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

Overview of the Science and Energy Research Enterprise of the U.S. Department of Energy
Thursday, May 27, 2021
1:00PM ET

PURPOSE

The purpose of this hearing is to examine the research, development, demonstration, and commercialization programs and activities carried out by the Department of Energy (DOE). It will also consider the goals and impacts of the Department's Fiscal Year 2022 discretionary budget request.

WITNESS

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

Background

This Committee has exclusive jurisdiction over the Department of Energy's science and energy research, development, demonstration, and commercial application activities. This includes the management and support of 17 national laboratories, and programs that advance technologies and our scientific understanding in areas a varied as: renewable energy, nuclear power, carbon capture and storage, fusion energy, particle physics, materials science, computational modeling, energy efficiency, energy storage, modernization of the electric grid, climate research, engineering biology, next generation vehicle technologies, and more.

Department of Energy Fiscal Year 2022 Discretionary Budget Request

The discretionary budget request would provide $46.1 billion overall for the Department of Energy in FY 2022, a 10.2% increase from the 2021 enacted level. The detailed budget request has not yet been released, though the Administration provided a brief summary of the request on April 9th. According to this summary, the request "invests more than $8 billion, an increase of at least 27 percent over 2021 funding, in technology such as advanced nuclear energy technologies, electric vehicles, green hydrogen, and even innovative approaches to air conditioning and

refrigeration. These investments would leverage the tremendous innovation capacity of the National Laboratories, universities, and entrepreneurs to transform America's power, transportation, buildings, and industrial sectors to achieve a net-zero emissions economy by 2050." [1]

In addition, it would provide "increased funding for a revitalized Office of Fossil Energy and Carbon Management," currently named the Office of Fossil Energy, and support additional grants and workforce development programs for Minority-Serving Institutions.[2]

Office of Science

The Office of Science is the lead federal agency supporting scientific research for energy applications and the nation's largest supporter of research in the physical sciences. The Office supports large-scale research programs in materials science, climate science, biofuels, carbon management, advanced computing, fusion energy, high-energy physics, and nuclear physics. It also provides a unique service to the U.S. research enterprise by building and managing 29 national scientific user facilities, which are some of the most advanced tools of modern science. They include the world's fastest supercomputers, light sources and neutron sources to study the properties of new materials for a wide range of applications, accelerators to explore the building blocks of matter, and facilities for studying the nanoworld. The Office supports 25,000 researchers from industry, universities, national laboratories, other federal agencies, and international partners.[3]

In addition to discipline-specific programs, the Office of Science leads or significantly contributes to the Department's initiatives in several emerging and crosscutting areas. One such area is quantum information science (QIS), where the Office of Science supports five National QIS Research Centers and stewards a broad research program focused on quantum computing, sensing, and communication among other related fields. The Office of Science also leads crosscutting research activities in artificial intelligence, high-performance computing, and microelectronics.

Budget

FY 2021 Enacted:	$ 7 billion
FY 2022 Discretionary Request:	$ 7.4 billion

[1] https://www.whitehouse.gov/wp-content/uploads/2021/04/FY2022-Discretionary-Request.pdf
[2] Ibid.
[3] https://www.energy.gov/science/about-office-science

Difference: +$ 400 million (+5.7%)

The President's FY 2022 discretionary request would, if enacted, increase federal support for the Office of Science by 5.7% from the FY21 enacted level.

Note: The Office of Science is currently the only major element within DOE that the Administration has provided a specific budget request level for.

