



## ENERGY SCIENCES COALITION

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March 11, 2019

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) 2019 appropriations bill (H.R. 5895). By providing a five percent increase over the FY 2018 enacted funding level, Congress demonstrated a clear appreciation for Office of Science's role in enhancing our energy security and national security, strengthening the U.S. economy, and maintaining America's global competitiveness. To help build on this momentum and ensure we continue to support groundbreaking scientific discoveries and the construction of world-class scientific facilities, **ESC urges Congress to lift the non-defense discretionary budget caps and appropriate \$7 billion in FY 2020 for DOE Office of Science, an increase of four percent real growth above FY 2019.**

As the nation's primary sponsor of physical sciences research, DOE 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; helps maintain the U.S. pipeline of science and engineering talent; builds world-class scientific tools and facilities; and supports the network of DOE National Laboratories.

For more than half a century, the United States held the preeminent global position in science, technology and innovation. However, other nations took note of America's success – stemming in large part from its history of strong investments in research and development – and countries across Europe and Asia have bolstered their own investments in both research and workforce development. The result: the U.S. is no longer the undisputed leader in science and technology. The 2018 Global Innovation Index ranks the United States 4<sup>th</sup> among world innovators and 10<sup>th</sup> in national research investment as a percentage of GDP. Sustained increases in federal R&D investments are needed to avoid falling further behind.

By providing DOE Office of Science \$7 billion in FY 2020, Congress would continue its commitment to prioritizing funding for early-stage research and demonstrate to our global counterparts that the U.S. has no intention of ceding its leadership in science and technology. This level of funding would enable DOE Office of Science to:

**Sponsor Vital Research:** Office of Science is the largest government sponsor for basic research in the physical sciences. It is the primary funder for several subdisciplines – including high energy physics, heavy-element chemistry, plasma physics and catalysis – as well as a leading sponsor in the biological sciences, advanced materials, geosciences, computing and engineering. In FY 2020, Office of Science will continue to make strategic investments in innovative high-risk, high-reward research areas. Discoveries in targeted areas such as quantum science and technology, genomics, microelectronics, machine learning and matter at extreme conditions, have potential far-reaching impacts that could lead to paradigm-shifting innovations that spawn the creation of new industries. In addition to its targeted initiatives, Office of Science must also continue to grow its core research programs to fully utilize its updated world-class facilities and cutting-edge instrumentation.

**Prepare the Next Generation of American Scientific and Engineering Talent:** Office of Science supports a diverse portfolio of research at colleges and universities nationwide. Through competitively awarded grants, Office of Science supports approximately 22,000 Ph.D. scientists, engineers, graduate students, undergraduates and technical personnel at more than 300 institutions across all 50 states and the District of Columbia. DOE-funded research and education programs strengthen our nation's scientific knowledge base and prepare the next generation of scientists and engineers by providing hands-on experience for students. ESC urges Congress to expand the successful DOE Office of Science Graduate Fellowship Program to support the best and brightest students from multidisciplinary areas of research, such as quantum information science, in pursuing their advanced degrees.

**Steward World-Class Scientific Facilities:** Office of Science supports the operation of the largest collection of major scientific user facilities in the world. Located at national laboratories and universities across the country, these 27 facilities include particle accelerators, experimental reactors, X-ray synchrotron and free-electron laser light sources, leadership-class supercomputers and other high-precision instruments. Annually, more than 36,000 researchers from academia, industry and federal agencies use these facilities to support their pursuits in science and engineering. Nearly half of the DOE facility users are university and federal researchers working to answer fundamental questions in science. Additionally, more than 50 Fortune 500 companies and many small businesses use these facilities to conduct the underlying research required to develop new technologies and products that drive the economy. In FY 2020, robust funding for Office of Science would ensure that construction of and upgrades to major facilities are completed on time and on budget. These projects are necessary to maintain U.S. leadership and help attract and retain the best scientific talent.

**Support U.S. Economic Growth:** During the last decade, Office of Science has made key investments to advance U.S. leadership in energy technologies. Examples include but are not limited to: fundamental research in nanostructured cathode materials that led to the production and deployment of high-energy, lithium ion batteries used by car companies for electric vehicles; a better understanding of fuel spray chemistry yielded the design of new, more energy-efficient diesel engines; interest in how organic films harvest light and generate electricity resulted in the commercialization of a thin film that uses solar energy to power tablets, digital signage, wearable devices, and even buildings by generating energy on windows and structural surfaces; and the discovery of multiple quantum states in superconducting materials has, decades later, prompted industrial investment in quantum computing. These are all examples of high-risk, early-stage research that is beyond the scope of what industry can or will support.

**Ensure National Security:** Office of Science facilities offer researchers from the National Nuclear Security Administration (NNSA), Department of Defense, Department of Homeland Security and Intelligence Agency unique resources necessary to advance a broad range of national security applications. NNSA scientists, for example, rely on Office of Science facilities to understand the material properties of an aging nuclear weapons stockpile and how to defend electronic components against radiation. Additionally, Office of Science-supported research has helped develop stronger, lighter armor for our soldiers, fortify the electric grid against cyber attacks, and improve our ability to detect nuclear and radiological smuggling at our borders.

For these reasons, we urge Congress to provide \$7 billion for DOE Office of Science in FY 2020. ESC looks forward to working with Congress and the Administration to enact a budget that will strengthen our economy, improve our global competitiveness, and enhance our energy security and national security.

Contacts: Christopher Carter  
Co-chair  
610-216-5656  
[ccc317@lehigh.edu](mailto:ccc317@lehigh.edu)

Leland Cogliani  
Co-chair  
202-289-7475  
[Leland@lewis-burke.com](mailto:Leland@lewis-burke.com)

*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.*

## ESC Membership

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