ENERGY SCIENCES COALITION

May 13, 2024

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

The Energy Sciences Coalition (ESC) thanks you again for prioritizing funding for the U.S. Department of Energy (DOE) Office of Science in final fiscal year (FY) 2024 appropriations. As you begin work on the FY 2025 Energy and Water Appropriations bill, we hope you will continue to provide the bold investments needed for the DOE Office of Science to stay ahead of international competition consistent with the vision and intent of the *CHIPS and Science Act*.

ESC continues to urge Congress to appropriate $9.5 billion in FY 2025 for DOE Office of Science. This level of funding is needed to accelerate the construction of world-class science facilities, grow research programs in discovery science and emerging technology areas, and support workforce development programs. We also recognize the budget caps in place under the *Fiscal Responsibility Act.* In a funding constrained environment, ESC urges Congress to provide the DOE Office of Science no less than $8.583 billion, the funding level in the FY 2025 President's budget request. This is the minimum funding level necessary to protect the highest priorities for the Office of Science. Even at this funding level, ESC has significant concerns about advancing critical research and workforce development programs, operating cutting-edge facilities, and building world-leading facilities on time and on budget. Below is ESC's analysis of the FY 2025 DOE Office of Science budget request and recommendations to advance research, operations, construction, and workforce development programs if additional funding is available:

- **Reverse cuts to fundamental research that supports Nobel Prize-winning discoveries and drives innovation in clean energy solutions and emerging technologies.** Overall, core research could see a decrease of 8 percent over two years. Core research saw a cut of 2.4 percent in the final FY 2024 enacted budget and the FY 2025 budget request proposes another 6 percent cut. ESC supports targeted increases in the budget request for a few core research areas to reverse this trend including: applied mathematics and computer science primarily to support artificial intelligence (AI), machine learning, and advanced computing applications; fusion energy research; and earth systems and environmental sciences primarily to improve modeling and prediction of extreme weather events. However, ESC continues to recommend growing core research at national

laboratories and research universities across all six of the Office of Science program areas. ESC is concerned with the proposed cuts in FY 2025 to critical research disciplines including materials, chemistry, geosciences, biological sciences, particle physics and nuclear physics. This comes on the heels of cuts enacted in FY 2024 for these same research areas, meaning at least two years in a row of cuts. For example, core research programs supported by Basic Energy Sciences, such as materials and chemistry, would see a cut of $57 million or close to 6 percent compared to the FY 2023 enacted funding level. The U.S. risks falling behind if cuts continue to research programs that serve as the scientific foundations for innovations in clean energy and emerging technologies. More concerning is that these cuts translate into less support for U.S. researchers and students in STEM fields. The U.S. needs to grow, not shrink, its workforce. Consistent with the *CHIPS and Science Act*, ESC recommends an increase of 7 percent to all core research programs, or an additional $287 million above the budget request. This level of funding would start to reverse cuts or flat funding for core research in most programs and advance the highest priority research areas outlined in Office of Science advisory committee reports, strategic plans, and workshop reports.

- **Maximize facility operations.** ESC strongly supports the proposed increase of $178 million to facility operations across the Office of Science. This is necessary to operate existing facilities and experiments and support more than 36,000 researchers from academia, industry and federal agencies who rely on these facilities for their science and engineering pursuits. However, even with the proposed increase, the funding only supports 88% of operations. This means significant missed opportunities for thousands of additional users to advance mission-relevant science. ESC recommends an additional $367 million above the budget request to achieve close to 98% of facility operations and fund critical maintenance activities to ensure long-term operation.
- **Accelerate the construction and upgrades of world-class scientific user facilities and major equipment.** ESC supports the increases proposed in the budget request to keep most major facility line-item construction projects and major items of equipment on time and on budget. However, ESC is concerned that the budget request still falls short of DOE-approved and *CHIPS and Science Act* authorized project profile funding for several critical research facilities and experiments. Given the budget constraints, the budget request also did not look to add funding to some key projects that could be accelerated since they are funding constrained rather than schedule constrained. The budget request also included little research and development funding to define and guide future facility needs. ESC recommends an additional $200 million above the budget request to fully fund and accelerate construction projects and state-of-the-art equipment and $100 million above the budget request for research and development for next-generation facilities.
- **Upgrade national lab scientific infrastructure.** ESC strongly supports the proposed increases to the Science Laboratories Infrastructure program, including full funding for existing line-item construction projects and an increase to general plant projects. These investments in upgrading and replacing aging utilities, roads, office buildings and other general purpose infrastructure are essential for the safe, reliable, and resilient operation of the 10 Office of Science national laboratories as well as a critical tool in the recruitment and retention of leading scientists and engineers. However, ESC is concerned that based on current budget projections no new projects will be proposed until 2028. Based on a DOE Office of Science FY 2022 assessment of the 10 national labs it stewards, 43

