ENERGY SCIENCES COALITION

January 8, 2024

Dear Chairman Fleischmann, Chairwoman Murray, Ranking Member Kaptur, and Ranking Member Kennedy,

As you prepare a final fiscal year (FY) 2024 Energy and Water appropriations bill, the Energy Sciences Coalition (ESC) urges you to appropriate at least $8.4 billion in FY 2024 for the Department of Energy (DOE) Office of Science, consistent with the Senate mark. ESC also continues to urge Congress to increase discretionary funding allocations or consider supplemental funding to appropriate at least $8.8 billion in FY 2024 for DOE Office of Science, consistent with the FY 2024 President's budget request and the bipartisan *CHIPS and Science Act*.

The DOE Office of Science, the nation's largest funder of the physical sciences, has long enjoyed widespread and bipartisan support in Congress. It supports groundbreaking scientific discoveries, builds and maintains the nation's largest collection of world-class scientific facilities, advances key emerging technologies such as quantum and artificial intelligence, is mission-focused on advancing energy technologies needed for the nation to meet net-zero carbon emissions, and helps maintain the U.S. pipeline of science and engineering talent. The Office of Science is also unique among federal science agencies by supporting the network of 17 DOE national laboratories—a competitive advantage for the nation's research and innovation ecosystem—and directly stewards 10 of them.

The *CHIPS and Science Act* recognized that the only way for the U.S. to win the science and technology race was to outspend and outcompete our competitors. While ESC appreciates both the House and Senate efforts to prioritize funding for the Office of Science in a constrained budget environment, the funding levels included in the bills are simply not sufficient to maintain U.S. competitiveness and advance the new investments and initiatives proposed in the budget request and authorized in the *CHIPS and Science Act*. This puts the U.S. at risk of falling behind international competition, especially in new technology areas such as high-performance computing, artificial intelligence, biotechnology, microelectronics, fusion energy, and quantum information science.

<u>The modest funding increase proposed in the Senate bill is the minimum necessary to advance the critical missions of DOE Office of Science</u>. In its July 26 statement, ESC highlighted concerns with the House funding proposal of $8.1 billion, or flat funding at the FY 2023 enacted level, and in particular the negative impact it would have on DOE Office of Science research, operations, and infrastructure programs. The Senate funding level of $8.4 billion mitigates many of these concerns. The Senate mark would fully fund major research facility construction and national lab modernization projects consistent with current cost and schedule profiles; provide stable funding for most fundamental research programs; maintain stable funding for operations of research facilities used by more than 38,000 researchers each year; and support workforce development and STEM training and education programs.

However, major initiatives not funded or fully supported in either the House and Senate bills include:

- **Growing fundamental research programs.** The *CHIPS and Science Act*, as well as the budget request in certain targeted areas, proposed growing core research at national laboratories and research universities across all six major Office of Science program areas by at least five percent. This included investments in the physical sciences, biological sciences, advanced materials, geosciences, computing and engineering to help develop future energy and emerging technologies, fully utilize new and updated world-class facilities and cutting-edge instrumentation, and invest in STEM talent. Neither the House nor Senate bills meet this target (the House would cut fundamental research by 5 percent, while the Senate would maintain flat funding).
- **Next-generation computing.** Both the House and Senate bills are more than $100 million below the budget request for mathematical, computational, and computer science research and both would cut research funding within the Advanced Scientific Computing Research Program by more than $40 million below the FY 2023 enacted funding level. This cut in funding would reverse efforts to support research and STEM education programs in computer science, applied math, engineering, quantum science and technology and AI when domestic demand for that talent is growing as well as halt projects focused on developing exascale computing software and applications, advancing trustworthy and scalable scientific AI, and building industry partnerships to improve the energy efficiency of computing and AI technologies. In addition to these negative impacts, no new funding is a lost opportunity to invest in next-generation computing systems; exploit current exascale and other high performance computing facilities to address science, energy, and national security challenges; advance the trustworthy, energy-efficient, and scalable use of artificial intelligence and machine learning; and design next-generation semiconductors.
- **Microelectronics Science Research Centers.** While we appreciate the Senate report language in support of microelectronics research and microelectronics research centers, neither bill includes funding for these initiatives. The budget request proposed $60 million to launch up to four Microelectronics Research Science Centers as authorized in the *CHIPS and Science Act*, Section 10731. This effort would complement other federal agencies, such as the National Science Foundation and the Departments of Defense and Commerce, but focus on next-generation semiconductors for DOE missions in science, energy, and national security.
- **Expanded Quantum Information Science.** While the House and Senate bills provide at least $245 million for quantum science and technology, as in prior years, and provide DOE Office of Science flexibility on the use of funds, with no growth in research funding, as described above, for DOE Office of Science, there are no additional resources for a cross-cutting initiative such as quantum information science. Additional resources are needed to expand use-inspired research projects that focus on initial applications, especially in sensing and metrology, communications, and computing and simulation; invest in innovative research in materials, new devices, and novel platforms for quantum information science technologies; launch and expand quantum internet, networking, and communications testbeds and research efforts consistent with DOE's "America's Blueprint for the Quantum Internet" strategy; and fully support the quantum user expansion for science and technology (QUEST) program that would expand access to researchers to the nation's leading quantum infrastructure and capabilities.
- **Bold investments for fusion energy.** The FY 2024 budget request proposed an increase of $248 million over the FY 2023 enacted level to make significant progress in achieving fusion energy within the next decade. The increased funding is necessary to fully fund existing facilities and research programs; increase funding for the Milestone-based fusion development program to support U.S.-based fusion reactor demonstration projects; expand inertial fusion energy to take advantage of the fusion ignition achievement at the National Ignition Facility; and create four new fusion R&D centers dedicated to materials, the blanket fuel cycle, enabling technologies, and advanced simulation. The funding levels provided in the House and Senate bills do not allow for most of these investments.

- **New funding for Artificial Intelligence (AI).** Neither the House or Senate bills provide new funding to accelerate the development and application of AI for science, energy, environmental, and national security missions. Recent DOE strategic plans and workshop reports have identified new AI applications that would, among other things, accelerate the design, discovery, and evaluation of new materials for clean energy technologies; advance the development of self-driving laboratories and scientific workflows; and enable the autonomous operation and optimization of complex user facilities such as light sources and high performance computers. For example, AI could help find new materials or chemical compounds that have unique properties needed for real-world applications much faster—for example, batteries that hold 10 times the storage capacity compared to today's batteries, or materials that capture more solar energy at greater efficiency.

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 appropriate no less than $8.4 billion for DOE Office of Science in a final spending package. We also urge Congress to strike general provisions included in the House bill that would reduce funding for research universities and hurt recruitment and retention of the scientific and engineering workforce. If additional resources become available – either as part of the conference agreement or through supplemental appropriations -- we urge Congress to provide at least $8.8 billion for the Office of Science. This would help the U.S. maintain its international leadership in clean energy, such as fusion, and other emerging technology areas, such as AI and microelectronics.

Thank you for your strong support for the DOE Office of Science.

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.