COMMITTEE ON
ENERGY & COMMERCE
CHAIRMAN FRANK PALLONE, JR.

MEMORANDUM

February 3, 2020

To: Subcommittee on Environment and Climate Change Members and Staff

Fr: Committee on Energy and Commerce Staff

Re: Legislative Hearing on "Clearing the Air: Legislation to Promote Carbon Capture, Utilization, and Storage"

On **Thursday, February 6, 2020, at 10 a.m. in the John D. Dingell Room, 2123 of the Rayburn House Office Building**, the Subcommittee on Environment and Climate Change will hold a legislative hearing entitled, "Clearing the Air: Legislation to Promote Carbon Capture, Utilization, and Storage." The hearing will focus on H.R. 1166, the "Utilizing Significant Emissions with Innovative Technologies Act" or the "USE IT Act."

I. BACKGROUND

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released its *Special Report on Global Warming of 1.5°C*. The report concluded that avoiding the worst effects of climate change will require limiting warming to 1.5 degrees Celsius above preindustrial levels by 2100.[1] The IPCC found that global carbon dioxide (CO_2) emissions must reach net-zero by 2050 to avoid exceeding the 1.5-degree threshold.[2]

Net-zero emissions requires balancing the amount of greenhouse gases (GHGs) released into and removed from the atmosphere. The IPCC warned that in the absence of near-term climate action, "net negative emissions" (i.e., removing more GHGs from the atmosphere than are released into it) will be needed to limit warming to 1.5 degrees Celsius.[3] The United Nations Environment Programme's most recent *Emissions Gap* report showed that global temperatures are currently on track to increase by as much as 3.9 degrees Celsius above preindustrial levels by 2100.[4] Reaching net-zero emissions by 2050 demands swift and sustained climate action to

[1] Intergovernmental Panel on Climate Change, *Special Report on Global Warming of 1.5°C* (Oct. 2018).

[2] *Id.* at Chapters 2.2 and 2.3.

[3] *Id.*

[4] United Nations Environment Programme, *Emissions Gap Report 2019* (Nov. 2019).

transition to a low-carbon electricity system; reduce emissions from the transportation, buildings, and industrial sectors; and remove CO_2 from the atmosphere.[5]

A. Carbon Capture

Research shows that limiting warming to 1.5 degrees Celsius requires a combination of nature-based (or "natural") and technology-based CO_2 removal and sequestration.[6] Without these measures, the IPCC warns that deep decarbonization will not only be significantly more difficult to achieve, but also that the costs of climate action will be substantially higher.[7] Moreover, carbon capture can play a critical role in reducing emissions from industrial processes generating CO_2 as an unavoidable byproduct of chemical reactions.[8]

Nature-based approaches include measures in the agriculture, forestry, and other land use sectors to improve CO_2 capture and storage.[9] These measures can achieve the complementary goals of reducing emissions from land use, removing and storing CO_2 from the atmosphere, and enabling ecosystem restoration and resilience.[10] Examples of nature-based approaches include afforestation, reforestation, and soil carbon sequestration.[11]

Technology-based approaches include systems that capture CO_2 from industrial sources or ambient air, and either utilize or store the captured CO_2.[12] Examples include capturing CO_2 from large power plants or other emitting facilities; bioenergy with carbon capture and storage (BECCS), in which CO_2 is captured from facilities that either combust biomass for electricity or convert biomass to fuels; and direct air capture (DAC), which captures CO_2 from ambient air.[13]

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[5] *See, e.g.*, Center for Climate and Energy Solutions, *Pathways to 2050: Alternative Scenarios for Decarbonizing the U.S. Economy* (May 2019); The White House, *United States Mid-Century Strategy for Deep Decarbonization* (Nov. 16, 2016); E3, Lawrence Berkeley National Laboratory, and Pacific Northwest National Laboratory, *Pathways to Deep Decarbonization in the United States* (Nov. 2015).

[6] *See, e.g.*, note 1; *Id.*; and Niall MacDowell, et al., *The role of CO2 capture and utilization in mitigating climate change*, Nature Climate Change (Apr. 5, 2017).

[7] *See* note 1 at Chapters 2.3.4 and 4.3.

[8] The White House, *United States Mid-Century Strategy for Deep Decarbonization* (Nov. 16, 2016).

[9] National Academies of Sciences, *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda* (2019) at page 88.

