

Subcommittee on Energy
Hearing on
“Reviving our Economy: COVID-19’s Impact on the Energy Sector”
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Rich Powell
Executive Director
ClearPath

The Honorable Tom O’Halleran (D-AZ)

1. I believe adopting energy storage technology is critical to supporting the energy grid of the future by capturing excess electricity when demand and prices are low, and then utilizing that captured energy during peak demand times.
 - a. How can initiatives such as the Department of Energy’s *Energy Storage Grand Challenge* help advance the commercial deployment of new energy storage technology?

RESPONSE:

Energy storage can play a key role in a clean energy future, but the U.S. currently relies on foreign companies to supply the main ingredients for this critical technology. In the past decade American energy storage companies have been bought out and their technology built at scale overseas, meaning countries like China have profited off American ideas and ingenuity. Additionally, some of the building blocks for energy storage -- critical minerals like lithium, cobalt, nickel, and graphite -- are vulnerable to supply chain disruption. The Energy Storage Grand Challenge helps the U.S. regain global leadership in the energy storage sector by fostering American innovation in storage technologies, supporting development through the “valley of death” between ideas and commercialization, and developing a comprehensive supply and manufacturing chain, all here in the U.S. This approach supports the American economy while ensuring it has the tools to bring about a clean energy future.

- b. What role do you see energy storage playing in a clean energy economy?

RESPONSE:

Energy storage can support the electric grid at every stage from generation to transmission. In areas with inconsistent energy supply, storage can address supply disruptions. As the country’s transmission lines are strained from increased congestion and higher heat stress, storage can economically mitigate these issues to improve reliability. Additionally, energy storage can improve the economics of all generation technologies by preventing unnecessary ramping. Research and

development into new materials and technologies can extend energy storage duration, improve system efficiency, and make storage cheaper. Such innovation expands the applicability of energy storage across the U.S. market, helping storage achieve the full potential of the benefits it provides a clean energy economy.

The Honorable Bill Flores (R-TX)

1. Clearly COVID-19 has severely impacted the oil and gas industry and the energy sector overall.

- *Impact is described as “historic” and “resulting all-time lows.”*
- *In March and April, for instance, drilling fell a record 52%.*
- *Refinery throughput and capacity utilization had their largest declines on record since 1985. (from API April Monthly Statistical Report)*

A strong rebound in the energy sector is essential to overall economic recovery and revitalizing the job market. In fact, due to the historic dominance of the U.S. oil and gas sector globally and proven sustainability of the industry, we are already seeing some minor improvement. It is a credit to the industry’s strength.

But as much as we need the oil and gas markets to rebound quickly and drive overall economic recovery, we must not reduce efforts to create sustainable and long-term growth in other sectors. Specifically, we must aggressively support innovation and private sector partnerships to regain U.S. dominance in the nuclear energy industry.

In 2017 we passed and funded the Nuclear Energy Innovation and Modernization Act. Among other things, the Act directed the Nuclear Regulatory Commission to prepare the regulatory structure to support the new safety attributes of these advanced technologies and fuels. There is clear urgency to get these technologies to the market.

In HR 1760, the Advanced Nuclear Fuel Availability Act (passed the House twice and currently awaits Senate action), we create a public-private consortium to facilitate development of a market for advanced fuels, thus ensuring taxpayer support is well spent.

- a. Can you speak to how a public-private consortium can ensure access to the type of fuel needed for advanced reactors and support the development of a market for advanced fuels?

