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The National Energy Labs: Connecting Science and Energy Policy

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The U.S. Department of Energy's 21 labs promote national interests.

The U.S. Department of Energy has 21 research laboratories and technology centers across the United States that conduct research in environmental management and sciences, nuclear energy and physics. These laboratories, part of the national laboratory system, are considered by the department to be the "most comprehensive research system of its kind in the world." The federally funded national laboratory system focuses on advancing science and promoting the nation's economic, environmental and national security interests.

Argonne National Laboratory, located southwest of Chicago and managed by the department's Office of Science, was the first, chartered in 1946. Argonne, started on the heels of the Manhattan Project, has made significant advances in energy, economic and national security. According to its history, Argonne was the first to provide electricity to an entire town using nuclear power, created the nation's first high-temperature superconductors, and developed a compact fuel processor that converts gasoline into a hydrogen-rich gas for fuel cells.

The Oak Ridge lab helped build energy-efficient homes.

The Oak Ridge National Laboratory in Tennessee is the largest multi-purpose laboratory in the national system. Here, scientists developed the first sustained nuclear reaction, which led to the atomic bomb. Although Oak Ridge no longer develops nuclear weapons, it continues research on nuclear power. To reduce nuclear waste, Oak Ridge is developing new technologies for spent nuclear fuel use. The lab also researches neutron sciences, biological systems and energy. Oak Ridge recently collaborated with the Tennessee Valley Authority and Habitat for Humanity to build five homes that will operate on only 40 cents of electricity per day. It hopes to develop a zero-energy home within the next four years.

Some national labs promote state economic development.

Aside from conducting ground-breaking research, some national laboratories work with existing local, regional, state and national groups to promote economic development. The Idaho National Laboratory, an energy and homeland security research laboratory, works with organizations to promote technology-based local and national economic development projects. The Idaho National Laboratory says that corporate investments have funded assistance for technology-based start-up businesses, including helping new companies develop business plans, providing technical assistance and sponsoring workshops.

The department recognizes the importance of public-private partnerships to enhance and market innovative technologies. In August 2008, five national labs—Lawrence Berkeley, Oak Ridge, Argonne, the National Renewable Energy Laboratory, and Pacific Northwest—formed the National Laboratory Collaborative on Building Technologies. Its goal is to develop zero-net energy

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buildings that use new efficiency technologies and renewable energy to offset power from the electric grid.

Public and private universities collaborate with labs on research projects.

To promote information-sharing and collective knowledge, the national laboratory system conducts research in collaboration with public and private universities. The collaboration not only improves research quality by providing access to state-of-the-art facilities and high-quality research teams, but also contributes to science education nationwide. The Lawrence Berkeley National Laboratory, for example, is operated by the University of California and trains approximately 800 students annually in nuclear science, physics and engineering. Thousands of scientists and engineers who are advancing technological innovations nationally and worldwide were trained there.

The National Conference of State Legislatures' Energy Program works closely with Department of Energy labs to link science-based research with effective policy and decision making through expert testimony, report distribution and laboratory visits. The table shows some of the national laboratories and their specialties.

National Laboratory	Location	Research Specialty
Ames Laboratory	Ames, Iowa	▪ Synthesis, analysis and engineering of rare-earth metals and their compounds ▪ Physical, chemical and mathematical sciences associated with energy generation and storage
Brookhaven National Laboratory	Upton, N.Y.	▪ Physical, biomedical and environmental sciences ▪ Energy technologies and national security
Lawrence Berkeley National Laboratory	Berkeley, Calif.	▪ Sustainable energy ▪ Nanoscience ▪ Climate science ▪ Astrophysics and nuclear science
National Renewable Energy Laboratory	Golden, Colo.	▪ Renewable electricity ▪ Renewable fuels ▪ Energy efficiency
National Energy Technology Laboratory	Pittsburgh, Pa. Morgantown, W.V. Tulsa, Okla. Fairbanks, Alaska Albany, Ore.	▪ Coal, natural gas and oil technology ▪ Analysis of energy systems ▪ International energy issues
Oak Ridge National Laboratory	Oak Ridge, Tenn.	▪ Energy efficiency and renewable energy ▪ Fossil and nuclear energy ▪ Bioscience
Pacific Northwest National Laboratory	Richland, Wash.	▪ Computational science ▪ Microbial and cellular biology ▪ Radiological science
Princeton Plasma Physics Laboratory	Princeton, N.J.	▪ Fusion plasmas, plasma theory, computational physics ▪ Computer engineering ▪ Physics and technology of plasma applications
Stanford Linear Accelerator Center National Accelerator Laboratory	Menlo Park, Calif.	▪ Accelerator-based particle physics ▪ Photon science and nonaccelerator-based particle physics
Thomas Jefferson National Accelerator Facility	Newport News, Va.	▪ Nuclear physics ▪ Accelerator science and technology

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U.S. Department of Energy
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