



August 27, 2018

The Honorable Mick Mulvaney
Director
Office of Management and Budget
Eisenhower Executive Office Building
1650 Pennsylvania Avenue, NW
Washington, DC 20503

Dear Director Mulvaney:

The member organizations of the Energy Sciences Coalition (ESC) urge you to strongly support the Department of Energy (DOE) Office of Science during fiscal year (FY) 2020 budget discussions. We recommend building on the momentum of the bipartisan FY 2019 Senate Energy and Water Appropriations bill (S. 2975) by providing increased funding for DOE Office of Science in the President's FY 2020 budget request. Sustained growth in funding is necessary for the Office of Science to continue to support cutting-edge research at universities and national laboratories, construction and operation of world-class science infrastructure, and training the next generation STEM workforce required to maintain U.S. leadership in scientific innovation, economic competitiveness and national security.

During the last several months, the Administration has put forward priorities across the science, technology and national security spaces. The December 2017 National Security Strategy, for example, highlights the need to "prioritize emerging technologies critical to economic growth and security, such as data science, encryption, autonomous technologies, gene editing, new materials, nanotechnology, advanced computing technologies, and artificial intelligence." This strategy also prioritizes "America's technological edge in energy, including nuclear technology, next-generation nuclear reactors, better batteries, advancing computing, carbon-capture technologies, and opportunities at the energy-water nexus." Additionally, your July 2018 memo (M-18-22) lists the Administration's FY 2020 research and development budget priorities: "American leadership in artificial intelligence, quantum information science, and strategic computing," maintaining "American energy dominance" by investing in innovative technologies, managing and modernizing "state-of-the-art Federal science and technology infrastructure," and continuing strong partnerships with industry and academia.

The Office of Science provides essential support for the world-class scientists, scientific tools and state-of-the-art facilities needed to meet *all* of these science and technology opportunities and challenges. Currently, the Office of Science plays a leading role in advancing multidisciplinary areas of science including quantum technologies, machine learning applications, next-generation energy storage, materials and chemistry solutions for advanced nuclear reactor concepts, the energy-water nexus, subsurface science for carbon capture and utilization applications, and high-performance computing capabilities such as exascale.

As the nation's largest sponsor of basic research in the physical sciences, the Office of Science pushes the frontiers of knowledge. Long-term, sustained investments in Office of Science programs have yielded broad benefits to many sectors of society. A June 2018 report, titled *A Remarkable Return on Investment in Fundamental Research*, highlights examples of major scientific accomplishments emerging from 40 years of Basic Energy Sciences (BES) research within the Office of Science. The discovery of new alloys for coal-fired power plants, superconductivity to advance mobile telecommunication networks, light emitting diodes that use 85 percent less energy than incandescent bulbs, and the study of metal components in nuclear weapons to maintain the U.S. nuclear deterrent are just a few examples BES research that help showcase American innovation or bolster our national defense.

In addition to sponsoring a leading-edge research program, the Office of Science also stewards a set of world-class scientific user facilities. Located at national laboratories and universities across the country, these 26 open-access 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 32,000 researchers from academia, industry and federal agencies use these facilities to support their scientific and engineering needs. These user facilities also support the missions of many other federal agencies, including the National Science Foundation, the National Institutes of Health (NIH), Department of Veterans Affairs (VA), Department of Defense, Department of Homeland Security and Intelligence agencies. For example, the VA is using the Office of Science's high-performance computing capabilities to improve health care delivery for veterans and NIH is using light sources to help develop new cancer treatments. Robust funding is needed to ensure that ongoing construction and upgrades of major facilities are completed on time and on budget and keep us ahead of international competition.

The Office of Science also plays a critical role in preparing the next generation of American scientific and engineering talent. Through competitively awarded grants, the 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. Sustained, robust funding is needed to maintain DOE-funded research and education programs, such as early career and graduate fellowship programs, that strengthen our nation's scientific knowledge base and prepare the next generation of scientists and engineers by providing hands-on experience.

Today, U.S. leadership in critical areas of research is being challenged by our economic competitors. Countries across Europe and Asia are making significant investments in strategic science and technology, including artificial intelligence, quantum information science and microelectronics, in an attempt to dominate the market. China has plans to become the world leader in supercomputing in the 2020s – not just in hardware development but also software for science applications and high-tech manufacturing. While the Office of Science has built and maintains a unique collection of large-scale user facilities, nations such as China, Japan, Germany, France, Brazil, Sweden and Switzerland are building or updating their own world-class facilities. The U.S. must continue to show leadership in funding high-risk, long-term research and invest in the most advanced scientific tools and facilities, which attract and retain the best minds and talent from around the U.S. and the world. Should we not, the next wave of technological advances will occur elsewhere and contribute to other countries' innovation enterprises.

We recognize the challenges presented by a constrained federal budget. However, robust funding for the Office of Science is essential to our nation's national security, energy security, scientific leadership and economic prosperity. We urge the Administration's strong support for it. Thank you for your consideration of our views.

Sincerely,

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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 Physics Teachers
American Astronomical Society
American Chemical Society
American Geophysical Union
American Geosciences Institute
American Institute of Physics
American Mathematical Society
American Physical Society
American Society for Engineering
Education
American Society of Agronomy
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
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Florida State University
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Geological Society of America
George Mason University
Georgia Institute of Technology
Harvard University
IBM
IEEE-USA
Iowa State University

Jefferson Science Associates, LLC
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
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Soil Science Society of America
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