

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY**

HEARING CHARTER

Providing the Tools for Scientific Discovery and Basic Energy Research: The Department of Energy Science Mission

Wednesday, October 30, 2013
9:30 – 11:30 a.m.
2318 Rayburn House Office Building

PURPOSE

The Subcommittee on Energy will hold a hearing entitled *Providing the Tools for Scientific Discovery and Basic Energy Research: The Department of Energy Science Mission* on Wednesday, October 30, at 9:30 a.m. in Room 2318 of the Rayburn House Office Building. The hearing will examine challenges and opportunities in setting priorities for the DOE’s basic research mission as well as the execution of these fundamental science programs and activities within the Office of Science (SC). Additionally, the hearing will examine draft legislation *Enabling Innovation for Science, Technology, and Energy in America Act* (or EINSTEIN America Act)¹ of 2013 to provide authorization and direction to the DOE Office of Science.

WITNESS LIST

- **Dr. Patricia Dehmer**, Deputy Director for Science Programs, Office of Science, Department of Energy
- **Dr. Horst Simon**, Deputy Director, Lawrence Berkeley National Lab
- **Dr. John Hemminger**, Chairman, Basic Energy Sciences Advisory Committee, Department of Energy

BACKGROUND

The Department of Energy is the “lead federal agency supporting fundamental scientific research for energy and the Nation’s largest supporter of basic research in the physical sciences.”² The mission of the DOE’s Office of Science (SC) is the delivery of scientific discoveries and major scientific tools that transform our understanding of nature and advance the energy, economic, and national security of the United States.³

The Office of Science budget and activities are divided into six major program areas:

- **Basic Energy Sciences (BES)** supports fundamental research to understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels and

¹ A Section by Section Analysis of the legislation is included as Appendix A.

² <http://science.energy.gov/about/>

³ DOE Fiscal Year 2014 Budget Request, Volume 4, p. SC-3.

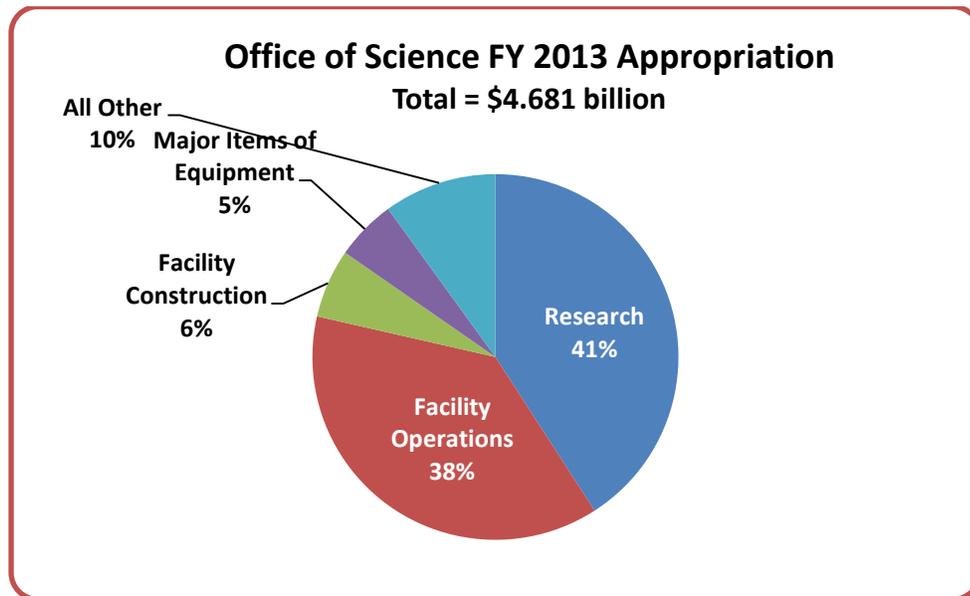
maintains world-class research facilities to develop facilitate advances in material science and chemistry.

