



June 21, 2024

Department of Energy (DOE) Office of Science

The Department of Energy (DOE) Office of Science conducts most of the department’s basic research, in fields ranging from nuclear physics to the biological and environmental sciences, and oversees 10 of the department’s 17 national laboratories (see **Figure 1**). For FY2024, Congress appropriated \$8.24 billion in the Consolidated Appropriations Act, 2024 (P.L. 118-42), to support DOE’s science programs. For the FY2025 budget request, see CRS Report R48097, *Energy and Water Development: FY2025 Appropriations*.

The Office of Science supports research and development (R&D) across six major research programs: Advanced Scientific Computing Research, Basic Energy Sciences, Biological and Environmental Research, Fusion Energy Sciences, High Energy Physics, and Nuclear Physics. Smaller programs in Isotope R&D and Production, and Accelerator R&D and Production, were split off from the Nuclear Physics and High Energy Physics programs, respectively, in FY2020. The office also funds the Workforce Development for Teachers and Scientists program, science labs infrastructure, safeguards and security, and program direction (see **Table 1**).

The Office of Science is led by a director, who is appointed by the President and confirmed by the Senate, and a deputy director, who is a career civil servant. That deputy is currently acting as director. The director reports to the DOE Under Secretary for Science and Innovation.

Major Research Programs

Advanced Scientific Computing Research

The Advanced Scientific Computing Research program develops and maintains computing and networking capabilities for science and research in applied mathematics, computer science, and advanced networking.

Basic Energy Sciences

The Basic Energy Sciences program supports research in disciplines such as condensed matter and materials physics, chemistry, and geosciences. It also supports scientific user facilities at DOE national laboratories, as well as extramural Energy Frontier Research Centers and Energy Innovation Hubs.

Biological and Environmental Research

The Biological and Environmental Research program seeks a predictive understanding of complex biological, climate, and environmental systems from the small scale (e.g., genomic research) to the large (e.g., Earth systems).

Fusion Energy Sciences

The Fusion Energy Sciences program investigates the behavior of matter at very high temperatures to establish the science needed for development of fusion energy systems, including the U.S. portion of the ITER project, a multinational effort to design and build an experimental fusion reactor. See CRS In Focus IF12411, *Fusion Energy*.

High Energy Physics

The High Energy Physics program conducts research on the fundamental constituents of matter and energy, including studies of dark energy and the search for dark matter.

Nuclear Physics

The Nuclear Physics program supports basic research on understanding atomic nuclei, including their basic constituents and interactions.

Table 1. Office of Science Programs and Funding, FY2022-FY2024 (in millions of dollars)

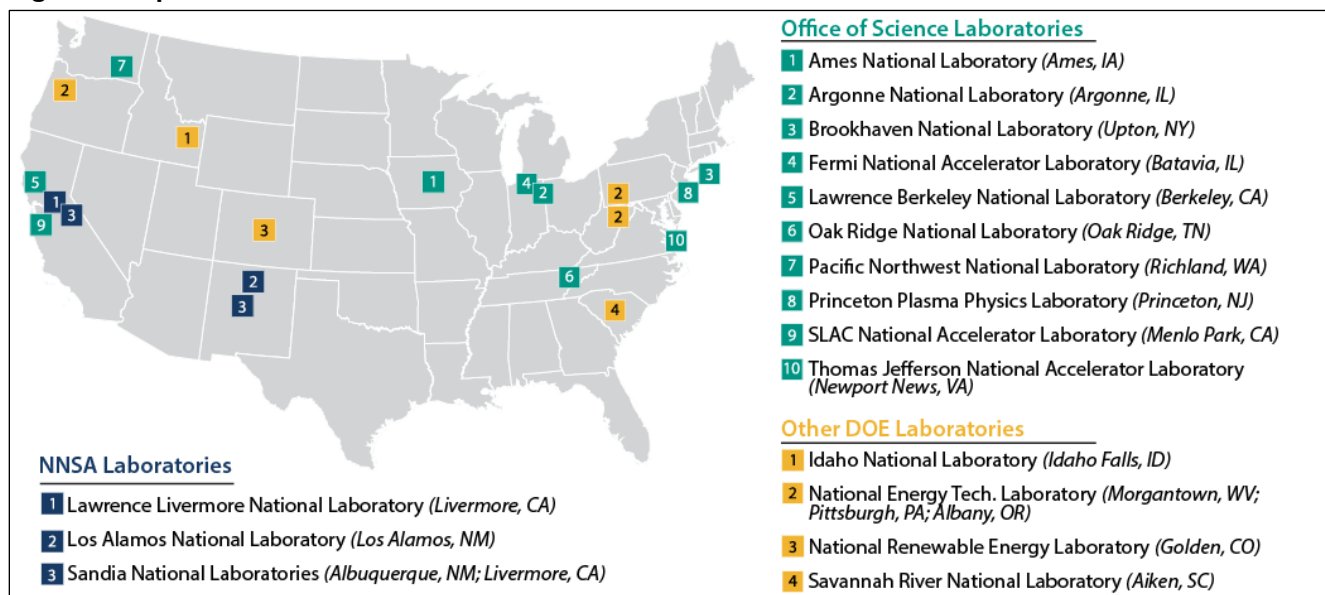
Program	2022	2023	2024
Adv. Sci. Computing Research	1,035	1,068	1,016
Basic Energy Sciences	2,308	2,534	2,626
Bio. & Environmental Research	815	909	900
Fusion Energy Sciences	713	763	790
High Energy Physics	1,078	1,166	1,200
Nuclear Physics	728	805	804
Isotope R&D and Production	82	109	130
Accelerator R&D and Production	18	27	29
Workforce Development for Teachers & Scientists	35	42	40
Science Labs Infrastructure	291	281	288
Safeguards and Security	170	184	190
Program Direction	202	211	227
Total	7,475	8,100	8,240

