



Department of Energy
Office of Science
Washington, DC 20585

Office of the Director

Dr. Cynthia Friend
The Kavli Foundation
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Dear Dr. Friend:

Thank you for your continuing service as Chair of the Basic Energy Sciences Advisory Committee (BESAC). I appreciate the International Benchmarking report, which is inspiring similar assessments by other advisory committees in the Office of Science (SC). Following on that report, I would like BESAC to take on a new charge.

Recent events have addressed aspects of the health of United States (U.S.) science, now and more importantly in the future, and have called attention to the strategic implications of government investments in science for American competitiveness in the 21st century. These events include the scientific community deliberations about the directions of U.S. science policy for the next 75 years; the Congressional debate that culminated in the enactment of the CHIPS and Science Act in August 2022; and, in the more specialized domains of Basic Energy Sciences (BES), the benchmarking study, *Can the U.S. Compete in Basic Energy Sciences?*, in July 2021.

It is, therefore, timely for BESAC to follow up on its benchmarking report and advise SC and BES on strategies for investments in the medium to long term to ensure the future impact of BES's research portfolio. The report found that the U.S. is falling behind other nations in critical aspects of the research enterprise, including key research areas, facilities and instrumentation, and the attraction and retention of talented people. It broadly recommended investments in research, infrastructure including experimental and computational facilities, career paths, and research and development integration from basic research to technological implementation.

Going forward, receiving more specific advice on BES research investment strategies would be exceptionally valuable, considering the foreseeable constrained economic environment. Costs for research, facility operations, and facility construction are all rising rapidly due to the combined effects of inflation, competition for talent, supply chains, and the pandemic. Even if increased authorization levels in the CHIPS and Science Act are realized in future appropriations, under business-as-usual scenarios, these forces will constrain the ability of BES to continue its historical record of productivity and impact on the Department of Energy's mission and the U.S. science enterprise. To build an impactful research portfolio within these constraints, strategies that will increase the productivity of BES investments, in the sense of scientific impact, capacity, and capability per dollar invested, are paramount.

As a first step in this direction, I ask BESAC to propose strategies for evaluating the prioritization of research investments in BES-supported domains. These proposals should be area-agnostic strategies that BES management and staff can subsequently apply to specific research topics as BES and the research community go forward. Some questions that BESAC could consider in this report include:

- How should BES determine that a topical area is a high priority for increased investment?
- How should BES determine that a topical area is a low priority for continued investment and could be reduced or phased out?
- How should BES identify new topical areas for investment?
- As disciplines converge on complex problems, how should BES identify and foster cross-cutting areas for investment?
- How should BES balance research and instrumentation support for National Laboratories?
- How should BES balance research and instrumentation support for academic grants?
- What should be the balance among the research modalities (single principal investigator, small groups, and team research [e.g., Energy Frontier Research Centers, Energy Innovation Hubs, Quantum Information Science Research Centers, and computational science centers]) for the future?
- How should BES weigh the potential for technological impact in defining investment priorities?
- How can BES play a useful role in enabling innovations to cross the “valley of death”?
- How sharp or fuzzy should the “basic-applied boundary” be?
- How should BES take account of international competition in its research domains?
- How frequently should these evaluations be revisited?

It would be advantageous if BESAC approved the review report by the Spring or Summer meeting of 2024. I want to thank you and BESAC for undertaking this important function for the Office of Science.

Sincerely,



Asmeret Asefaw Berhe
Director
Office of Science

cc: H. Kung, SC-3
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