RESPONSE:

ClearPath understands the need to develop high-assay low enriched uranium (HALEU) and other new fuel forms for advanced reactors. ClearPath Action supports this bill,¹ and has developed a white paper on the need for a robust

¹ <https://clearpathaction.org/legislation/advanced-nuclear-fuel-availability-act-h-r-1760/>

HALEU supply. As you mentioned, advanced fuels can provide improved safety benefits for advanced reactors compared to existing plants. However, while there are ongoing pilot projects,² there are currently no commercial domestic sources of HALEU. Furthermore, while multiple vendors are interested in developing advanced fuels like TRi-structural ISotropic (TRISO) pebbles, they are still in the development stage. In order for these companies to make the needed investments, they need certainty that there will be adequate demand. Reactor designers also need certainty in a fuel supply to provide confidence to investors for their deployment timelines. This provides an opportunity for Congress to direct the Department of Energy to address this initial uncertainty until adequate demand materializes. Legislation like the Nuclear Energy Leadership Act, which is being considered as part of this year's National Defense Authorization Act, and the Advanced Nuclear Fuel Availability would accomplish this objective. Broadly, this also shows the importance of Congress supporting other DOE and industry efforts to incentivise reactor designers to create that initial demand.

- b. If our objective is to build new nuclear power infrastructure, would you discuss how developing the licensing and regulatory framework now, rather than later, for advanced technologies, fuel infrastructure, and transportation of fuels can help support a more timely U.S. transition to these new technologies and U.S. dominance of the nuclear market?

RESPONSE:

Today there are over two dozen companies designing the next generation of advanced reactors. It is important to develop the licensing and regulatory framework now for these designs, which significantly differ from the existing large light water reactor fleet. Developing the licensing framework today provides certainty to these designers in regards to questions of safety, fuel supply, costs, and deployment timelines. Answering these questions can incentivise investors to support these advanced reactor companies. Today the Nuclear Regulatory Commission (NRC) is making significant progress in modernizing its regulatory framework, however more needs to be done, and it needs to align with when industry plans on deploying its reactors. Congress needs to provide the NRC the necessary resources to support these efforts and while most of the NRC's modernization efforts are focused on reactor safety, it is also important for the NRC to consider how to improve its environmental review process and look at other portions of the review such as the fuel cycle.

- c. Can you speak to the increased safety profile of this innovative technology?

RESPONSE:

² <https://www.centrusenergy.com/what-we-do/nuclear-fuel/high-assay-low-enriched-uranium/>

The next generation of advanced reactors claim to be even safer than the existing operating fleet of large light water reactors. They plan on achieving this through the use of new types of fuel that are more robust at higher temperatures, as well as relying on inherent or passive safety features. These safety features allow a design to stay safe without the use of active pumps, valves, or backup generators. The NRC understands that these new designs will look and operate differently from the current fleet of reactors. They are modernizing their regulatory framework to credit these improved, passive safety features. It is important to understand that these changes do not lead to a reduction in safety, but instead focuses the NRC on the most important safety aspects of these new designs while crediting these unique features.

The Honorable Tim Walberg (R-MI)

1. In my home state of Michigan, DTE Energy and CMS have bold visions for reducing their emissions while also utilizing affordable and cleaner energy sources - including natural gas. I would like to get your perspectives on the role utility companies play in enabling these future investments. Specifically:
 - a. As many utilities pursue their net zero emission targets, can these goals be met with variable energy resources alone?

RESPONSE:

Basic economic theory tells us that limiting options from a potential solution set can only increase costs. It is extremely unlikely that utilities, let alone the entire United States or global economies, can meet decarbonization goals by midcentury with variable renewable energy alone. For example, one high-profile energy system modeling scenario assumes a litany of unrealistic assumptions, such as new hydropower capacity equal to 600 new Hoover Dams and about 9 times the current generating capacity of the United States grid³, to achieve a “100% renewable” outcome. Studies with more reasonable assumptions show that dispatchable clean energy sources are needed for both practical and economic decarbonization.

- b. What technological advancements need to take place for these companies to achieve their zero emissions goals given the reliability issues associated with variable energy resources?

RESPONSE:

Clean energy resources that can deliver on-demand power are needed to improve reliability and reduce costs of meeting net-zero emissions goals. Duke Energy’s

³ <https://www.jpmorgan.com/jpmpdf/1320745241034.pdf>

Achieving a Net Zero Carbon Future (2020), for example, highlights the potential importance of advanced nuclear, carbon capture, hydrogen, and long-duration energy storage in playing this stabilizing role. Demand-side resources, such as responsive demand response and direct load control, can also play a future role.

