

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY
U.S. HOUSE OF REPRESENTATIVES
HEARING CHARTER

Fossil Energy Research: Enabling our Clean Energy Future

Wednesday, June 19, 2019

2:00 PM EST

2318 Rayburn House Office Building, Washington, D.C. 20015

PURPOSE

The primary purpose of this hearing is to examine research and development needs to mitigate the environmental impacts of the extraction and use of fossil fuels. The hearing will focus on two draft bills: 1) the Fossil Energy Research and Development Act of 2019, to support research, development, and demonstration activities in carbon capture, storage, utilization, and removal; efficiency improvements; and mitigation of methane leaks from natural gas infrastructure, among other areas; and 2) the Industrial Decarbonization Technology Development Act of 2019, which authorizes a cross-agency but Department of Energy-led research program to develop technologies that will help decarbonize industrial processes and long-distance transportation, including emissions from steel and cement production, chemicals production, the generation of heat for industrial processes, heavy road and rail transport, shipping, and aviation.

WITNESSES

- **Ms. Shannon Angielski**, Executive Director, Carbon Utilization Research Council
- **Mr. Elgie Holstein**, Senior Director for Strategic Planning, Environmental Defense Fund
- **Mr. Jeff Bobeck**, Director of Energy Policy and Engagement, Center for Climate and Energy Solutions
- **Ms. Erin Burns**, Director of Policy, Carbon180
- **Dr. Erik K. Webb**, Senior Manager, Geoscience Research and Applications, Sandia National Laboratories

BACKGROUND

Department of Energy, Office of Fossil Energy (FE)

The DOE Office of Fossil Energy (FE) supports research to develop new technologies and methods to reduce the environmental impact of fossil fuel production and use, with a major focus

on the capture and storage of carbon dioxide emissions. A portion of this research also focuses on improving the efficiency of fossil fuel power plants. Coal and natural gas account for about 56% of electricity generation and will likely continue to be a major part of the U.S. energy portfolio in the decades to come.¹ However, financial analysts have determined that greenhouse gas emissions and other pollution associated with fossil fuels add risk to investing in these technologies in the long-term.² Developing environmental mitigation strategies for these resources is not only an environmental concern, but also an economic one for these industries.³ Moreover, while carbon emissions growth has leveled off in the United States in recent years, this is due mainly to the transition from coal to less expensive natural gas. Studies have found that this transition to natural gas alone is unlikely to be sufficient to mitigate the most significant potential impacts of climate change.^{4,5,6} The International Energy Agency has projected that deploying carbon capture on natural gas fired power plants will likely be critical to meeting meaningful emissions reductions targets in the long term.⁷

FY 2020 Office of Fossil Energy R&D Budget

FY 2019 Enacted:	\$ 740 million
FY 2020 Budget Request:	\$ 562 million

The President’s Fiscal Year 2020 budget request would, if enacted, reduce federal support for FE R&D activities by 24% from the FY19 enacted level. This would include a 65% cut for carbon capture, utilization, and storage R&D and a 40% cut for research activities to reduce emissions from the extraction and use of natural gas.⁸

¹ Annual Energy Outlook 2018, U.S. Energy Information Administration, <https://www.eia.gov/outlooks/aeo/>

² Morgan Stanley, “Is the Climate Changing for Fossil Fuel Investments?”, October 9, 2018, <https://www.morganstanley.com/articles/fossil-fuels>

³ Risky Business: The Economic Risks of Climate Change in the United States, 2014, <https://riskybusiness.org/report/national/>; and Risky Business Project, From Risk to Return: Investing in a Clean Energy Economy, 2016, <https://riskybusiness.org/fromrisktoreturn/>.

⁴ Hirji, Zahra, “Slowing Climate Change Will Require Vastly More Carbon Capture, Study Says,” Inside Climate News, January 30, 2017, <https://insideclimatenews.org/news/30012017/global-warming-carbon-capture-paris-climate-agreement>

⁵ Harder, Amy, “Natural gas is helping combat climate change — but not enough,” Axios, June 10, 2019, <https://www.axios.com/natural-gas-is-helping-combat-climate-change-but-not-enough-bbad3dd2-b3f8-43bb-827c-ffad24e145c9.html>

⁶ Roberts, David, “More natural gas isn’t a “middle ground” — it’s a climate disaster,” Vox, May 30, 2019, <https://www.vox.com/energy-and-environment/2019/5/30/18643819/climate-change-natural-gas-middle-ground>

⁷ “Technology Roadmap – Carbon Capture and Storage,” <http://www.iea.org/publications/freepublications/publication/TechnologyRoadmapCarbonCaptureandStorage.pdf>

⁸ https://www.energy.gov/sites/prod/files/2019/04/f61/doe-fy2020-budget-volume-3-part-1_0.pdf

Deep decarbonization

A number of recent reports have indicated a need for prioritizing the reduction of greenhouse gas (GHG) emissions from sectors beyond power generation, for both economic and environmental reasons.^{9,10} In 2017, the transportation sector contributed the highest amount of GHG emissions economy-wide at 28.9%, the power industry contributed the second highest amount at 27.5%, and the industrial sector contributed the third highest at 22.2% of GHG emissions.¹¹ Despite this, the vast majority of federal R&D investments on emissions reduction technologies and methods in the U.S. have focused on the power sector.