Office of Energy Efficiency and Renewable Energy

The Office of Energy Efficiency and Renewable Energy (EERE) supports investments in a wide range of clean energy technologies, including solar, wind, geothermal, marine and hydrokinetic power, bioenergy, vehicle technologies, hydrogen and fuel cells, critical materials, advanced manufacturing, and building technologies.[4]

Office of Electricity

The Office of Electricity (OE) leads efforts to ensure that the Nation's energy delivery system is resilient and reliable. The office supports the development of new technologies to improve the infrastructure that stores and transports electricity, and the federal and state electricity policies and programs that shape electricity system planning and market operations.[5]

Office of Cybersecurity, Energy Security, and Emergency Response

The mission of the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) is to enhance the security of U.S. critical energy infrastructure to all hazards, mitigate the impacts of disruptive events and risk to the sector overall through preparedness and innovation, and respond to and facilitate recovery from energy disruptions.[6]

[4] https://www.energy.gov/eere/office-energy-efficiency-renewable-energy
[5] https://www.energy.gov/oe/office-electricity
[6] https://www.energy.gov/ceser/ceser-mission#:~:text=To%20enhance%20the%20security%20of,Federal%20agencies%2C%20the%20private%20sector%2C

Office of Fossil Energy

The Office of Fossil Energy (FE) supports R&D projects in the areas of carbon capture, utilization, and storage (CCUS), carbon removal, methane leak detection and mitigation, and other areas related to the extraction and use of coal and natural gas with a focus on reducing environmental impacts and improving efficiency.[7]

In addition to changing its name to the Office of Fossil Energy and Carbon Management, the Administration's discretionary request states that it "would advance carbon reduction and mitigation in sectors and applications that are difficult to decarbonize, including the industrial sector, with technologies and methods such as carbon capture and storage, hydrogen, and direct air capture - all while ensuring that overburdened communities are protected from increases in cumulative pollution." [8]

Office of Nuclear Energy

The Office of Nuclear Energy (NE) supports RD&D activities to resolve the technical, cost, safety, and waste management challenges of increased use of nuclear energy to ensure that this resource remains a viable clean energy option for the nation.[9]

Advanced Research Projects Agency-Energy

The Advanced Research Projects Agency-Energy (ARPA-E) was established in 2009 after being authorized in the America COMPETES Act and funded through the American Recovery and Reinvestment Act. Modeled on the military's DARPA program, ARPA-E funds the type of high-risk, high-impact research projects that industry, universities, national labs, and other government programs are unlikely to pursue on their own. Like DARPA, its business model makes it unique, with a flat management structure and small staff that consists largely of technical and scientific experts hired for limited terms of 2-4 years, and business practices that emphasize reducing transactional speed and adhering to "go/no go" milestones for projects.[10]

The request includes $1 billion total for a new Advanced Research Projects Agency for Climate and for activities supported by ARPA-E, of which $700 million would be funded through DOE. ARPA-E received $427 million in FY21.

[7] https://www.energy.gov/fe/about-fossil-energy
[8] https://www.whitehouse.gov/wp-content/uploads/2021/04/FY2022-Discretionary-Request.pdf
[9] https://www.energy.gov/ne/about-us
[10] https://arpa-e.energy.gov/about/our-impact

Loan Programs Office

The DOE's Loan Programs, administered by the Loan Programs Office (LPO), enable the Department to work with private companies and lenders to mitigate the financing risks associated with first-of-a-kind commercial clean energy projects, and thereby encourage their development on a larger scale. LPO stewards three major programs, the Innovative Energy Loan Guarantee Program, the Advanced Technology Vehicles Manufacturing Loan Program, and the Tribal Energy Loan Program through which it originates, guarantees, and monitors loans.[11]

Office of Technology Transitions

The Department of Energy's Office of Technology Transitions (OTT) serves as the hub for the technology transfer activities across the Department of Energy's R&D enterprise. The Office works to expand the commercial impact of the Department of Energy's research and development portfolio. It focuses on streamlining information and access to DOE's national labs and sites to accelerate the transfer of DOE-supported innovations into the marketplace.[12]

Arctic Energy Office

The Department of Energy's Arctic Energy Office leads cross-cutting R&D operations in the Arctic to address energy, science, and national security challenges. The Office will represent the Department in engagements involving the Arctic.[13]

[11] https://www.energy.gov/lpo/about-us-home
[12] https://www.energy.gov/technologytransitions/about-us
[13] https://www.energy.gov/arctic/arctic-energy-office