?

A79a. Recruiting and acquiring highly talented individuals has become more challenging and increasingly competitive in today's market. NETL is facing an increased workload as a result of the Energy Act of 2020 and the Infrastructure Investment and Jobs Act (IIJA). With the passage of the IIJA, also referred to as the Bipartisan Infrastructure Law (BIL), the Department of Energy (DOE) and the Clean Energy Corps (CEC) will be charged

with investing more than $62 billion to deliver a more secure and equitable clean energy future for the American people. To effectively meet DOE's responsibilities outlined in the IIJA, DOE launched the Applicant Portal in January 2022 to fill positions in the CEC with new and current Federal employees. NETL is leveraging all tools to expedite recruitment actions to implement the new programs and investments included in the Energy Act of 2020 and the BIL.

To implement these opportunities, NETL is seeking candidates with diverse backgrounds and using innovative solutions to do so, including hiring veterans, disseminating internal expressions of interest, posting Open Continuous Direct Hire (OCDH) announcements via USAJOBS, and using the DOE Applicant Portal to fill CEC positions. The DOE Applicant Portal is considered a virtual job fair, where resumes are collected from voluntary respondents to assess their interest in working in DOE as part of the CEC.

All IIJA positions have been determined to be critical hires and are covered under DOE's Direct Hire Authority as authorized by the IIJA. USAJOBS serves as DOE's system of record for making competitive selections and documenting the recruitment process. DOE has posted OCDH announcements on USAJOBS specifically to support filling these positions based on a critical hiring need.

Q80. Would DOE support the Morgantown Lab assuming direct hiring authority?

A80. All Infrastructure Investment and Jobs Act (IIJA) positions have been determined to be critical hires and are covered under DOE's Direct Hire Authority. The National Energy Technology Laboratory (NETL) has been successful in utilizing direct hire for IIJA staffing and for job series that OPM has identified on non-IIJA positions. The Direct Hire Authority was granted for only certain job series and does not extend to all series. Direct Hire job series include General Engineers, Physical Scientist, Research Scientist, Acquisition, Economists, and IT positions.

NETL staffing has historically been substantially less than the allotted threshold of 578 positions. As a result of Direct Hire Authority, NETL has been able to expedite hiring actions while attracting a larger candidate pool.

Direct Hire has significantly reduced the timeline for recruiting and filling positions. Another benefit of Direct Hire is a larger applicant pool. Direct Hire positions attract an increased number of applicants and this authority ensures the most qualified candidates are hired.

It should be noted, by utilizing direct hire, NETL staff perform the majority of the processing of the action and decrease the workload going to the Office of Recruitment and Advisory Services (ORAS), for which NETL has a memorandum of agreement and pays for roughly ten employees to process a portion of the hiring actions.

Q81. The continuity of operations for DOE and the continuity of government is critical during times of crisis. Last year, you stated that the completion of the sensitive compartmented information facility (SCIF) at NETL is currently estimated to be March 2022.

Q81a. Did DOE meet that estimation? If no, then when is completion of the SCIF expected and why has it been delayed?

A81a. Due to supply chain issues and material shortages, the project's estimated construction completion has been pushed back to November 2022.

The cause for much of this delay pertains to the resources needed for the communications and networking infrastructure. As a brief example, material delays for secure communication electronics ordered as far back as January 2022 are only arrived in July 2022. Other material ordered during this same time has yet to ship, with no ship date available from the vendor. Because of this, the work where this material is needed had to be delayed, which in turn created a cascading effect that necessitated pushing back the overall project completion. Research into sourcing the material through a different vendor or substituting for an approved equal was not fruitful, as vendors are all experiencing the same issue of not having material in stock and not being able to give firm availability dates from the manufacturer. Furthermore, some of this material is special order, which inherently has a longer lead time. Additionally, any deviations from already reviewed and approved materials would again require notification and review and approval from headquarters which in turn would create additional delay. Because of these factors, the best option at this juncture is to wait for the material to arrive and schedule the work

accordingly, as any attempted changes at this stage could create further unintended delays.

However, the vast majority of construction for the project is completed. Walls, doors, ceiling, flooring, power, lighting, HVAC systems, furniture, and the backup generator are installed and operational. The remaining construction work impacted by this delay is primarily that of the communications and networking infrastructure. Remaining work on the SCIF includes testing as part of the accreditation process and activating the security systems.