- **Biological and Environmental Research (BER)** supports fundamental research focused on biological systems, climate, and environmental sciences, including work in genomics, climate change, and advanced environmental issues. The program also supports three DOE Bioenergy Research Centers, the Joint Genome Institute, and Environmental Molecular Sciences Laboratory.
- **Advanced Scientific Computing Research (ASCR)** supports research to discover, develop, and deploy computational and networking capabilities. The program is developing a program to position the Department to address scientific challenges that require 1,000 fold increases in computing capability and scientific data.
- **Fusion Energy Sciences (FES)** supports research to improve fundamental understanding of matter at very high temperatures and densities needed to develop fusion energy.
- **High Energy Physics (HEP)** probes the basic relationship between space and time, the elementary constituents of matter and energy, and the interactions between them. This effort focuses on three scientific frontiers: the energy frontier, the intensity frontier, and the cosmic frontier.
- **Nuclear Physics (NP)** supports research to discover and understand various forms of nuclear matter, as well as the production and development of techniques to make isotopes needed for medical, national security, environmental, and other research applications.

*Department of Energy (DOE) Office of Science Spending
(dollars in millions)*

Program	FY 2012	FY 2013 Annualized CR	FY 2014 Request	FY 2014 House Energy & Water Mark
Office of Science				
<i>Advanced Scientific Computing Research</i>	428.3	417.8	465.6	432.4
<i>Basic Energy Sciences</i>	1644.8	1601.2	1862.4	1583.1
<i>Biological and Environmental Research</i>	592.4	578.3	625.3	494.1
<i>Fusion Energy Sciences</i>	393.0	380.1	458.3	506.1
<i>High Energy Physics</i>	770.5	748.3	776.5	772.5
<i>Nuclear Physics</i>	534.6	519.9	569.9	551.9
Office of Science	4873.6	4621.1	5152.8	4653.0

SC's operations take part in three primary areas: research (44 percent in Fiscal Year 2014 budget request), facility operations (40 percent), and future facility planning (15 percent).



To carry out its mission, SC utilizes research capabilities maintained by DOE National Laboratories. The Office of Science is the steward of 10 of the 17 National Laboratories.⁴ (see Appendix B) DOE laboratories are government-owned, contractor-operated facilities, that:

- “Execute long-term government scientific and technological missions, often with complex security, safety, project management, or other operational challenges;
- Develop unique, often multidisciplinary, scientific capabilities beyond the scope of academic and industrial institutions, to benefit the Nation’s researchers and national strategic priorities; and
- Develop and sustain critical scientific and technical capabilities to which the government requires assured access.”⁵

SC also supports research to outside stakeholders through its 31 user facilities.⁶ User facilities “are among the most advanced tools of modern science, enabling researchers to explore a host of new scientific frontiers.” In Fiscal Year 2014, nearly 29,000 researchers from universities, national laboratories and industry are expected to use SC scientific user facilities.⁷

⁴ For a full list of Office of Science National Laboratories see: <http://science.energy.gov/laboratories/>

⁵ <http://science.energy.gov/laboratories/>

⁶ A full list of DOE Office of Science User Facilities can be found at http://science.energy.gov/~media/_pdf/user-facilities/Office_of_Science_User_Facilities_FY_2013.pdf

⁷ DOE FY 2014 Budget Request, Volume 4, SC-4.

Appendix A
Discussion Draft of
EINSTEIN America Act of 2013
Section by Section Analysis

Sec. 1. Short Title

This Act may be cited as the “Enabling Innovation for Science, Technology, and Energy in America Act of 2013.”

TITLE I—OFFICE OF SCIENCE

Sec. 101. Mission

Section 101 codifies the basic research mission of the Office of Science as the delivery of scientific discoveries, capabilities, and major scientific tools to transform the understanding of nature and to advance the energy, economic, and national security of the United States.

