ENERGY SCIENCES COALITION

February 19, 2020

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) 2020 appropriations bill (H.R. 1865). By providing a six percent increase over the FY 2019 enacted funding level, Congress demonstrated its 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 maintain a funding trajectory that ensures continued support for groundbreaking scientific discoveries, as well as the construction and operation of world-class scientific facilities, **ESC urges Congress to appropriate at least $7.4 billion in FY 2021 for DOE Office of Science, an increase of four percent real growth above FY 2020.**

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; helps maintain the U.S. pipeline of science and engineering talent; builds world-class scientific tools and facilities; and supports the network of 17 DOE National Laboratories. Specifically, the **Office of Science is a leader in advancing critical industries of the future,** including quantum information science, artificial intelligence, next-generation high performance computing, advanced communications networks, future energy technologies and engineering biology. These investments are needed to maintain American science and technology leadership over the next several decades and share bipartisan support from Congress and the Trump Administration.

For more than half a century, the United States held the preeminent global position in science, technology and innovation. However, the U.S. is no longer the undisputed leader in science and technology. The 2019 Global Innovation Index ranks the United States 3rd among world innovators, an improvement over last year, but still 10th in R&D expenditures relative to the size of its economy. China, in particular, has made significant science and technology investments and in 2019 surpassed the U.S. in absolute R&D spending. In addition, the National Science Board's *The State of U.S. Science and Engineering 2020* report found that even with strong congressional support, the share of U.S. R&D funded by the federal government has continued to decline since 2000. The report cautions that, "This decline is notable as federally funded R&D is an important source of support, particularly for the higher education sector and for the basic research enterprise of the United States." **ESC calls on Congress to increase federal R&D investments in Office of Science to avoid falling further behind international competition.**

By providing DOE Office of Science at least $7.4 billion in FY 2021, 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 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 2021, 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 and cross-agency data sharing capabilities 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 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 2021, 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 of basic research investments that led to new energy technologies include lithium ion batteries used by car companies for electric vehicles; the design of new, more energy-efficient diesel engines; and organic films for windows and structural surfaces that generate solar energy to power tablets, digital signage, wearable devices and even buildings. These are all examples of high-risk, early-stage research that is beyond the scope of what industry can or will support. ESC supports Office of Science's renewed efforts to help advance and commercialize innovative research and expand public-private partnerships to grow awareness of DOE investments.

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 agencies 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 **at least** $7.4 billion for DOE Office of Science in FY 2021. 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.

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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

American Association for the Advancement of Science
American Association of Physicists in Medicine
American Association of Physics Teachers
American Astronomical Society
American Chemical Society
American Crystallographic Association
American Geophysical Union
American Geosciences Institute
American Institute of Physics
American Mathematical Society
American Physical Society
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Acoustical Society of America (ASA)
American Society of Mechanical Engineers
American Society for Microbiology
American Society of Plant Biologists
American Vacuum Society
Arizona State University
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Battelle
Binghamton University
Biophysical Society
Boston University
Case Western Reserve University
City College of CUNY
Clemson University
Coalition for Academic Scientific Computation (CASC)
Consortium for Ocean Leadership
Columbia University
Computing Research Association
Council of Scientific Society Presidents
Cornell University
Cray Inc.
Crop Science Society of America
Duke University
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Florida State University
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General Atomics
Geological Society of America
George Mason University
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Krell Institute
Lehigh University
Massachusetts Institute of Technology
Materials Research Society
Michigan State University
Michigan Technological University
New York University
Northeastern University
Northern Illinois University
Northwestern University
Oak Ridge Associated Universities (ORAU)
OSA—The Optical Society
Pace University
Penn State University
Princeton University
Purdue University
Rensselaer Polytechnic Institute
Rutgers, The State University of New Jersey
Society for Industrial and Applied Mathematics
Soil Science Society of America
South Dakota School of Mines
Southeastern Universities Research Association
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