2. Studies have indicated the need for significant investment in transmission in the coming years to repair our country's aging electric grid. What are the policy barriers to unleashing private sector dollars to make the investments we need to upgrade our electric infrastructure?

RESPONSE:

One of the main roadblocks to new transmission investment is the lengthy and uncertain permitting process. Transmission lines, 'electron highways', often span multiple states and must work with multiple regulatory bodies and stakeholders. Combined with large upfront costs, the uncertain time to construction or project completion is a significant deterrent to attracting private capital. Congress attempted to streamline the process by allowing the Department of Energy to act as a facilitator in the Energy Policy Act of 2005, with limited results. The large interstate transmission lines supported by the federal government more than a decade ago are still in the permitting process. Transmission lines that would connect the United States with clean Canadian hydropower have also been stymied, despite clear benefits. Accelerating these types of projects would deliver both climate and economic benefits, according to an February 2020 MIT study.⁴

The Honorable Michael C. Burgess, M.D. (R-TX)

1. Mr. Powell, your organization has worked tirelessly to communicate the importance of markets in developing better technologies for a cleaner tomorrow. With the economy in crisis, I'm concerned about the impact on the development of those technologies and the good American jobs they support.
 - a. What sort of recovery do you expect to see for the oil and gas industry?

RESPONSE:

The oil and gas industry's recovery will be correlated to the recovery of the broader economy. As more people and goods are produced and shipped, energy demands will increase. The economic shock triggered by the COVID virus and response, however, will very likely negatively affect America's long-term economic growth trajectory and aggregate energy demand. Thus, the coming

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<https://climate.mit.edu/posts/mit-study-highlights-benefits-two-way-exchange-electricity-between-us-northeast-and-quebec>

rebound in oil and gas production is unlikely to reach pre-COVID forecasted demand levels in the short-term.

According to the Energy Information Administration's Short-Term Energy Outlook, U.S. crude oil production will average "11.6 million b/d in 2020 and 11.0 million b/d in 2021." These levels, EIA stated, "are 0.6 million b/d and 1.2 million b/d, respectively, lower than the 2019 average of 12.2 million b/d." As for natural gas, EIA expects annual average dry natural gas production "will decline by 6% in 2021 to 84.2 Bcf/d." However, EIA expects production to "increase during the second half of 2021 as natural gas prices in the forecast rise."

2. Shale oil production has always been more capital intensive than traditional exploration and production techniques, but it also has more flexibility. Do you expect this flexibility to be a competitive advantage or will the higher capital costs prove to be too much of a liability for the industry?

RESPONSE:

Shale oil production is beneficial because it is much more flexible and adaptive to market conditions. The price-responsive nature of these wells was demonstrated earlier this year. Many operators shut-in wells in response to the steep decline in global oil prices, triggered by coordinated international efforts to drive down the price of oil in tandem with the dramatic demand reduction in oil stemming from the COVID crisis. As oil prices have climbed, many operators are restarting wells. While production is unlikely to reach pre-COVID levels in the short-term, this added flexibility will be a valuable attribute as demand recovers and more sustainable levels of production resume in other parts of the world. Many of these factorsThe economic outlook for shale producers depends on factors specific to individual wells and operations, e.g., their ability to effectively resume operations and production, which in turn depends on the basins in which they operate and , as well as global oil prices, that is, whether they reach or exceed so-called break-even prices. According to a recent survey conducted by the Dallas Federal Reserve, break-even prices for shale range anywhere from \$48 to \$54 per barrel. the production costs relative to forecasted global prices.

3. Some estimates suggest oil prices won't return to pre-COVID levels until 2021. Have low oil prices significantly impacted the business model of facilities that utilize carbon capture technologies?

