U.S. Senate Committee on Energy and Natural Resources
February 8, 2022 Hearing: The Robinson, DeCarolis, and Daniel-Davis Nominations
Questions for the Record Submitted to the Honorable Maria Robinson

Questions from Ranking Member John Barrasso

Question 1: As a Massachusetts state legislator, you cosponsored a bill to mandate a zero-carbon electric grid by 2030. In 2020, natural gas accounted for nearly two-thirds of electricity generation in Massachusetts. According to the Massachusetts 2050 decarbonization roadmap:

"Reliance on zero-carbon fuels needed for grid balancing and end uses leads to dramatically higher costs in 2050."

a. Do you believe the entire nation can achieve a zero-carbon electric grid by 2035 with no negative effects on grid reliability or increases in consumer prices?

   The opportunity exists to achieve a zero-carbon electric grid by 2035 if state and federal investments/policies support this goal and utilities/regulators provide actionable information regarding system requirements for essential reliability services including the deployment of energy storage and other flexible generation and flexible loads technologies. Supply chain concerns and extreme climate weather events must be modeled and evaluated. In Massachusetts, we have seen price increases for consumers due to our reliance on natural gas, which becomes constrained in the winter. Addressing supply chain constraints can help improve both reliability and affordability.

b. How do you intend to utilize existing authorities at the Office of Electricity to minimize negative impacts to grid reliability and consumer costs?

   The Office of Electricity should investigate high risk- high reward technologies that can provide transformational change and support to grid reliability. The organization should focus on reducing cost of major components and systems, such as reducing the cost and improving performance of the power electronics to facilitate direct current transmission, integrating power electronics into transformers and substations to standardize the technology versus unique components and designs.

Question 2: The most recent EIA data show Massachusetts has the fifth highest electricity rates in the country, 72% higher than the national average.

a. Do you believe the people in Massachusetts pay too much for electricity?

   No.

b. Please explain why electricity rates in Massachusetts are so high?

Electricity rates are set by the state Department of Public Utilities. A number of factors go into setting electricity rates.

c. About three-quarters of Massachusetts's power generation comes from natural gas. In 2018, when being interviewed during your run for the Massachusetts State Legislature, you stated, "I would certainly be a part of a group of folks who would oppose any new gas pipelines." Do you disagree that access to the abundant, affordable gas being produced in Ohio, Pennsylvania, and West Virginia would put downward pressure on electricity rates in your state?

   If gas were to be the least-cost option in ISO-NE's dispatch order, there is potential for impacts on electricity rates.

Question 3: Numerous cybersecurity experts agree that the internet connectivity of many clean energy technologies increases the likelihood for cyber-attacks against energy infrastructure. Barely two years ago, a cyberattack affected a grid operator's visibility into nearly 500 megawatts of solar and wind facilities in a "denial of service" attack. Some of these facilities were in Wyoming.

a. Do you agree that the internet connectivity of many new energy technologies increases the vulnerability of the electric grid to cyberattacks?

   Any connection to the internet will expand the surface area for attacks and provide an access point for hackers. At the same time, communication technologies can provide system operators with important tools for improving system efficiency, affordability, and day to day reliability. It is important to consider not only which systems are vulnerable, but also which systems need to be protected the most for safety and security.

b. What will you do to address this vulnerability?

   The Office of Electricity should develop advanced approaches to grid modernization that consider cybersecurity vulnerabilities and engineer/design in cyber protections. For example, closed loop monitoring of assets, where possible and especially for high priority systems. We should leverage the use of the NIST framework and cybersecurity maturity models to evaluate risks at all stages of project design and development.

c. How will you address the problem of cybersecurity of components, such as power inverters and other components that have proven susceptible to cyber-attacks?

   The Office of Electricity should coordinate with the Office of Cybersecurity, Energy Security and Emergency Response to prioritize cyber testing of critical components and components that are susceptible to cyber-attacks so mitigation measures can be developed, or risk mitigation operational approaches be executed.

Question 4: Last year House Democrats proposed a national "clean electricity standard" as part of their budget reconciliation bill. The so-called "Clean Electricity Payment Program," or CEPP, would have provided grants to

electric utilities that meet pre-determined "clean energy" targets, and penalized those that do not. You have been nominated to lead the office that would have been tasked with administering the CEPP.

a. If confirmed, will you advocate for the CEPP or any other similar measure?