Q82. Does DOE have any plans to consolidate or close any of NETL's locations and campuses?

A82. No, DOE does not have any plans to consolidate or close any of NETL's locations and campuses.

Q83. Last year, in light of Jennifer Wilcox stating that the Office of Fossil Energy and Carbon Management would "absolutely not" pursue research and development into coal to products – specifically using "newly mined carbon ore," I asked you if DOE would continue to promote R&D into coal-to-products using newly mined coal, to which you answered, "newly mined coal could also source the carbon ore required for the production of carbon products for the advanced technologies" and that "DOE does not exclude newly mined coal from its current coal-to-products research and development program."

Q83a. Do you agree with your previous statement? If no, why not?

A83a. FECM supports research on using carbon ore to create valuable products, such as graphite. DOE does not exclude newly mined coal from its current carbon ore processing research and development program. FECM is also supporting research, development and demonstration of the production of products and critical minerals from waste coal and coal by-products, the remediation of which provides additional benefits, especially in terms of environmental justice and stewardship.

Q84. What is the ratio of newly mined coal to waste coal used in DOE's research and development program? Please provide data supporting your statement that DOE does not exclude newly mined coal.

A84. FECM and the Carbon Ore Processing Program do not exclude newly mined coal as a feedstock. However, you are correct that this administration has focused primarily on coal waste feedstocks, since they provide the greatest opportunity to create value remediating land and air impacts. Generally, most R&D under the program supports the creation of value-added products that are almost pure carbon (such as carbon fibers, graphite, nanocarbons, and activated carbons), and thus could be relevant for both newly mined coal, as well as waste coal. Of the current 39 active projects, six focus solely on waste coal as feedstocks, while the remainder primarily use newly minded coal.

Q85. Do you agree that there is a shortage of domestically sourced rare earth elements (REEs) in the United States?

A85. Yes, there is a shortage of domestically sourced REEs in the United States. REEs are on the U.S. Geological Survey (USGS) 2022 Final List of Critical Minerals, and the United States is approximately 80% reliant on foreign sources for REEs as a whole, according to the USGS Commodity Survey. Furthermore, almost all of the REEs that are currently produced domestically are shipped to Asia because of the lack of processing and refining facilities in the United States. DOE is working on diversifying supply for REEs through unconventional, secondary, and recycled sources, as well as enabling advanced processing and refining technologies.

Q86. Do you agree that extracting REEs and other critical minerals from coal is integral to meeting this Administration's goals? West Virginia University's Water Research Institute found that the REEs extracted from coal resources actually exceeded NETL's REE extraction and purity goals.

A86. DOE agrees that extracting REEs and other critical minerals from coal, coal byproducts, and coal waste, as well as other unconventional and secondary sources (like produced water), provides an excellent opportunity to produce significant domestic supplies of REEs. Reliable REE supplies are needed to meet the administration's clean energy goals.

Q87. How does this Administration plan to meet its supply needs if it continues to take regulatory action that will shutter coal mining operations? Will they procure REEs and critical minerals from countries like China or the Congo?

A87. DOE aims to drastically reduce our foreign dependence (including from China and the Congo) on critical minerals (CM), including REEs, through applying a critical minerals and materials strategy to enable resilient, diverse, sustainable, and secure domestic supply chains by 1) diversifying supply with balanced co-production; 2) developing substitutes; 3) improving material and manufacturing efficiency; and 4) enabling a circular economy by reducing, reusing, and recycling. For example, DOE's Office of Fossil Energy & Carbon Management's (FECM) CM programs are sponsoring research to accelerate the domestic commercial production of CM and REEs from secondary feedstocks, such as coal ash, mine drainage, and produced water. In addition, DOE's Office of Energy Efficiency & Renewable Energy (EERE) is sponsoring research on recycling of REEs/CM from e-waste, the domestic production of lithium from new sources such as geothermal brines, and development of substitute materials, all to reduce our reliance upon foreign sources. Furthermore, DOE's Advanced Research Projects Agency-Energy (ARPA-E) is sponsoring work on domestic production of REEs from abundant waste materials, such as red mud from the aluminum industry.

QUESTIONS FROM THE HONORABLE H. MORGAN GRIFFITH (R-VA)

Q1. Please respond for the record to the following questions pertaining to Energy Act 2020 revisions to the requirements for Title XVII Department of Energy loans:

Q1a. Has DOE worked out a memorandum of understanding with Treasury on analysis of DOE Loans as required by the Energy Act of 2020?