Sec. 102. Basic Energy Sciences

Section 102 directs the Office of Science to carry out a basic energy sciences program, including material sciences and engineering, chemical sciences, physical biosciences, and geosciences. The Section also directs the Department to develop, construct, operate, and maintain national scientific user facilities, including x-ray light sources, neutron sources, electron beam microcharacterization centers, nanoscale science research centers, and other facilities as appropriate.

Section 102 additionally authorizes the establishment of a Light Source Leadership Initiative to sustain and advance global leadership of light source user facilities.

Sec. 103. Advanced Scientific Computing Research

Section 103 directs the Office of Science to carry out a research, development, demonstration, and commercial application program to advance computational and networking capabilities to analyze, model, simulate, and predict complex phenomena relevant to the development of new energy technologies. The Section also encourages support for applied mathematics, computer science, and advanced networking activities to support the Department’s mission.

Section 103 additionally directs the Department to conduct a research and development program to pursue exascale computing systems.

Sec. 104. High Energy Physics

Section 104 directs the Office of Science to carry out a research program on the elementary constituents of matter and energy and the nature of space and time. The Department is also required to create, preserve, and maintain U.S. facilities essential to underground scientific research. The Department must deliver a report on its stewardship of underground science activities to Congress.

Sec. 105. Biological and Environmental Research

Section 105 directs the Office of Science to carry out a research, development, and demonstration program in the areas of biological systems science and climate and environmental science. The program shall prioritize fundamental research on biological systems and genomics sciences.

The Section also directs the Office of Science to carry out a research program relating to low dose radiation exposure. The National Academy of Sciences is directed to undertake an assessment of the current status of low dose radiation research. Upon completion of the report, the Department must develop a research plan in response to the assessment.

Sec. 106. Fusion Energy Science

Section 106 directs the Office of Science to carry out a fusion energy sciences research program to expand the fundamental understanding of matter at very high temperatures and densities to build the scientific foundation necessary to enable fusion power. The Section also requires the Fusion Energy Science Advisory Committee prepare and National Academy of Sciences review a plan to carry out the fusion energy sciences program.

Sec. 107. Nuclear Physics

Section 107 directs the Office of Science to carry out a program of experimental and theoretical research, and support associated facilities, to discover, explore and understand all forms of nuclear matter. The Section also directs the Department to carry out a program for the production of isotopes for research purposes.

Sec. 108. Transparency

Section 108 requires the Secretary to make public information relevant to Departmental operation and use of taxpayer funding and resources. This information includes waivers of cost share requirements for research, development, and demonstration activities under Section 988 of the Energy Policy Act of 2005; and technology transfer research agreements between National Laboratories and non-government entities.

Sec. 109. External Regulations

Section 109 directs the Secretary of Energy to coordinate with the Occupational Safety and Health Administration and the Nuclear Regulatory Commission to provide for the efficient external regulation of nuclear safety and occupational and health responsibilities at any nonmilitary energy laboratory owned or operated by the Department.

Sec. 110. Technology Transfer

Section 110 delegates signature authority to the National Laboratories for technology transfer agreements with a total cost under \$500,000.

Sec. 111. National Energy Technology Laboratory.

Section 111 directs the National Academy of Public Administration to conduct a study assessing the management and operations of the National energy Technology Laboratory. The assessment shall evaluate the current status of laboratory management; assess the cost-benefit associated with operating the laboratory as a government-owned, government-operated model compared to a government-owned, contractor-operated model; and identify challenges of transitioning the laboratory to a government-owned, contractor-operated model.