If confirmed as Assistant Secretary, my role is to implement programs put into law by Congress, not to advocate for specific policies. If Congress were to put forward this law, I would implement it willingly, like any other law.

b. Have you had discussions with anyone at the White House, at DOE, or elsewhere in the Administration about establishing in federal law or by regulation any form of a national "clean electricity standard" or associated program like an emissions credit trading system for electricity?

No.

c. If so, please identify whether any such discussion is on-going.

Question 5: When you were formally nominated to lead the Office of Electricity, Secretary Granholm stated, "This office's work […] is critical to helping us confront the climate crisis and create a clean energy economy that works for everyone. Maria has been leading the charge for clean energy in Massachusetts, and her political smarts and technical expertise will help us turn President Biden's goal of 100% clean electricity by 2035 into reality." The Office of Electricity is a fuel-neutral office. The core functions of the office are providing technical assistance to the states on various energy priorities (such as transmission planning and permitting) and cybersecurity and grid modernization R&D.

a. What actions will you take to ensure that the Office stays within its mission?

The role and mission of the Office of Electricity is critical to developing solutions that will support the reliability and resilience of the electric system in accordance with congressional appropriations and Administration policies. The Office of Electricity will continue to work with National groups, such as National Association of Regulatory Utility Commissioners and National Association of State Energy Officials, to ensure the appropriate level of support is given to States with a primary focus on technical assistance and scenario analysis provided by the National Labs, research and development of new grid technology as well as deployment of the new Infrastructure Investment and Jobs Act funds in accordance with the law.

b. Please point us to any authority from Congress for the Office of Electricity to seek "100% clean electricity by 2035"?

100% clean electricity by 2035 is an Administration priority. 30 states have laws or policies that support clean electricity or direct utilities to develop clean or renewable electricity generation. It is within the

role of the office to help electricity system operators meet the evolving needs of their service territories, through research and development of technologies that can help provide them with additional tools for flexibility, reliability, and resilience.

Question 6: On the first day of his Administration, President Biden suspended for 90 days President Trump's Executive Order on Securing the United States Bulk Power System (EO 13920). Additionally, some special interest groups were advocating for revoking this order, such as the American Wind Energy Association (AWEA). This order granted the Secretary of Energy, through the Office of Electricity, authority to prohibit the acquisition or installation of equipment in the bulk power system that is deemed a threat to national security because of foreign ownership, control, or interest.

a. As head of the Office would you advocate issuing a revised version of the Executive Order?

   The Office of Electricity will work with the Office of Cybersecurity, Energy Security and Emergency Response in the development of a revised Executive Order as directed by the White House. Supply chain security and domestic manufacturing is critical to the United States and remains a core part of the organization's mission.

b. Will you assure this committee, both now and in the future, if you are confirmed, that you will put the security of our nation's electricity supply and delivery system ahead of any environmental goal or any objective to promote certain forms of energy?

   Reliability and security of our nation's electric infrastructure is paramount. The Office of Electricity should evaluate and monitor the transition to ensure essential reliability services are met through the deployment of clean flexible generation including but not limited to hydropower, biomass, offshore wind, nuclear, and energy storage.

Question 7: Last year, Secretary Granholm stated that foreign adversaries have the capability to shut down our electric grid through cyberattacks. Do you see cybersecurity as a primary threat to the reliability and resilience of the electric grid?

Yes, cyber-attacks and extreme weather events are both significant threats to the reliability and resilience of the electric grid. Climate change will continue to increase the frequency and duration of extreme weather events.

Question 8: The easiest way to reduce emissions is to use less energy by increasing energy efficiency. Technologies are available for enhancing the efficiency of the electric grid by reducing transmission line loss. This allows for increasing transmission capacity without siting and permitting new lines, which can take years to do. What should DOE do to promote such transmission technologies?

Advanced conductors, grid enhancing technologies such as dynamic line rating, power flow controllers and dynamic topology configuration, and HVDC provide excellent opportunities for improving the capacity, operations and efficiency of the electric grid. The Office of Electricity should continue to demonstrate

innovative technologies such as these as part of its research and development portfolio in order to reduce cost, document the cost/benefits of their application, and help develop control strategies and procedures for effective operation.

Question 9: How do you evaluate the risk of a disruption to the nation's electric grids from electromagnetic pulse (EMP) or geomagnetic disturbance? How can the Office of Electricity help mitigate this risk?