[10] The Nature Conservancy, *Natural Climate Solutions* (naturalclimatesolutions.org) (accessed Jan. 28, 2020).

[11] *See* note 1 at Chapter 4.3.7.

[12] These measures are typically referred to as carbon capture, utilization, and storage (CCUS) or carbon capture and storage (CCS).

[13] *See* note 8.

B. Storage and Utilization of Captured CO_2

CO_2 captured from nature- and technology-based approaches can be stored underground in geologic formations or utilized for a variety of commercial purposes. Potential applications for captured CO_2 include fuel production; cement, concrete, and other construction materials; chemicals; and plastics and other materials, such as carbon fiber.[14] Applications other than fuel production still have limited technological maturity and market development. Furthermore, the various uses for captured CO_2 differ in their GHG emissions reduction potential.[15]

There are 17 operating carbon capture, utilization, and storage (CCUS) projects across eight countries.[16] In general, CCUS project deployment has been slow, due to high costs of capture, lagging development of infrastructure, and a lack of market incentives.[17] Policy support can mitigate some of those challenges. In the United States, for instance, the Section 45Q tax credit provides a performance-based incentive for geologic storage and beneficial use of captured CO_2.[18]

One of the primary applications for utilizing captured CO_2 is enhanced oil recovery (EOR), in which CO_2 is injected into an oil reservoir to facilitate the flow of oil to the surface. This process increases the pressure in mature, depleted reservoirs, forcing oil towards the production well.[19] The injected CO_2, in turn, remains stored underground. According to the International Energy Agency, approximately 500 thousand barrels of oil are produced daily via EOR with CO_2.[20] In the United States, EOR is the most developed and economical form of CO_2 utilization.[21] However, less than 30 percent of the CO_2 used in domestic EOR is captured from

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[14] Global CO_2 Initiative at the University of Michigan, *Global Roadmap Study of CO_2U Technologies* (Nov. 2018).

[15] *Id.*; C2ES, *Carbon Utilization — A Vital and Effective Pathway for Decarbonization* (Aug. 2019); and Cameron Hepburn, et al., *The technological and economic prospects for CO_2 utilization and removal*, Nature (Nov. 6, 2019).

[16] International Energy Agency, *CCUS in industry and transformation* (iea.org/tcep/industry/ccus) (Sept. 4, 2019).

[17] *See* note 1 at Chapter 4.3.1.6.

[18] Great Plains Institute, *Primer: Section 45Q Tax Credit for Carbon Capture Projects* (betterenergy.org/blog/primer-section-45q-tax-credit-for-carbon-capture-projects) (Jun. 17, 2019).

[19] International Energy Agency, *Whatever happened to enhanced oil recovery?* (iea.org/commentaries/whatever-happened-to-enhanced-oil-recovery) (Nov. 28, 2018).

[20] International Energy Agency, *Can CO2-EOR really provide carbon-negative oil?* (iea.org/commentaries/can-co2-eor-really-provide-carbon-negative-oil) (Apr. 11, 2019).

[21] C2ES, *Carbon Utilization — A Vital and Effective Pathway for Decarbonization* (Aug. 2019).

industrial facilities; the vast majority of CO_2 used for EOR in the United States instead comes from natural deposits.[22]

Linking EOR to captured CO_2 utilization is not a panacea. While possibly making DAC more economically viable, the World Resources Institute notes "EOR with air-captured CO_2 is unlikely to provide meaningful net carbon removal" and its usefulness will diminish with the economy's transition away from fossil fuel dependence.[23] Using CO_2 for EOR also prolongs oil operations and increases the production of oil that would not otherwise be available.

II. H.R. 1166, THE "UTILIZING SIGNIFICANT EMISSIONS WITH INNOVATIVE TECHNOLOGIES ACT"

Reps. Peters (D-CA), McKinley (R-WV), Veasey (D-TX), and others introduced H.R. 1166, the "Utilizing Significant Emissions with Innovative Technologies Act", or the "USE IT Act". The bill supports CO_2 utilization and DAC research and facilitates permitting and development of CCUS projects and CO_2 pipelines.

Section 101 amends section 103 of the Clean Air Act, directing the Environmental Protection Agency (EPA) to support research to reduce CO_2 from stationary sources. It authorizes research into DAC, including through a competitive prize program that awards funds to DAC projects that capture at least 10,000 tons of CO_2 per year. H.R. 1166 authorizes $35 million for this program, to remain available until expended.