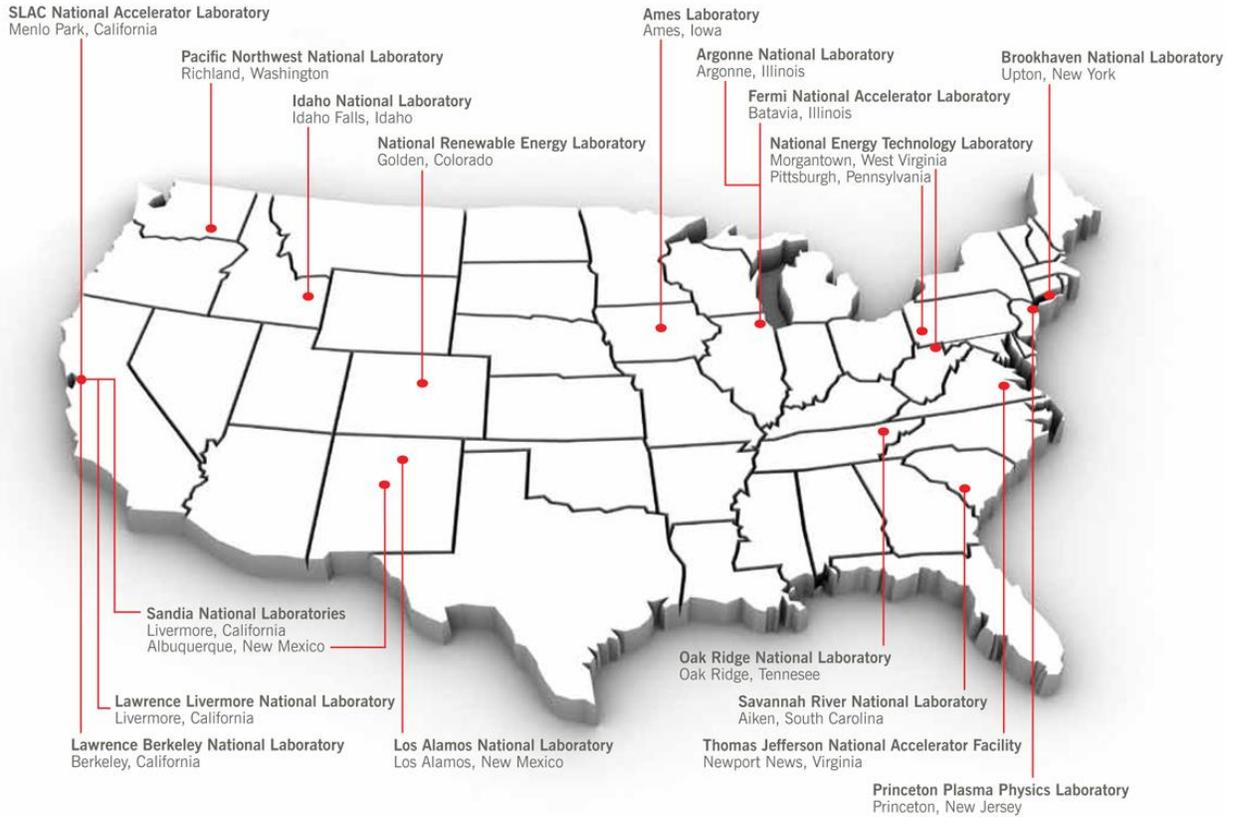
Sec. 112 Definitions.

Section 112 provides definitions, including: Office of Science, Secretary, and Under Secretary.

Sec. 113. Authorization of Appropriations

Section 111 authorizes funding for the Office of Science at \$4,700 million for Fiscal Year (FY) 2014 and \$4,747 million for FY 2015. The Section authorizes funding levels for the Advanced Scientific Computing Research, High Energy Physics, and Basic Energy Sciences programs.

Appendix B



DOE National Labs and Their Sponsors

Laboratory	Sponsor
Ames Lab	Science
Argonne National Lab	Science
Brookhaven National Lab	Science
Fermi National Accelerator Lab	Science
Idaho National Lab	Nuclear Energy
Lawrence Berkeley National Lab	Science
Lawrence Livermore National Lab	NNSA
National Renewable Energy Lab	Energy Efficiency and Renewable Energy
Los Alamos National Lab	NNSA
Oak Ridge National Lab	Science
Pacific Northwest National Lab	Science
Princeton Plasma Physics Lab	Science
Sandia National Lab	NNSA
Savannah River National Lab	Environmental Management
Stanford Linear Acceleration Lab	Science
Thomas Jefferson National Accelerator	Science