The Office of Electricity will work with the Office of Cybersecurity, Energy Security and Emergency Response to develop and demonstrate innovative shielding technologies, transformers and advanced operational approaches to minimize the effects of electromagnetic interference and geomagnetic disturbances.

Questions from Senator James E. Risch

Question 1: How do you see the national labs playing a role in protecting and enhancing grid reliability? Specifically, what are your views of the Idaho National Lab's industry-scale power grid testbed capability, which is part of the recent Office of Electricity investment over the last 5+ years?

The full-scale test grid allows experts from across the federal government and private industry to develop and demonstrate technologies that improve security and enhance resiliency. Capabilities like these at the national laboratories provide industry and academia with access to the tools they need to safely and effectively test and develop new technologies that will be critical for meeting the nation's energy needs.

Question 2: One of the Office of Electricity's divisions is Electricity Delivery Cybersecurity Research and Development. Can you please explain how you will prioritize the cybersecurity of the nation's grid if you are confirmed, and how you will leverage research and development efforts to support electric grid cybersecurity?

The Office of Electricity should develop advanced approaches to grid modernization that consider cybersecurity vulnerabilities and engineer/design-in cyber protections. For example, closed loop monitoring of assets, where possible. The organization should leverage the use of the NIST framework and cybersecurity maturity models to evaluate risks at all stages of project design and development. Most importantly, this should be applied to the technologies the organization is developing such as energy storage and microgrids.

Question 3: With Fifth Generation (5G) wireless technology rapidly being deployed, and enabling, in some cases, game changing capability, what are your thoughts on the interdependence between the electric and telecommunications sectors?

Secure and reliable communications are critical to the operation of the electric grid. The Department in coordination with other federal agencies should work to ensure that wireless technologies are available to support the operation of the electric grid as well as assure policies are made to mitigate cybersecurity risks while ensuring policies not interfere with grid operations.

Question 4: What is your vison for connecting the Office of Electricity to the breadth of DOE programs, including the stable clean energy from advanced nuclear, that contribute to our nation's resilience to catastrophic storms, cyberattack and other threats?

Cyber-attacks and extreme weather events are both significant threat to the reliability and resilience of the electric grid. Climate change will continue to increase the frequency and duration of extreme weather events. The Department should leverage all of its resources and support efforts such as the grid modernization initiative to develop strategy teams that ensure a unified Departmental approach to a clean and resilient electric grid.

Questions from Senator Maria Cantwell

Question 1: Ms. Robinson, as we discussed during your confirmation hearing, a nationwide build out of Optical Ground Wire along our nation's transmission grid systems could move the data needed to modernize our energy system, make our grid more cybersecure, and provide the backhaul, middle-mile capacity needed to bring affordable broadband to essentially every household or business that currently serviced by the grid.

- Do you agree that expanding communications capacity along the grid's existing rights-of-way could provide significant co-benefits for cybersecurity, grid modernization, and providing affordable high-speed internet to underserved and unserved communities and households?

  To the extent that developers can "dig-once" or leverage assets being built, such as transmission, to enable communication capacity along existing rights-of-way, underserved communities would be able to take advantage of the benefits building this infrastructure provides. Optical ground wire is necessary for transmission/grid operations and can provide communication services to the communities along the transmission rights-of-way. It is currently standard practices to install optical ground wire with transmission.

- How do you think the Office of Electricity could help facilitate more investment and rapid deployment of optical ground wire along our nation's grid?

  The Office of Electricity conducts research and development to advance the reliability and resilience of the electric grid. Operating the electric grid requires a significant buildout of secure communications for grid operations. To the extent developers/utilities support the building of transmission and distribution lines as part of its projects or through the implementation of the Bipartisan Infrastructure Law funding, optical ground wire will be part of the transmission infrastructure.

- Do you think there other ways to spur deployment of grid fiber, like requiring all transmission projects that receive federal funding include Optical Ground Wire or by providing incentives through FERC when transmission gets built out?

DOE, through the Office of Electricity, would recommend considering any incentives, policies, or credits to spur the building of transmission. Operating the electric grid requires a significant buildout of secure communications for grid operations. To the extent, the developers and utilities support the building of transmission and distribution lines as part of its projects on implementation of the Bipartisan Infrastructure Law funding, optical ground wire will be part of the transmission infrastructure.

Question 2: Ms. Robinson, if confirmed, you will be a key decision maker in the management of the $3 billion in cost-shared smart grid grants that the Energy and Natural Resources Committee approved and was included in the Bipartisan Infrastructure Bill.

