



March 28, 2022

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) 2022 omnibus appropriations bill (H.R. 2471). To build on this support, **ESC urges Congress to appropriate \$8.8 billion in FY 2023 for DOE Office of Science, an increase of 18 percent above FY 2022 and consistent with the bipartisan House and Senate DOE Science for the Future Act.** This level of funding is necessary to maintain U.S. competitiveness. Specifically, increased funding is needed to accelerate construction of world-class scientific facilities, support groundbreaking scientific discoveries, advance energy technologies needed for the nation to meet net-zero carbon emissions, develop emerging technologies, and grow a highly skilled and diverse science and technology workforce that is essential for the United States to compete globally.

As the nation's primary sponsor of physical sciences research, the DOE Office of Science plays a vital role in the American scientific ecosystem – a proven model for success in discovery and innovation. The 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. The Office of Science is also unique among federal science agencies, supporting the network of 17 DOE national laboratories—a competitive advantage for the nation's research and innovation ecosystem—and directly stewarding ten of them. The Office of Science also builds and operates the most sophisticated, world-class scientific user facilities used by universities, industry and other federal agencies.

Another unique feature is science at scale. The 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 establishment of National Quantum Information Science Research Centers and assisting in the nation's response to the COVID-19 pandemic. In response to COVID-19, the Office of Science established multi-disciplinary teams from all 17 national labs to address critical needs, such as improving capabilities for 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, microelectronics, 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 increasing 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 \$8.8 billion 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 economy-wide net-zero emissions 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 tackling 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 who 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 of the six DOE Office of Science federal advisory committees on research priorities and infrastructure investments. 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 international benchmarking study for materials and chemistry research and associated facilities needed to stay ahead of international competition and the fusion energy and plasma science long-range plan with recommended steps to delivery fusion energy on the grid.

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 \$8.8 billion for the Office of Science in FY 2023. We look forward to working with you in advancing the critical missions of this invaluable agency.

Sincerely,

Leland Cogliani
Co-chair
202-289-7475
leland@lewis-burke.com

Carina Márquez-Oberhoffner
Co-chair
202-263-4521
carina.marquez@wisc.edu

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American Association of Physics Teachers
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