Sources: P.L. 117-103, P.L. 117-328, P.L. 118-42, and accompanying explanatory statements.

Notes: Amounts listed do not include any additional funding provided through other laws (e.g., P.L. 117-169). Column numbers may not add to totals shown due to rounding.

National Laboratories

The Office of Science oversees 10 of DOE’s 17 national laboratories (see **Figure 1**). They are managed by contractors as federally funded research and development centers. The Office of Science laboratories also host

Figure 1. Map of DOE National Laboratories

Source: CRS, adapted from Department of Energy (DOE), “Office of Science National Laboratories,” 2024, <https://www.energy.gov/science/office-science-national-laboratories>.

Notes: Not represented on this map are the Hawaiian Kauai Test Facility (part of Sandia National Laboratory) and the National Renewable Energy Laboratory’s Alaska Campus. NNSA = National Nuclear Security Administration.

scientific user facilities that provide access to researchers funded by other agencies or the private sector. Funding for research programs of the national laboratories is allocated each year by DOE’s R&D programs.

Advisory Committees

Each of the six major research programs of the Office of Science has an advisory committee that provides external scientific and technical advice to DOE on program planning, scientific priorities, and research facilities. The High Energy Physics Advisory Panel and the Nuclear Science Advisory Committee are joint committees with the National Science Foundation. All six operate under the Federal Advisory Committee Act.

Statutory Authorities

Statutory authorizations for the Office of Science and its major programs appear in the Department of Energy Organization Act (P.L. 95-91; see 42 U.S.C. §7139), the Energy Policy Act of 2005 (P.L. 109-58; see 42 U.S.C. §16311 et seq.), the Department of Energy Research and Innovation Act (P.L. 115-246; see 42 U.S.C. §18641 et seq.), and elsewhere. The Office of Science also relies on DOE’s general authorities to acquire and maintain laboratories (42 U.S.C. §7257), conduct research for others on a reimbursement basis (42 U.S.C. §7259a), and establish advisory committees (42 U.S.C. §7234), among other general authorities. The national laboratories also operate under these general departmental authorities and not under the specific statutes that authorized and designated them by name. The term *national laboratory* was defined by the Energy Policy Act of 2005 (42 U.S.C. §15801(3) and 42 U.S.C. §16355).

Selected Issues for Congress

The Office of Science is the largest federal funder of basic research in the physical sciences. Its role in fostering U.S.

scientific and technological leadership has been central to congressional discussions related to federal investment in R&D. This has included the appropriate levels of funding for current or new research programs balanced against funding levels for DOE’s more applied programs, including facilities costs.

The national laboratories, overseen by the Office of Science, host several large, unique scientific facilities, such as accelerators, reactors, and advanced light sources. Building and upgrading these facilities can require costly and specialized construction. When federal funding is constrained, these construction projects can create pressure on the resources for other activities, including the operation of existing facilities. Balancing the desire for new and upgraded facilities against the desire for full utilization of existing facilities has sometimes been a challenge.

For example, across Administrations, DOE budget justifications to Congress typically have projected facility operating hours at the proposed budget amount, as a percentage of what the DOE views as the optimal level of operation. On several occasions, DOE has proposed budget initiatives to increase this percentage. One issue for Congress is whether to expand facility operating hours to reach the optimal level and, if so, how to support such an increase.

Acknowledgment

Former CRS Analyst Daniel Morgan wrote the original draft of this product. Current CRS Analyst Todd Kuiken updated the final version and is available to answer questions from congressional clients on request.

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