- As the author of the Smart Grid Title of the 2007 Energy Bill, which included the authorization for the original Smart Grid Grant Program which was then funded in the 2009 American Rescue and Reinvestment Act, I am interested in hearing your views on the results and lessons learned from the original program.

  The Smart Grid Program was a success in several ways, it catalyzed technology deployment with over 1380 transmission syncrophasors deployed; 82,000 intelligent automated devices on the distribution system; 16 million meters and over 47,000 direct/indirect jobs (vendors, supply chain, etc.). The program did more than just technology deployment, it enabled the development of data analytics such as advanced outage management systems, and asset management systems. This capability enabled outcomes such as reduced time to forensic assessments of events, reduced outage times, and prevention of catastrophic equipment events (e.g. transformer failures).

- What are some example of smart grid technologies and projects that you think are more beneficial to support using the current round of funding as compared to the smart grid technologies and projects funded a decade ago?

  Given the current need for additional transmission capacity, the deployment of grid enhancing technologies would provide some early benefits to enabling clean energy deployment. Asset management and fault identification continues to be critical to enable for wildfire prevention and health monitoring of equipment.

- The Bipartisan Infrastructure Bill expanded eligibility for the smart grid program to include *"In the case of utility communications, operational fiber and wireless broadband communications networks to enable data flow between distribution system components."* Do you believe that would cover investments like cost-sharing the build out of Optical Ground Wire along our nation's electricity grid?

  The funding available for smart grid investments under the Bipartisan Infrastructure Law is $3 Billion – approximately $600 million per year over 5 years. Given the cost of deploying such investments, this funding will provide a small incremental investment and deployment of operational fiber and wireless broadband communications.

Question 3: Ms. Robinson, the Pacific Northwest National Laboratory recently released a new study showing that if transactive energy technologies were used across the country, we could cut peak loads by up to 15% and deliver $50 billion in economic benefits to consumers.

- Do you agree with the report's conclusions and do you think transactive energy technologies can help achieve the Administration's goals for decarbonizing the power system, while maintaining an affordable, reliable, and resilient electric grid?

  The PNNL Study is based upon a large-scale simulation of a grid the size of Texas and demonstrated how customer-owned Distributed Energy Resources (DERs) could be engaged as grid assets and be fairly compensated for their participation. The benefits of transactive energy technology were shown to be independent of the types of DERs (EVs, energy storage, flexible loads), enabling multiple future paths. The study further showed that both active participants and non-participants benefit because total system costs go down, due to efficient coordination between supply and demand. As such, the study concludes that transactive energy technologies improve affordability and maintain reliability and provide an enhanced source of control necessary for a more dynamic, decarbonized power system.

- As the Assistant Secretary for the Office of Electricity, how will you work to advance technologies and innovations in distribution like transactive energy?

  The Office of Electricity maintains a broad portfolio of R&D such as energy storage, microgrids, and sensors, and the connections between these programs is as important as the accomplishments within the programs. Ensuring that these programs share results and develop combined opportunities is valuable, and can also inform DOE's newly formed deployment-forward organizations.

- And can you deliver in this area with current distribution R&D budgets that have been flat for the past decade?

  There is a gap between a large-scale simulation as utilized in the PNNL report and full scale deployment of transactive energy capabilities. Any R&D program whose mission is to have a substantive impact on the nation's electric system should be capable of executing applied research, pilots and demonstrations, and commercially self-sustaining activities within its portfolio. Some pilot projects utilizing transactive energy technologies are underway, such as a project by the Post Road Foundation funded by DOE's Connected Communities awards.

Question 4: Ms. Robinson, the Pacific Northwest National Laboratory has been a leader for the Office of Electricity, and across the Energy Department, in Co-Chairing the Grid Modernization Lab Consortium (GMLC) and leading the Department's Grid Modernization Initiative. Over the past several years, this initiative has supported a series of important projects that leverage the expertise and facilities across almost all of the Department's National Labs. The Lab Consortium has been a great mechanism for galvanizing the labs to coordinate amongst each other, and with hundreds of other stakeholders in industry, academia, and our public utilities.

- Can I have your commitment that you will leverage the GMLC as you implement your parts of the Bipartisan Infrastructure Law?

The Department of Energy's national laboratories have unique capabilities to provide technical assistance, partner on innovative demonstrations and assist in program execution in a variety of Bipartisan Infrastructure Law provisions. The modeling work on resilience through the North American Energy Resilience Model is an example of capabilities that will provide states critical insights regarding resilience strategies.