A1a. Yes, the Department and Treasury recently executed an Amended and Restated Memorandum of Understanding with respect to the Title XVII program, incorporating the requirements of the Energy Act of 2020.

In addition, the Department has taken several steps to revise its application process to meet the requirements of Energy Act of 2020 amendments, including updating the timing of collection of fees for projects that reach financial closing, clarifying regional variation exemption for deployment of same or similar technologies, and other items. LPO recently released restated and amended solicitation supplements to its Title XVII solicitations to reflect these and other changes.

Q1b. Have any loan guarantees been denied as a result of Treasury analysis?

A1b. No loans have been denied as a result of Treasury written analysis.

Q1c. Can you provide us with Treasury analysis on those that have been approved?

A1c. The Treasury analysis includes deliberative and business confidential information, and the Energy Act of 2020 requires DOE to submit Treasury's analysis on Title XVII loan guarantees to Congress only if DOE makes a guarantee of which the financial terms and conditions are not consistent with the Treasury written analysis. The Secretary has issued one Title XVII loan guarantee since this requirement came into effect, and the loan did not trigger this requirement.

Q1d. Are you working with IG on issues identified under Obama stimulus program?

A1d. LPO has continuously worked to improve oversight and efficiency of its loan programs, including incorporating independent audit recommendations from 2012 related to improvements in identifying potential issues with projects earlier, assessing project risk,

sharing best practices across LPO, and other items. LPO is currently working with the DOE Office of Inspector General's office on a review of lessons learned.

QUESTIONS FROM THE HONORABLE BILL JOHNSON (R-OH)

Q1. In the Energy Act of 2020, Congress amended the existing Smart Grid Demonstration program, directing you to "encourage the commercial application of advanced distribution automation technologies that exert intelligent control over electrical grid functions at the distribution level to improve system resilience." (Section 8001(f)). This language is intended to encourage application of advanced distribution automation technologies, like Advanced Distribution Management Systems (ADMS) technology and Distributed Energy Resource Management Systems (DERMS) technology, to improve distribution level resilience. Whether the priority is increasing reliability, lowering customer costs, or facilitating lower GHG emissions, this directive is a win-win-win.

Q1a. What is DOE doing to implement this provision?

A1a. No appropriations have yet been provided to fund Section 8001 of the Energy Act of 2020, and so DOE has not begun activities to implement this program.

Q2. Madam Secretary, I fully support the Department's uranium enrichment program in Piketon, Ohio, to demonstrate the production of High Assay Low Enriched Uranium, which is needed for most advanced reactor designs – but is available commercially only from Russia. What are the Department's plans for using this facility to produce HALEU? And when do you expect to expand the Piketon facility to bring more enrichment capacity to the emerging advanced reactor market?

A2. The Department published a Request for Proposals (RFP) on June 28, 2022, to complete the assembly of the uranium enrichment cascade, demonstrate successful operation by filling and storing the first cylinder with a minimum of 20 kg of HALEU, and, subject to appropriations, to continue operations at a rate of at least 900 kg of HALEU per year. The Department expects to complete assembly of the cascade; operate the cascade to produce 20 kg of HALEU to demonstrate operations; and, subject to appropriations, exercise the options to produce 900 kg per year of HALEU.

The Advanced Reactor Demonstration Program will require more than the annual production of 900 kg of HALEU. The Department is exploring market-based approaches to establishing a robust HALEU supply chain. Expansion of domestic enrichment capabilities are envisioned under this approach, pending authorization and appropriations from Congress.

Q3. The recent infrastructure law includes nearly $3.5 billion in funding for large-scale carbon capture pilot projects and demonstration programs, with six cooperative agreements to capture carbon dioxide. Of those six, two are specifically to be located at coal electric generation facilities.

Q3a. Please describe the process the DOE will use to select these specific locations as well as the anticipated timeline for when selections will take place.

A3a. The Department of Energy's (DOE) Office of Clean Energy Demonstrations in collaboration with the Office of Fossil Energy and Carbon Management intends to issue a funding opportunity announcement (FOA) entitled "BIL: Carbon Capture Demonstration Projects Program". DOE anticipates issuing this FOA in September 2022. DOE released a notice of intent on July 13, 2022, which highlighted preliminary details on the process for selection of demonstration projects. The process for selection of large-scale pilot projects is still under development.