RESPONSE: *A single carbon capture facility can capture millions of tons of carbon dioxide each year. For reference, the average tree absorbs about 50 pounds of carbon dioxide per year. Traditionally, the enhanced oil recovery industry was the only one that had a large enough appetite for these large capture volumes.*

Most carbon capture projects in the development stage are planning to commence construction closer to the sunset of the federal carbon capture credit (“45Q”) in January 2024. Due to low oil prices and financial hardships faced in the O&G sector, its likely that their willingness to pay for carbon dioxide has fallen relative to historic levels. Thus, the relative value of the carbon capture tax credit has increased in most cases.

Low oil prices, combined with market demand uncertainty associated with COVID recovery, are likely to discourage short-term investments for carbon capture projects with enhanced oil recovery offtakers. Although many projects were not expected to commence construction for several years, the lack of initial capital and the constrained ability of potential offtakers to invest in new fields will very likely have a negative impact.

Where geology permits, carbon dioxide can also be stored underground and receive a higher 45Q tax credit incentive. Many projects, such as those supported by the Department of Energy’s CarbonSAFE program, provide carbon capture projects flexibility and insurance against oil price volatility.

4. As consumers demand cleaner energy technologies with lower emissions, does COVID-19 reduce the choices available to the average consumer?

RESPONSE:

COVID-19 and the associated economic impacts will likely have both negative supply and demand implications for the average consumer. Many clean energy industries, as seen across the broader economy have experienced supply contractions in the workforce and production. Similarly, many consumers are facing declines in disposable incomes and savings. Many of these jobs and companies are unlikely to fully recover from the contraction. Together, COVID-19 is likely minimizing the choices available to the average consumer.

5. One of the best ways America can reduce emissions globally is to export clean energy products. How will the economic uncertainty we feel today impact America’s exportation of clean energy technologies in the future?

RESPONSE:

While the economic uncertainty caused by the COVID-19 crisis has dampened energy usage in 2020, it has not caused the long-term outlook for energy usage and emissions levels to change. Instead, the crisis illustrated that even in the face of an unprecedented global pandemic and economic unease, energy needs will continue to be high and reliability and affordability will be key to populaces experiencing the impacts of a shrinking job market. As a result of these lessons, the crisis has made countries even more aware that their future energy sources need to be clean, reliable, and market competitive to avoid increasing consumer costs. If the U.S. develops these market competitive solutions, the market for clean energy technologies will continue to grow and

U.S. economics will benefit greatly, turning economic unease into a driving force of recovery. If the U.S. does not fill this role, we risk ceding these markets to Chinese and Russian adversaries who are currently seeking to export their technology for geopolitical gain.

6. Are you concerned about COVID-19's impact on research and development in the energy sector?

RESPONSE:

The economic shock that companies experienced as a result of the COVID-19 pandemic will inevitably have an impact on short-term private sector R&D financing as companies tighten the belt. However, this does not appear to be a long-term issue as many of these same companies that one would be worried about have publicly maintained or doubled down on their R&D and decarbonization goals. For example, in June, Xcel Energy proposed a \$3 billion investment plan that would see them deploy clean energy technology to help them achieve their decarbonization goal while putting people to work to assist in COVID recovery.⁵ This private sector action, in addition to the continued work being done by researchers at the Department of Energy and our national labs, helps ensure that innovation in the energy sector remains strong despite economic uncertainty.

7. Some experts are expecting significant consolidations in the energy industry due in large part to the economic downturn caused by COVID-19. Do you consider this situation desirable and why? If undesirable, what can be done to mitigate these consolidations?

RESPONSE:

The potential of consolidation within the energy industry is representative of the stress COVID-19 has placed on the economy of the United States. For many this crisis has meant a loss of economic well-being. A continued consolidation of the energy industry as a long-term side effect of the crisis would further negatively exacerbate these impacts. However, the energy industry has long shown itself to be a resilient one, capable of adapting when it is needed. As the industry rebounds and reshapes itself following COVID-19, I am hopeful and confident that through the deployment of clean energy technologies, the industry will become a leader in recovery efforts.

The Honorable Jeff Duncan (R-SC)

⁵<https://www.power-eng.com/2020/06/18/xcel-proposes-almost-3b-energy-investment-plan-to-fight-covid-job-losses-and-reach-clean-energy-goals/#gref>

1. In March this year, this Subcommittee held a very informative hearing on the state of advanced nuclear technology, and what is needed for this to take root in the United States.