- Can I have your commitment that you will continue to focus on the important core research and development work that your office funds so that we can keep our innovation pipeline full of great ideas that will feed future deployment opportunities?

The Office of Electricity must continue its critical core research and development activities, given the lack of the private sector to drive innovation in the electricity system. Key priorities include the development of long duration energy storage, advanced solid-state systems such as transformers and substations, microgrids and advanced modeling and control.

Questions from Senator Steve Daines

Question 1: Ms. Robinson, do you believe that individual states should be able to choose and regulate the energy and electricity mix that best fits their needs?

Congressional law dictates the roles of states and FERC in electricity regulation. The states and federal government each can develop energy policy as a fundamental principle of our democratic society.

Question 2: Ms. Robinson, if confirmed, do you pledge to work with and provide assistance to state public service commissions to implement their electricity generation and transmission programs, even if those programs include increases in traditional energy production such as natural gas or coal?

The Department recognizes the need for flexible generation in support of electric system reliability and will work within state and federal policies and regulations to enable clean energy deployment. The Office of Electricity will continue to work with National groups, such as NARUC and NASEO, to ensure the appropriate level of support is given to States with a primary focus on technical assistance and scenario analysis provided by the National Labs, research and development of new grid technology as well as deployment of the new Bipartisan Infrastructure Law funds in accordance with the statue.

Question 3: Ms. Robinson, do you believe that funding for electricity programs should be limited to solely renewable energy projects and would you deny or advocate for the denial of funding for a project based on the fuel used to generate electricity?

Reliability and security of our nation's electric infrastructure is paramount. The Office of Electricity should evaluate and monitor the transition to ensure essential reliability services are met through the deployment of clean flexible generation, regardless of fuel source or technology.

Question 4: Ms. Robinson, access to affordable and reliable electricity is extremely important to the lives and livelihoods of Montanans. Over the last year we have seen home energy and heating costs got up. What solutions do you have to ensure access to affordable and reliable electricity for Montanans?

Transmission is paramount in the ability to access affordable and reliable electricity. Through the Bipartisan Infrastructure Law and existing programs, the Office of Electricity can help accelerate the development and reinforcement of transmission by helping to fund the adoption of new technology, deploying new approaches in helping transmission weather climate change, and aiding inter regional transmission development. A transmission grid that is integrated across regions is key to allowing the most affordable and reliable resources to reach customers.

Question 5: Ms. Robinson, do you support the construction of additional natural gas, hydropower, wind, solar, nuclear and geothermal generation sites and infrastructure?

Supporting the integration of a portfolio of clean resources is important in helping reach a decarbonized electric industry while also ensuring reliability and resiliency.

Question 6: Ms. Robinson, do you believe that the U.S. should increase nuclear energy production?

A mix of resources and technology will be needed to reach carbon reduction goals. Each state and region should develop a portfolio of resources that best meets their goals of clean and reliable electricity.

Question 7: Ms. Robinson, as a State Representative in Massachusetts you were responsible for advocating and supporting constituents in your district. As the Assistant Secretary for Electricity at DOE you will be responsible for advocating and supporting all your constituencies, from Montana to Massachusetts. If confirmed, will you commit to listen to state public service commissions, local and tribal governments, diverse industry representatives, and communities before making decisions or policy actions?

It will take input from state public service commissions, local and tribal governments, diverse industry representatives and communities in order to provide clean, affordable and reliable electricity to all parts of the U.S. Hearing from a diverse set of stakeholders is important in order to form policies that work for all different needs across the U.S.

Question 8: Ms. Robinson, powerlines that are older, in need of maintenance, or overheated pose a wildfire risk in the West particularly in the midst of drought and undermanaged forests. This poses a particular challenge in rural and remote areas where powerlines that are sagging, sparking, or otherwise malfunctioning may go unnoticed. If confirmed, what steps will you take to promote the development and usage of technologies to mitigate this risk?

In FY21, the Office of Electricity hosted a series of 4 webinars showcasing around 33 wildfires mitigation capabilities developed at the DOE laboratories. Four months later, the Office of Electricity recommended 4 promising capabilities to the U.S. Secretary of Energy for funds to accelerate these technologies. These capabilities address the challenges faced in the West as well as in remote and rural areas. The Office of Electricity has also leveraged on the Congressionally mandated Small Business Innovation Research program to

develop some of these capabilities. In the last two years alone, nearly half a dozen small businesses were funded at Phase I or Phase II level, including one Phase III award to accelerate AI capabilities onboard drones to inspect powerlines and vegetation. We are committed to continuing taking the steps necessary to promote the development and usage of technologies to mitigate this risk.