QUESTION FROM THE HONORABLE TIM WALBERG (R-MI)

Q1. Supply chain problems continue to plague many areas of our economy including new home construction. New SEER 2 requirements for HVAC systems are set to take effect on January 1st, 2023, meaning many HVAC systems that are manufactured in the late 4th quarter of this year and not installed by December 31st will not be allowed for installation in many parts of the United States. Do you support a six month waiver until July 1st, 2023 to allow home builders and consumers who have already purchased HVAC systems in late 2022 to clear out existing inventory?

A1. While DOE recognizes that manufacturers across various industries are facing unique and unforeseeable circumstances caused by supply chain issues, and that the scope of those impacts will vary by company, by product, and possibly even by model, DOE is not at this time extending this type of relief from compliance with the 2023 energy conservation standards. In this regard, DOE notes that the regional standards applicable to central air conditioners installed on or after January 1, 2023, were adopted in a direct final rule more than five years ago, in January 2017. Moreover, the rule was a product of negotiated rulemaking that included various manufacturers and trade representatives and consumer advocacy groups, which resulted in a consensus agreement among the interested parties that DOE ultimately adopted. The compliance lead time that was negotiated included trade groups representing installers and distributers of this equipment and is longer than the time required by statute.

QUESTIONS FROM THE HONORABLE JEFF DUNCAN (R-SC)

Q1. During the FY 2023 DOE budget you stated you drove to the hearing in gas powered vehicle, not an electric vehicle (EV). You did indicate your preferred method of transportation is an EV, but due to the space limitations of the EV you were required to take a larger vehicle in order to fit everyone. This is a similar concern I hear from many of my constituents regarding EVs. In response to high gas prices, you have encouraged the transition by consumers to EVs. However, there are practical and logistical realties inhibiting that transition.

Q1a. I am requesting the milage data logs for your official for official travel as Secretary of DOE for both gas powered vehicles and electric vehicles.

A1a. DOE provides the following information in response to your request for Secretary Granholm's mileage for both gas and electric powered vehicles in the National Capital Region. Please note Secretary Granholm frequently bikes or jogs to work.

Our records from February 2021-June 2022 indicate that official Secretarial travel included approximately 504 miles in a gas-powered vehicle and 699 miles in an electric vehicle.

Q2. The lack of a holistic nuclear energy approach is hamstringing the industry, particularly for advanced reactors. The Nuclear Regulatory Commission (NRC) is responsible for licensing reactors but in order to do so there needs to be a disposition pathway for the fuel. The Department of Energy (DOE) is responsible for entering into these disposition contracts when a new reactor is licensed.

Because we have not licensed a permanent repository, we have no clear disposition pathway for the fuel. I am worried these advanced reactors will get to place where they are ready to be licensed, but because of the lack of disposition pathway, the DOE won't be able to enter into the necessary disposal contracts. There will be advanced reactors ready for market and we won't be able to license them.

Q2a. Is DOE consulting with the Justice Department to develop standard disposal contracts for Advanced Reactors, absent a permanent repository? Please respond in detail.

A2a. DOE is following congressional direction to make progress on consent-based siting of a Federal interim storage facility. In December 2021, DOE issued a request for information (RFI) on a consent-based siting process and received over 200 responses. DOE issued a report summarizing findings and analysis of the feedback on September 15, 2021. DOE

also issued a Funding Opportunity Announcement (FOA) on September 20, 2021 to provide funding to communities interested in learning more about consent-based siting.

DOE has started preliminary discussions with advanced reactor developers on the appropriate contract mechanism for the acceptance of spent nuclear fuel from operation of reactors with their designs. DOE will continue to consult DOJ as needed on issues related to contracts required by the Nuclear Waste Policy Act.

Q3. In Title II, Section 2001 of the Energy Act of 2020 required the Secretary of Energy to submit a report on advanced fuel material availability to detail nuclear material inventories at DOE other than those containing the uranium-235 isotope.

This report to Congress is over a year past due. I am very interested in the findings related to U-233, because I believe our existing source is a national asset. Uranium-233 is a necessary seed for thorium reactors. It is my understanding China is aggressively pursuing the thorium reactor develop.

Q3a. When will you release to Congress the complete Advanced Fuels Report, as required by statute? Please summarize its principal findings.