Decarbonization of the industrial sector is particularly challenging due to the variety of products and processes involved, and our nation's historical reliance on these products and processes.¹² Emissions from the industrial sector come from a variety of processes, including: emissions from fossil fuel combustion to generate heat; chemical processes involved in steel and cement production; and the production and use of unsustainable building materials. Thus the technologies to reduce emissions from the industrial sector also take a variety of forms and include investments in: fuel switching; carbon capture; and development of new materials and manufacturing processes.

Department of Energy, Advanced Manufacturing Office (AMO)

Our nation's largest investment in the development of technologies to reduce industrial GHG emissions resides in the DOE Advanced Manufacturing Office (AMO), housed under the Office of Energy Efficiency and Renewable Energy. AMO supports a number of R&D projects and partnerships to develop technologies that enable sustainable and energy efficient manufacturing. For example, AMO funds research on combined heat and power; advanced materials; and digital smart manufacturing. AMO also supports manufacturers through targeted technical assistance and training programs to improve their energy efficiency.

AMO received \$320M in appropriations in FY19. The President's FY20 budget request proposed a 74.8% cut to AMO's budget from the FY19 enacted level.

FY 2019 Enacted:	\$ 320 million
FY 2020 Budget Request:	\$ 80.5 million

⁹ Science, *Net-zero emissions energy systems*, June 2018

¹⁰ Third Way, *Industry Matters*, October 2018, <https://www.thirdway.org/report/industry-matters-smarter-energy-use-is-key-for-us-competitiveness-jobs-and-climate-effort>

¹¹ EPA report, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2017*, <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>

¹² C2ES report, *Decarbonizing U.S. Industry*, July 2018

LEGISLATION

Fossil Energy Research and Development Act of 2019

The current draft of the Fossil Energy Research and Development Act of 2019 is an updated version of H.R. 5745 from the 115th Congress, introduced last year by then-Energy Subcommittee Ranking Member Veasey (D-TX), Rep. McKinley (R-WV) and now-Chairwoman Johnson. This bill would reauthorize and expand research, development, and demonstration of carbon capture technologies for power plants and industrial sources. It would also authorize R&D activities in carbon storage, carbon utilization, improvements in efficiency, and rare earth elements. In addition, the bill would launch new initiatives in carbon dioxide removal and methane leak detection and mitigation. Finally, it would authorize special hiring authority and laboratory-directed research and development (LDRD) activities for FE's laboratory, the National Energy Technology Laboratory (NETL) located in West Virginia, Pennsylvania, and Oregon, providing the lab with similar tools that have enabled successful technology development initiatives at DOE's other national laboratories.¹³

Draft Industrial Decarbonization Technology Development Act of 2019

This draft bill directs the Secretary of Energy to establish a DOE-led cross-agency research program to decarbonize non-power industrial sectors. Here, decarbonization is defined as the elimination, to the maximum extent practicable, of net GHG emissions. In particular, the research program focuses on the following:

- 1) decarbonization of industrial production processes, including: cement, iron and steel production; high-temperature heating processes; chemical production processes including ammonia, ethylene, and propylene production; smart manufacturing; and sustainable manufacturing;
- 2) alternative materials including: building materials; high-performance lightweight materials; and critical materials and minerals substitutions;
- 3) decarbonization of liquid and gaseous fuels;
- 4) decarbonization of shipping, aviation, and long distance transportation;
- 5) carbon capture for industrial processes; and
- 6) high-performance computing to develop advanced materials and manufacturing processes.

¹³ NETL is unique among DOE's 17 national laboratories in that it is the only one that is government-owned, government-operated (GOGO). The others are all government-owned, contractor-operated (GOCO) labs. According to a 2015 report from the Congressionally-mandated Commission to Review the Effectiveness of the National Energy Laboratories (CRENEL), NETL has thus far been unable to use certain tools and processes that have enabled the flexibility and effectiveness of the other DOE labs. <https://www.energy.gov/labcommission/downloads/final-report-commission-review-effectiveness-national-energy-laboratories>

The bill also establishes a Federal Advisory Committee that would consist of industry, academic, and federal representatives to help develop the missions and goals of the research program and ensure consistent progress towards achieving these goals, as well as to develop decarbonization roadmaps in each of the relevant focus areas. Finally, the bill authorizes a technical assistance program to allow eligible entities to receive assistance from DOE in working towards the goal of decarbonizing non-power industrial sectors.