percent of general-purpose buildings were rated as substandard or inadequate to meet mission needs, 71 percent of utility systems were rated as substandard or inadequate, and 35 percent of the remaining support infrastructure was rated as substandard or inadequate. According to DOE, the substandard and inadequate condition of facilities results in operational inefficiencies, reduced resiliency and reliability, unplanned outages, costly repairs, and elevated safety risks. ESC recommends an additional $200 million above the budget request to advance new national lab infrastructure upgrades to retire risk to lab operations faster.

- **Increase investments in emerging technologies.** ESC strongly supports DOE Office of Science investments in emerging technologies and believes DOE should continue to be a leading federal science agency leveraging unique research and infrastructure capabilities. Regarding specific emerging technology area investments:
    - ESC supports the $259 million requested for an AI initiative, consistent with ESC's recommendation and the vision outlined in the 2023 *Advanced Research Directions on AI for Science, Energy, and Security*. AI can play a major role in finding important scientific and technological solutions for DOE missions, such as the search for new quantum materials for quantum computing, sensing, and networking applications; new nuclear and fusion reactor designs; and improved climate models to improve resiliency and mitigate the worst effects of extreme weather events. While driving innovation, DOE can also advance the responsible development of AI focused on challenges related to AI technology, such as explainability, validation, security, and privacy.
    - ESC supports the $95 million requested for microelectronics research and development, but recommends $200 million for this initiative, consistent with the *CHIPS and Science Act.* DOE Office of Science plays a unique role in developing next-generation semiconductors and microelectronics and its efforts would be complementary to other federal agencies, such as the National Science Foundation and the Departments of Defense and Commerce. The budget request would advance research and development efforts but falls short of what is needed to fully meet DOE mission needs. ESC's recommendation includes $100 million for broad-based foundational research and development activities and $100 million to fund up to four Microelectronics Research Science Centers as authorized in the *CHIPS and Science Act*.
    - ESC recommends $315 million for Quantum Information Science. The budget request of $280 million continues three years of flat funding for this cross-cutting program. The additional funding above the budget request would be to expand quantum computing and quantum internet, networking, and communications testbeds and support the quantum user expansion for science and technology (QUEST) program as authorized in the *CHIPS and Science Act* to expand access to researchers to the nation's leading quantum infrastructure and capabilities.
- **Grow the next generation of American scientific and engineering talent.** ESC strongly supports programs to prepare a highly skilled and diverse STEM workforce. ESC supports programs like RENEW and FAIR to build research capacity at Minority Serving Institutions and emerging research institutions. ESC also recommends continued support for the Early Career Research Program, which is tied to overall research funding. On average, DOE supports over 80 early career researchers from U.S. academic

institutions and DOE national labs to pursue DOE-relevant research. Cuts to research funding may impact funding for this program. Under the Workforce Development for Teachers and Scientists program, ESC supports the modest budget increase ($500,000) to the Office of Science Graduate Student Research Program to support an additional 14 students, but this program can be expanded further. ESC is concerned about the proposed 11 percent or $1.7 million cut to the science Undergraduate Laboratory Internship Program that would support 112 fewer students. Based on a 2023 review of the program "SULI is a large, vibrant, and successful program that brings hundreds of undergraduate students to DOE labs each year." Engaging students earlier helps prepare students enter STEM careers that are relevant to DOE mission and the program exposes students to DOE national labs and hands-on research experiences. ESC recommends restoring and increasing funding for this program.

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 $9.5 billion for the Office of Science in FY 2025 and, even in a funding constrained environment, no less than $8.583 billion, consistent with the budget request. We look forward to working with you in advancing the critical missions of this invaluable agency.

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.