A3a. The report on "Alternate Fuels: Thorium and Uranium -233" is undergoing final review and concurrence within the Department. The Department will release the report to Congress as soon as it is finalized following interagency review and Administration approval. The report is comprehensive and lengthy, and includes an extensive discussion of aspects of thorium and uranium-233, including the history of thorium reactors in the U.S. and abroad, the benefits and challenges of the thorium fuel cycle, non-nuclear applications, and opportunities for the extraction of thorium with rare earth materials.

QUESTIONS FROM THE HONORABLE GARY J. PALMER (R-AL)

Q1. Secretary Granholm - Your department controls the key patent for a process that can take a very wide range of fuels, including biomass and waste materials and create clean energy with no emissions and even net-negative CO2 emissions. This technology, created at the National Carbon Capture Center in Alabama, was offered for commercial licensing by DOE over 1 year ago, yet nothing has happened to move it forward despite a company in my district applying for a license. It seems to me that they were being stonewalled because your department wished that someone else would have applied for the license or that their chosen approach to commercialization does not perfectly align with the agency's "green" agenda of renewables or nothing.

Q1a. Who should my staff reach out to get more information on the licensing process and why the company in my district was not awarded a license?

A1a. Please contact Robert Tuttle (Robert.Tuttle@hq.doe.gov) at the Department of Energy's Office of Congressional Affairs for follow-up.

Q1b. With all the talk from your Administration on the world ending due to a "climate emergency", don't you think that waiting over a year to issue a license is far too long?

A1b. The Department of Energy takes into account multiple considerations when making decisions, including availability of staff and resources, alignment with administration and department policies, prioritization of activities, and applicable law and regulation. Decisions must be fully vetted internally and with other relevant Federal agencies before issuance.

Q1c. Do you commit to treating all energy technologies fairly and to removing all bureaucratic roadblocks to the licensing and deployment of new technologies?

A1c. The historic Bipartisan Infrastructure Law has empowered DOE to supercharge its work on energy demonstration and deployment, including addressing challenges associated with getting energy infrastructure sited and built. DOE has been closely evaluating options to optimize Federal permitting, focused on improving the efficiency of technical review while maintaining meaningful engagement with state, local, community, and Tribal stakeholders. For instance, the Department's new Geothermal Energy from Oil and Gas Demonstrated Engineering (GEODE) program includes efforts to remove barriers to new geothermal projects.

As another example, currently every operating LNG project or LNG project under construction has approvals from DOE to export to its fully authorized capacity to any country not prohibited by U.S. law or policy. All operating export projects are exporting at or near their authorized capacities, with the exception of Freeport LNG that is currently working with the relevant regulatory authorities to return to service as soon as possible after a fire in June.

DOE has granted LNG export licenses up to the fully authorized capacity for 18 U.S. projects. Among the projects with DOE export approvals, six are currently operating (Sabine Pass, Cove Point, Corpus Christi, Cameron LNG, Elba Island, and Venture Global Calcasieu Pass), one project is temporarily offline (Freeport LNG, expected to return to service in October 2022), and three projects have reached a final investment decision and are currently under construction or expanding (Golden Pass, Venture Global Plaquemines, and Corpus Christi Stage III).

Q2. Do you believe that we should pursue an all the above approach to energy technologies?

A2. DOE is working to create family-sustaining jobs, support domestic manufacturing, strengthen supply chains, insulate Americans from high prices caused by global energy market disruptions, and reduce climate pollution. DOE supports a wide array of energy technologies that help achieve these national objectives.

Q3. What would you consider to be clear and timely communication in regard to a license application?

A3. The Department of Energy considers clear and timely communication as communication that is fully vetted and aligned with administration and departmental policies. In practice, this may be as long as 6-8 weeks depending on the complexity of the license application.

Q4. Do you commit to communicating clearly and in a timely manner with companies, like the one in my district, who apply for DOE licenses?

A4. Yes. The Department of Energy strives to communicate clearly and timely with its stakeholders.

QUESTIONS FROM THE HONORABLE DEBBIE LESKO (R-AZ)

Q1. The extreme persisting drought in the Colorado River Basin is significantly impacting grid resilience, resource adequacy, and the non-profit customers of multiple Western Area Power Administration (WAPA) projects, including 54 tribal entities. The ongoing drought has lowered the levels of Lake Powell and Lake Mead. This has lowered the amount of electricity of the Glen Canyon and Hoover Dams can generate. Less electricity generated from the dams means that the electric co-ops and others are forced to purchase electricity on the open market, which is expensive. These increased costs are passed onto customers.