Question 9: Ms. Robinson, will you commit to partnering with States and land management agencies to reduce the risk of wildfires ignited around powerlines?

Yes. The Office of Electricity has established years of trusted relationships with State-level stakeholders as well as federal partners and will continue to work closely with them as well as through other DOE Program Offices. The Office of Electricity will also continue to leverage the capabilities of its national labs to address this critical issue.

Question 10: Ms. Robinson, do you support the development of carbon capture technologies on new and existing coal and natural gas electric generation?

If confirmed, my role as Assistant Secretary would be to ensure reliability of the grid, regardless of source. I certainly believe that carbon capture technologies paired with fossil fuel facilities can provide critical firm, dispatchable power for the grid. I would look forward to working with colleagues in the FECM office to see the successful commercial demonstration and deployment of CCS in the power sector.

Questions from Senator Angus S. King, Jr.

Question 1: What role could DOE's new anchor/tenant authority in the Transmission Facilitation Program (Sec. 40106) play to encompass onshore interconnection infrastructure for offshore wind?

The Transmission Facilitation Program can provide support for large transmission projects that would aid in distributing offshore wind to multiple states and regional transmission entities onshore that the existing infrastructure cannot accommodate. This could be done through loans, public-private partnerships or by purchasing capacity on the transmission line.

Question 2: Is DOE considering directing some of the grant funding provided for enhancing grid resiliency (Sec. 40101) towards grid interconnection upgrade projects needed for offshore wind?

The grant funding for enhancing grid resiliency is a formula grant that utilities, states, tribes, or public entities can use for making their grid more resilient, including integrating offshore wind if desired. Each Bipartisan Infrastructure Law provision has specific criteria that then can be used by the applicant to best suit the needs of their state, tribe, or utility.

Question 3: How can DOE ensure that the energy security plans (Sec. 40108) and the State Energy Program (Sec. 40109) are being used to prioritize necessary interconnection upgrades to accommodate offshore wind projects?

The requirement in section 40108 for a state to submit a state energy security plan, the contents of which are to include "a State energy profile, including an assessment of energy production, transmission, distribution, and end-use," and the addition in 40109 of a mandatory element to the State Energy Program regarding "the mandatory conduct of activities to support transmission and distribution planning" provide an opportunity for states to consider what transmission and interconnections are necessary to support the deployment of renewable energy resources like offshore wind. While I am not privy to the internal deliberations around the implementation of the Bipartisan Infrastructure Law, if confirmed, I would look forward to collaborating with EERE on the reliable integration and transmission of offshore wind projects.

Questions from Senator James Lankford

Question 1: Ms. Robinson, do you agree that natural gas has a lower emissions profile than some of the fuels currently being burned in New England, like fuel oil, for instance?

Yes. Natural gas has a lower emissions profile compared to fuel oil.

Question 2: Ms. Robinson, you have in the past made the case that we should forego replacing energy sources like fuel oil with lower-emitting sources like natural gas now and instead transition to renewables, even though that is likely to take decades. Are you concerned that this strategy could actually increase emissions in the short term due to an avoidable reliance on fuel oil?

In order to help the nation transition to a clean electric industry, there must be short term and long-term goals. Transitioning an industry will need to take the long view in order to ensure reliability and resiliency are not compromised. Each part of the country is in a different spot and state energy policies drive much of that transition plan. The Office of Electricity is committed to provide technical analysis, drive advances in technology as well as provide funds to help the industry transition in the best way.

Questions from Senator Catherine Cortez Masto

Question 1: Last year, my home state of Nevada enacted legislation to require electric utilities to join a Regional Transmission Organization (or RTO) by 2030. This is a huge opportunity for renewable energy development across the West, as organized wholesale electricity markets can help serve diverse load profiles, support grid resiliency efforts, and promote energy saving opportunities for consumers.

a. If confirmed, would you commit to working with me and Nevada stakeholders as the State and region seek to expand organized wholesale electricity markets in the Western U.S.?

The Office of Electricity is committed to continuing its support of states and regions to provide both market and transmission analysis.