One fact from the hearing was the tremendous employment potential to construct new, small modular reactors. We heard from NuScale how it had contracts with 50 suppliers around 25 states and that each new site for its units would mean more than 1,000 construction jobs per plant and 300 permanent jobs. Given the new siting characteristics of these technologies, the jobs and the related skills to operate these new reactors promises a rebirth of nuclear manufacturing and technological skill in communities that previously would not have access to nuclear technology.

- a. How do we go forward and not foreclose on opportunities to develop this new technology? How do we actually ensure the best way for these opportunities to come to fruition?

RESPONSE:

Today there is significant momentum to develop the next generation of nuclear technologies. Over a dozen companies are interested in developing reactor designs. In 2020, Congress appropriated the highest amount ever to the Department of Energy's Office of Nuclear Energy. Today DOE is coordinating multiple large nuclear energy projects, including the Advanced Reactor Demonstration Program, the Versatile Test Reactor, and the creation of the National Reactor Innovation Center. These projects, and multiple others, are designed to bring these next generation technologies to market, and maintain US leadership in nuclear energy. The Nuclear Regulatory Commission is also modernizing its regulatory framework to be able to efficiently and effectively license these new designs which rely on different fuels, coolants, and safety features. It is important for Congress to continue to support all of these efforts, as well as look at new ways to support the advanced nuclear industry. Congress can help enable the domestic and international deployment of these designs through other policies.

2. Related to the first question, a lot has to do with the regulatory infrastructure for new nuclear and its related supply chains. If there's a project that [is implicated by NEPA](#), , for example, does it make sense to wait 4.5 years on average to complete the reviews?

RESPONSE:

This committee's development of the Nuclear Energy Innovation and Modernization Act (NEIMA) was an important first step to provide regulatory clarity to deploy the next generation of advanced reactors. It is important that Congress continues to support the

Nuclear Regulatory Commission's ongoing activities. Building upon NEIMA, the NRC is currently undergoing efforts to modernize its safety and environmental reviews. The NRC is developing a Generic Environmental Impact Statement for advanced reactors, and looking at other efforts including emergency planning, security, and siting. All of these efforts are important to ensure that a review does not necessarily take years. In order to deploy nuclear energy on the scale needed to regain global leadership and reduce emissions, the licensing process needs to be efficient while still ensuring safety. Modernizing requirements to credit advanced reactors unique safety features is one step. The NRC also needs to consider how it can improve its internal processes. This Committee can direct the NRC to take these actions. Through the development of a generic environmental impact statement for advanced reactors, the NRC can consider . ClearPath has developed and submitted a whitepaper⁶ to help facilitate more effective environmental reviews.

3. To follow up-the lengthy and duplicative federal permit process hamstrings the United States. Long overdue reforms are necessary to maintain our competitive edge while preserving our nation's environmental leadership. What can we do to ensure permit and siting decisions are made timely so we can have the benefits of these technologies for our communities as soon as practicable? Should Congress look at lessons from the recent shutdown to identify more efficiencies in regulatory decisions?

RESPONSE:

Environmental rules and regulations are critical to preserving air and water quality in the United States. Unfortunately, they are often used as legal tools to encumber and constrain commonsense development. Reforms can be made to facilitate timely and predictable permitting decisions that do not sacrifice environmental integrity or meaningful opportunities for public engagement. The Trump Administration's One Federal Decision provides a solid model in coordinating decisionmaking and timetables across multiple federal agencies. This approach should be emulated in broader aspects of clean energy licensing. For example, Rep. Cathy McMorris-Rodgers' Hydropower Clean Energy Future Act would establish FERC as the lead agency for federal authorizations and enable the Commission to establish a predictable and transparent permitting schedule. It also allows for hydropower projects to leverage prior related environmental studies and analyses.

⁶ <https://www.nrc.gov/docs/ML1905/ML19059A426.pdf>