Q1a. What steps are you taking to work in partnerships with Western Area Power Administration customers and Department of Interior (DOI) agencies to implement cost-cutting measures, stabilize customer rates, and mitigate drought impacts?

A1a. WAPA's program for addressing the impacts of drought on customers has been use of WAPA's purchase power and wheeling (PPW) authority. When power generation falls below contractual obligations for delivery due to drought, WAPA obtains power on the open market on behalf of customers who are then able to repay those costs over time. Congress supported this effort in the Infrastructure Investment and Jobs Act through the $500 million in funding included in the bill. This enabled WAPA to mitigate critical drought impacts in FY 2022 and will allow WAPA to use the estimated remaining $200MM of funding during the first three quarters of FY23. WAPA has used PPW to support its statutory obligation to provide power to customers at lowest possible rates using sound business principles. WAPA works in close collaboration with its customers and with the Bureau of Reclamation (Reclamation) at the U.S. Department of the Interior as partners to reduce annual costs wherever possible while maintaining a safe and reliable system. Other methods to address the impacts of drought have included adjusting rates in the short term at customers' request to diminish reliance on PPW needs. WAPA has also worked with customers to proactively include in rates drought adders that are triggered upon a rate system's entering drought conditions, and that allow for repayment of purchased power over time, thereby mitigating the effect of rate increases in these circumstances. In addition, WAPA is engaging with Reclamation given low reservoir levels and the possibility of reduced power generation in the Colorado River Storage Project and Desert Southwest Regions. WAPA and Reclamation are consulting with

stakeholders in the Colorado River Basin through the auspices of the John S. McCain III National Center for Environmental Conflict Resolution to explore longer term solutions in the face of historic and intensifying drought conditions in the West.

Q2. The Wall Street Journal recently reported that a Defense Department study found the People's Republic of China is exploiting a popular program, the Small Business Innovation Research program, that funds innovation among small American companies.[29] I was concerned to read that the $3.9 billion program has been used by researchers affiliated with the Chinese government to development advanced technologies using U.S. taxpayer dollars. As you may be aware, the Department of Energy awards grants to companies through this program.

Q2a. Can you explain how your department examines and investigates companies before you award these grants?

A2a. As part of the DOE award process for the SBIR/STTR programs, the Office of Science and ARPA-E consult with the Office of Intelligence and Counterintelligence (IN) once a proposal has gone through the Technical Merit review process. IN's Counterintelligence Due Diligence Team conducts an assessment of proposals that have a potential foreign nexus and conducts all-source intelligence reviews, as well as coordination with Intelligence Community partners as appropriate, to identify any counterintelligence risks. When proposals are identified as having an identifiable counterintelligence risk, IN briefs program office personnel on those risks. IN may also advise on potential measures available to attempt to mitigate risk should the program choose to continue with the proposal. If these reviews identify potential unlawful activity, the results are also shared with the DOE-IN Counterintelligence Investigations Division and/or Office of the Inspector General (OIG) personnel, as appropriate.

DOE continues to strengthen its risk-based research security policies across the Department to ensure that American taxpayer dollars are utilized in a responsible and effective manner through the SBIR/SSTR program, are directed to support innovative American businesses, and do not fall into the hands of hostile entities and governments. These ongoing efforts to strengthen the Department's risk-based research security

[29] Wall Street Journal, *Pentagon's China Warning Prompts Calls to Vet U.S. Funding of Startups* (www.wsj.com/articles/pentagons-china-warning-prompts-calls-to-vet-u-s-funding-of-startups-11652014803) (May 8, 2022).

policies include DOE financial assistance award policies, such as DOE's conflict of interest policy, current and pending support disclosure policy, and U.S. manufacturing policy for DOE-funded intellectual property. The Department continues to strengthen these policies as it implements section 223 of the National Defense Authorization Act for Fiscal Year 2021 (42 USC 6605; P.L. 116-283); requirements under the recently enacted Research and Development, Competition, and Innovation Act (Division B of the CHIPS and Science Act of 2022); National Security Presidential Memorandum 33; and National Security Memorandum 10.

