



ENERGY SCIENCES COALITION

February 26, 2021

The Energy Sciences Coalition (ESC) thanks Congress for continuing its strong, bipartisan support of the U.S. Department of Energy (DOE) Office of Science in the fiscal year (FY) 2021 appropriations bill (H.R. 133). **ESC urges Congress to appropriate at least \$7.7 billion in FY 2022 for DOE Office of Science, an increase of 9.6 percent above FY 2021.** This level of funding is needed to maintain a funding trajectory that ensures continued support for groundbreaking scientific discoveries, building and operating world-class scientific facilities, helping advance energy technologies needed for the nation to meet net-zero carbon emissions economy wide, developing Industries of the Future and emerging technologies, and maintaining the highly skilled science and technology workforce that is essential for the United States to compete globally.

As the nation's primary sponsor of physical sciences research, Office of Science plays a vital role in the American scientific ecosystem – a proven model for success in discovery and innovation. DOE Office of Science sponsors research programs vital to American prosperity and security at research universities and national laboratories and helps maintain the U.S. pipeline of science and engineering talent. DOE Office of Science is also unique among federal science agencies, supporting the network of 17 DOE national laboratories—the crown jewels of the nation's research and innovation ecosystem— and directly stewarding ten of them. DOE Office of Science also builds and operates the most sophisticated, world-class scientific user facilities used by research universities, industry and most federal agencies.

Another unique feature is science at scale. DOE Office of Science has a long history of combining the talent and capabilities of the national laboratories' unique science facilities, the country's leading research universities, and industry to bring together multi-disciplinary teams to tackle fundamental science, energy, and national security grand challenges. The most recent examples are the national quantum information science research centers and the nation's response to COVID-19. In response to COVID-19, DOE Office of Science established multi-disciplinary teams from all 17 national labs to address critical needs, such as improving capabilities for and ensuring effective detection of infection and expediting discovery of therapeutic drugs, including antibodies and antivirals, to complement vaccine development.

Bold new investments in fundamental research are needed to stay ahead of international competition, maintain U.S. competitiveness, and create American jobs of the future in key energy sectors as well as new technology areas such as high-performance computing, artificial intelligence, biotechnology, and quantum information science. In particular, scientific breakthroughs and energy technology innovation are still necessary to decarbonize the U.S. economy and mitigate the worst effects of climate change. Office of Science-supported fundamental research forms the foundation for future energy technologies. The current imperative—energy systems that meet our energy security, economic, and environmental challenges—requires continued, robust investments in all areas of fundamental research to advance all energy systems, including energy storage, negative emission technologies, advanced nuclear, hydrogen, fusion, renewables such as wind and solar, carbon capture, storage and utilization, and next-generation fuels.

The Energy Sciences Coalition (ESC) is a broad-based coalition of organizations representing scientists, engineers and mathematicians in universities, industry and national laboratories who are committed to supporting and advancing the scientific research programs of the U.S. Department of Energy (DOE), and in particular, the DOE Office of Science.

Specifically, ESC's funding recommendation is needed to:

- grow core research at national laboratories and research universities in the physical sciences, biological sciences, advanced materials, geosciences, computing and engineering to help develop future energy technologies and fully utilize new and updated world-class facilities and cutting-edge instrumentation, especially with ambitious goals to achieve net-zero emissions economy-wide no later than 2050;
- prepare the next generation of American scientific and engineering talent through competitively awarded grants and significantly expand existing workforce and education programs, such as the DOE Office of Science Graduate Fellowship and Computational Sciences Graduate Fellowship, while also creating new programs to address the nation's growing workforce needs in STEM and energy industries as well as meaningfully tackle issues of broadening participation and diversity, equity, and inclusion;
- accelerate the construction and upgrades of world-class scientific user facilities and maximize operations to support the more than 36,000 researchers from academia, industry and federal agencies that rely on these facilities for their science and engineering pursuits;
- advance new, strategic investments in innovative high-risk, high-reward research areas, such as quantum science and technology; artificial intelligence and scientific machine learning; genomics, biotechnology, and other convergence science; microelectronics; next-generation communications; accelerator and laser systems; and optical detectors, and
- maintain and grow multi-disciplinary centers focused on addressing scientific grand challenges, such as Energy Frontier Research Centers, Bioenergy Research Centers, Energy Innovation Hubs, and national quantum information science research centers as well as artificial intelligence co-design and microelectronics research centers.

To help guide these investments, ESC strongly recommends following the advice on research priorities and infrastructure investments of the six DOE Office of Science federal advisory committees. Since their inception, the Office of Science advisory committees have provided valuable, independent advice on complex scientific and technical issues and they have been essential for engaging the scientific community in open and transparent processes related to user facility planning, assessment, ranking and prioritization. They also help establish consensus across the scientific community on research priorities and goals. Recent examples include the fusion energy and plasma science long-range plan and recommendations on a future U.S. domestic high-performance reactor-based research facility for materials research and other applications.

The United States must maintain its leadership in science, technology and innovation, and the DOE Office of Science plays a pivotal and leading role in addressing this country's energy, national security, and environmental challenges. For these reasons, we urge Congress to provide at least \$7.7 billion for DOE Office of Science in FY 2022. We look forward to working with you in advancing the critical missions of the DOE Office of Science.

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ESC Membership

American Association for the Advancement of Science	Jefferson Science Associates, LLC
American Association of Physicists in Medicine	Krell Institute
American Association of Physics Teachers	Lansing Economic Area Partnership
American Astronomical Society	Lansing Regional Chamber of Commerce
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American Society of Agronomy	Northern Illinois University
Acoustical Society of America (ASA)	Northwestern University
American Society of Mechanical Engineers	Oakland Chamber of Commerce
American Society for Microbiology	Oak Ridge Associated Universities (ORAU)
American Society of Plant Biologists	OSA—The Optical Society
American Vacuum Society	Pace University
Arizona State University	Penn State University
Association of American Universities	Princeton University
Association of Public and Land-grant Universities	Purdue University
AVS – The Society for Science and Technology of Materials, Interfaces, and Processing	Rensselaer Polytechnic Institute
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Bioenergy Association of America	Soil Science Society of America
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The Ecological Society of America	University of Missouri System
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Florida State University	University of North Texas
Fusion Power Associates	University of Oklahoma
General Atomics	University of Pennsylvania
Geological Society of America	University of Rochester
George Mason University	University of Southern California
Georgia Institute of Technology	University of Tennessee
Grid Alternatives	University of Texas at Austin
Harvard University	University of Virginia
Health Physics Society	University of Wisconsin-Madison
IBM	Vanderbilt University
IEEE-USA	Washington State University
Iowa State University	West Virginia University
	Yale University

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