Section 101 also directs EPA to establish a research and development (R&D) program for CO_2 utilization. The program would provide technical and financial assistance to new and existing CO_2 utilization technologies that transform captured emissions into commercial products or inputs to commercial products. The Act authorizes $50 million for this program, to remain available until expended. This section further directs EPA to prepare and submit to Congress two reports. The first addresses the risks and benefits of storing CO_2 in deep saline formations and will provide recommendations for managing any risks. The second, to be submitted to Congress at least every two years, describes the CO_2 utilization and DAC projects funded through this section and will recommend non-regulatory strategies and technologies to reduce atmospheric CO_2 levels. In addition, this section directs the Government Accountability Office to submit to Congress a report identifying all federal grant programs that support CCUS and DAC technologies and examining the extent to which these programs may overlap.

Section 201 amends section 41006 of the Fixing America's Surface Transportation (FAST) Act. It clarifies that "covered projects" eligible for the environmental permitting process

[22] *See* note 20.

[23] World Resources Institute, *CarbonShot: Federal Policy Options for Carbon Removal in the United States* (Jan. 2020).

established by Title XLI of the FAST Act include construction of CCUS projects, DAC projects, and CO_2 pipelines.[24]

Section 202(a) defines terms used in this section.

Section 202(b) directs the Chair of the Council on Environmental Quality (CEQ) to submit to Congress, within 180 days, a report identifying several CCUS-related items. The report would identify all existing federal permitting and review information and resources related to deploying CCUS and CO_2 pipelines, as well as activities that transform captured CO_2 into commercial products or inputs for commercial products. The report also would highlight existing initiatives and publications that evaluate priority CO_2 pipelines needed to enable development of CCUS projects and regulatory gaps for deploying CCUS projects and CO_2 pipelines. Finally, the report would identify federal financing mechanisms available to project developers.

Section 202(c) directs the CEQ Chair to submit guidance, within one year, to all relevant agencies based on the report submitted under section 202(b). That guidance shall facilitate reviews associated with deploying CCUS projects and CO_2 pipelines. It would also support the efficient, orderly, and responsible development of such infrastructure.

Section 202(d) directs the CEQ Chair to establish, within 18 months, at least two regional task forces to (1) identify relevant permitting challenges and successes related to CCUS development and (2) improve the permitting process and regional coordination related to the development of CCUS projects and CO_2 pipelines. These task forces must include at least one representative from EPA; the Department of Energy; the Department of the Interior; any other federal agency designated by the Chair; any interested state; developers or operators of CCUS projects and CO_2 pipelines; nongovernmental organizations; and any interested tribe or local government.

The task forces would meet twice annually to identify existing or potential federal and state approaches to facilitate reviews of CCUS projects and CO_2 pipelines and develop common models for state-level CO_2 pipeline regulation and oversight. The task forces would also provide technical assistance to states to implement any relevant regulatory requirements or models, and identify current or emerging activities that transform captured CO_2 into commercial products or inputs to commercial products. Additionally, the task forces would identify any priority CO_2 pipelines needed to enable development of CCUS projects at scale, as well as federal and state regulatory gaps related to deployment of CCUS projects and CO_2 pipelines. Finally, the task forces would identify federal and state financing mechanisms available to project developers, and provide recommendations to relevant federal agencies for R&D of technologies that capture CO_2 and can be deployed in the region covered by the task force. Each task force must prepare and submit to the Chair an annual report with recommendations to improve permitting and any additional relevant findings.

[24] For more information on Title XLI of the FAST Act, *see*, e.g., U.S. Department of Energy, *FAST-41* (energy.gov/oe/mission/transmission-permitting-and-technical-assistance-division/fast-41) (accessed Jan. 29, 2020).

III. WITNESSES

The following witnesses have been invited to testify:

Laurel Harmon
Vice President
LanzaTech, Inc.

Jason Albritton
Director of Climate and Energy Policy
The Nature Conservancy

John Noel
Senior Climate Campaigner
Greenpeace USA

Sasha Mackler
Director, The Energy Project
Bipartisan Policy Center

Lee Anderson
Government Affairs Director
Utility Workers Union of America, AFL-CIO

Jason Begger
Executive Director
Wyoming Infrastructure Authority