QUESTIONS FROM THE HONORABLE GREG PENCE (R-IN)

Q1. Thank you, Secretary Granholm, for appearing before the committee to discuss your department's budget request. Like many of my colleagues, I support an all the above strategy for energy production, not an "everything but" approach.

Your department plays a critical role in fostering innovation to lower carbon emissions and establish a diverse slate of competitive energy sources. However, the direction taken by the Biden Administration – like rejoining the Paris Climate Accord and stopping the Keystone XL Pipeline – will jeopardize our energy security, affordability, and reliability. I am also concerned that my colleagues in Congress are pushing the American people onto untested energy technologies that are not yet ready to sustain our current demands. These endeavors, like electrifying our transportation sector, will not work for the rural Hoosiers that I represent in Indiana's Sixth District.

Madam Secretary, I gave these remarks the last time you came before this subcommittee. One year later, American energy security is in crisis, affordability is through the roof, and reliability is at risk. Instead of taking consideration of our concerns, the Biden Administration has doubled down on flawed policies that are crippling American energy independence.

Q1a. Can you explain to my constituents why you did not heed the warnings of what might happen to our energy sector with your misguided policies?

A1a. DOE's mission is to address the nation's energy and climate challenges through transformative science and technology. DOE's investments in clean energy research, development, demonstration, and deployment are central to maintaining U.S. competitiveness and enabling achievement of a 50-52 percent reduction from 2005 levels in greenhouse gas pollution in 2030. The United States cannot afford to miss these greenhouse gas pollution reduction goals, as extreme weather events are already imposing an estimated $120 billion in costs on Americans every year. The future impacts on GDP and the Federal budget will be even more severe if the United States does not lead in energy innovation to reduce greenhouse gas pollution.[30]

By leading the formation and execution of the Paris Agreement, the United States and its partners have built a framework for nearly every country on earth to work toward greenhouse gas pollution reduction simultaneously. This global effort represents a massive economic opportunity for the United States that DOE is working to realize in

[30] White House, Quantifying Risks to the Federal Budget from Climate Change (April 4, 2022).

partnership with states, local governments, and private industry on behalf of the American people. DOE's investments, enabled in significant part through the Bipartisan Infrastructure Law, will create good-paying jobs in communities across the country, strengthen domestic clean energy manufacturing, and develop key energy industries and supply chains to increase U.S. competitiveness in the market for technologies that are critical for reducing greenhouse gas pollution.

DOE's investments are aimed at advancing energy innovation and creating good-paying jobs while reducing harmful greenhouse gas pollution and increasing energy affordability and resilience. DOE has taken historic steps aimed at mitigating the significant global supply disruption in response to Russia's unprecedented invasion of Ukraine by like releasing 1 million barrels of oil per day from the Strategic Petroleum Reserve, in coordination with releases by international allies and partners, which also proved to help mitigate rising prices by ensuring certainty of supply for refiners while domestic production increased, as well as offering $3.5 billion in energy efficiency improvements to families through the Bipartisan Infrastructure Law's funding for the Weatherization Assistance Program. The newly signed Inflation Reduction Act will make it more affordable for Indiana families to purchase energy-efficient appliances, make repairs around their homes, and save money on their utility bills each month through a combination of rebates for appliances and heat pumps, rebates for home weatherization, tax credits for home energy generation systems, and new technology-neutral tax credits for putting new carbon pollution-free power projects on the grid — among other provisions for reducing energy costs.

DOE has also encouraged the domestic oil and gas industry to safely increase supply and evaluate their operations to meet this moment we are in and help bring down prices for consumers. These prices have been adversely impacted by supply disruptions caused by Russia's unprovoked and reckless invasion of Ukraine. The U.S. Energy Information Administration estimates that the United States is currently producing 11.9 million barrels (MM bbl) per day and that U.S. oil production is set to reach a record 12.9 MM bbl per day in 2023. Coupled with SPR releases, this contributed to average gas prices

falling for nearly 100 days (September), to $1.10 per gallon below where they were in June. And natural gas production and LNG exports are at record highs.

Ultimately, though, America's climate and energy security and affordability will depend on the long-term, steady advance toward American-made clean energy, that will reduce consumer exposure to fossil fuel price volatility. DOE will continue implementing the Bipartisan Infrastructure Law and the Inflation Reduction Act in pursuit of this objective.