



## Department of Energy

The Department of Energy (DOE) is a mission-driven agency that has custodianship of the nation's nuclear weapons stockpile, funds research on new sources of energy and technology development, supports energy production, and promotes energy efficiency and conservation. DOE is the largest federal funding agency for research in the physical sciences.

The Department sustains a network of 17 national laboratories to carry out its missions, which include three nuclear weapons laboratories and 14 civilian research laboratories, as well as smaller technology centers supported within DOE's annual \$26 billion budget. The Department also supports university researchers and collaborations with industry as part of an integrated pipeline of energy-related research and development (R&D) and demonstration and deployment (D&D).

DOE's nuclear programs are directed by the National Nuclear Security Administration (NNSA). At nearly \$17 billion per year, these programs make up close to two-thirds of DOE's overall budget. NNSA carries out nuclear weapons R&D, stewardship of the nation's nuclear stockpile, defense nuclear nonproliferation activities, environmental clean-up associated with the nuclear legacy, and related activities.

DOE's civilian research programs include support for basic research through the Office of Science, applied research through the renewable energy and technology programs of the Office of Energy Efficiency and Renewable Energy (EERE), nuclear energy research, fossil energy R&D, and transformational research on new energy technologies through the Advanced Research Projects Agency-Energy (ARPA-E). The Obama Administration has worked to integrate the DOE research enterprise across the agency in order to develop and commercialize new clean energy technologies. DOE also invests in new technologies, such as carbon capture and storage to improve the utilization of conventional energy resources such as coal, oil and gas, and nuclear energy.

### ***Research Scope & Objectives***

The current Administration has made it a priority for DOE to engage university researchers and industry in its strategy of working toward energy independence, improving our national security posture, and reenergizing the U.S. economy by developing and manufacturing clean energy technologies. To meet these challenges, DOE has generally supported mid- to large-sized research groups rather than small groups and individual investigators. Universities have generally competed very well for DOE funding and have been welcome to partner with DOE national laboratories and with industry to respond to major funding opportunities, such as Energy Innovation Hubs and Energy Frontier Research Centers. Through the competitive process, these initiatives have been led by both DOE national laboratories and university-led consortia.

## Degree of Engagement



DOE supports university researchers through both grants and cooperative agreements. Most of the competitive funding opportunity announcements (FOAs) are funded through grants. For multi-year projects, DOE can employ cooperative agreements. With its network of national laboratories, competition for DOE funding can be very stiff. In some cases, universities will be competing against both industry and national laboratories for DOE funding; however, DOE's increasing emphasis on supporting larger consortia has provided new opportunities for universities. One disincentive for university researchers is the cost-sharing statutory requirement for the R&D applied technology programs (20 percent) and for D&D (50 percent). This requirement has, however, helped foster greater university collaborations with industry given the ability to provide matching funds. More recently, to leverage federal investments, DOE has been issuing funding opportunities geared toward industry; as such, university connections to industry are a potential avenue for DOE funding.

DOE has convened workshops and reached out to the research community to establish roadmaps that guide research funding opportunities. These research roadmaps are an invaluable resource to university researchers and can be found at nearly every DOE program website. The Department also undertook a Quadrennial Technology Review (QTR) with broad stakeholder input to define the challenges facing DOE's technology (applied) research programs, which will inform future agency initiatives.

## Signature Programs

DOE has proposed and funded several major, multi-year initiatives in recent years. Some of these programs were started under the *American Recovery and Reinvestment Act* and are now being sustained within existing budgets. These programs include:

- **Energy Innovation Hubs (Hubs)** – The President has proposed eight Energy Innovation Hubs to expedite the development of new energy technologies. Congress has approved funding for five Hubs (Nuclear Modeling and Simulation; Fuels from Sunlight; Energy Efficient Building and Systems Design; Batteries and Energy Storage; and Critical Materials). A sixth Hub for Electricity Systems has been proposed but not yet funded by Congress. The Hubs are slated for approximately \$122 million each over five years. There is uncertainty over whether there will be any Hubs beyond the Electricity Systems Hub. *More information:* <http://energy.gov/science-innovation/innovation/hubs>.
- **Energy Frontier Research Centers (EFRCs)** – With a combination of Recovery Act funding and annual appropriations, DOE has funded 46 EFRCs at \$2 to \$5 million each per year for five years. EFRCs are designed to tackle and overcome specific barriers to accelerate the creation of new energy technologies. *More information:* <http://science.energy.gov/bes/efrc/>.
- **Advanced Manufacturing** – The Administration views the creation of clean energy technologies as a way to jump start U.S. manufacturing and innovation. DOE has emphasized the development of electric and hybrid vehicles, new battery technologies, and new industrial processes, including energy efficiency. *More information:* <http://www1.eere.energy.gov/manufacturing/>.
- **Materials Genome** – DOE is part of a broader federal initiative to create the next generation of materials to be utilized in new energy technologies and other manufacturing processes that will keep the U.S. competitive in the global economy.

More information: <http://www.whitehouse.gov/blog/2012/02/10/doe-announces-12-million-support-materials-genome-initiative>.

- **Smart Grid** – Increasing attention is focused on the need to modernize the nation’s electrical grid with DOE developing the technologies needed for a 21<sup>st</sup> century grid and incorporating renewable sources, such as solar, wind, and water power on the grid. More information: <http://www.doe.gov/smart-grid>.
- **Small Modular Reactors** – A DOE initiative to develop the next-generation nuclear reactor technology that is smaller and more secure is just getting underway. Nuclear energy remains part of the “all of the above” energy strategy. More information: <http://www.ne.doe.gov/>.
- **Cost-competitive Renewable Energy Technologies** – DOE is supporting research targeted on making renewable energy sources, such as solar, wind, and biofuels, cost-competitive with conventional coal, oil, and gas resources. More information: <http://www.eere.energy.gov/>.
- **Biofuels** – DOE supports biofuels R&D at its three bioenergy centers; however, the Department is also jointly funding research with the U.S. Department of Agriculture (USDA) to develop feedstocks for non-food sources of cellulosic biofuels, and with the Department of Defense (DOD) as a test bed to develop drop-in biofuels that can be used in existing infrastructure and better secure military bases and defense operations through energy security. More information: <http://www.eere.energy.gov/topics/biomass.html>.

**Additional  
Resources**

DOE Website: <http://www.doe.gov/>

DOE Offices

- NNSA: <http://nnsa.energy.gov/>
- Office of Science: <http://science.energy.gov/>
- EERE: <http://www.eere.energy.gov/>
- ARPA-E: <http://arpa-e.energy.gov/>