Question 2: This was raised during the hearing, but existing transmission capacity can be a real bottleneck for connecting large-scale renewables. In fact, some studies have found that national transmission capacity needs to double or triple in order to decarbonize our energy grid.

a. If confirmed, how would you seek to utilize infrastructure investments to leverage new and existing technologies, such as grid enhancing technologies, to increase transmission capacity and quickly bring more clean energy onto the grid?

Advanced grid grid-enhancing technologies, such as dynamic line rating, dynamic transformer rating, topology optimization, and power flow control, have the potential to significantly increase transmission capacity by deferring costly transmission upgrades through eliminating or reducing system constraints. Through the Bipartisan Infrastructure Law and core Office of Electricity programs, the incorporation of grid-enhancing technologies can advance beyond the pilot demonstrations stage and enable broad use of these innovations by a workforce well-trained to use them. Specific technical areas holding back wider deployment of grid-enhancing technologies include optimizing technology siting, aligning incentives and benefits, and measuring cost impact.

Question 3: Can you expand on the emphasis you placed on research and development (R&D) in your written testimony – especially as it relates to the development of innovative technologies to contribute to a cleaner, resilient, and more reliable energy grid?

As far as research is concerned, many technologies are already available, but more research and development needs to take place to better optimize their use on the grid. Resources such as the national laboratories, especially INL's test bed, could be excellent for developing use cases of these technologies. In addition, as grid technologies are developed and deployed, we can anticipate breakthroughs in cost and implementation that could advance the grid.

Questions from Senator Bill Cassidy

Question 1: The Infrastructure Investment and Jobs Act includes substantial funding to enable the development new transmission. Louisiana currently produces a significant amount of energy from fossil fuels while also possessing extensive renewable energy potential both on land and in the Gulf of Mexico. Can you please detail how the implementation of the transmission provisions in the infrastructure bill will ensure increased resiliency of the grid while not advantaging one energy source over another?

The Bipartisan Infrastructure Law provides $2.5 billion to establish a Transmission Facilitation Program which will allow for strategic investments in transmission for both resilience and clean energy. The cold weather event in Texas, the heat dome in the Pacific Northwest, and other extreme weather events are a constant reminder of the importance of grid resilience investments that will be enabled through the Bipartisan

Infrastructure Law to include new transmission, upgrading transmission lines, undergrounding, and reconductoring activities.

Question 2: The Infrastructure Investment and Jobs Act contains a provision requiring the Secretary of Energy to develop a report to Congress assessing the use of digital tools and platforms such as blockchain, distributed ledgers, artificial intelligence, and machine learning to help address the role such digital tools can play in tracking, analyzing and addressing emissions and other climate impacts. It is likely that this report would be the responsibility of the Office you are nominated for. This provision was an amendment that I introduced as a part of the mark-up this committee had on energy infrastructure. How might such technologies may be utilized to help illustrate the U.S. emission advantage relative to its global competitors?

I am not privy to the internal deliberations of implementation of the Bipartisan Infrastructure Law, but I understand that Section 40433. requires a report within 1 year that assesses using digital tools and platforms as climate solutions. Modeling tools and digital tools will be important to help define and illustrate investment priorities, and to compare relative climate and reliability impacts of various technologies. One such tool that the Office of Electricity supports is the North American Energy Resilience Model.

Question 3: The role of the digital climate solutions report has become even more important recently as the Nevada PUC just declined to allow digital tools such as the ones named in the legislation to help track and assign compliance with the states Renewable Portfolio Standard. Can you commit to ensure the Department of Energy ensures that this report is completed within a year of the date of enactment of the infrastructure bill as required by the law?

If confirmed, I will commit to supporting the completion of this report based on funding availability.

Question from Senator John W. Hickenlooper

Question: Constructing new high-voltage, interregional transmission lines as part of a "macrogrid" will enable the movement of electricity from resource-rich rural areas to major load centers, benefiting both. However, no process exists to plan for and optimize an efficient national network and quickly put Americans to work to build it. Can you speak to the importance of transmission planning, and how the Department of Energy can help deliver an efficient network that anticipates our future energy mix?

DOE is working with two of the national labs and industry to produce a National Transmission Planning Study aimed at helping identify the needed inter-regional transmission projects to deliver a diverse portfolio of clean generation across regions. The Bipartisan Infrastructure Law Transmission Facilitation Program can then help the developers of these large inter regional projects, if desired, with financial support to help accelerate the building process.