U.S. Department of Energy

Office of Science

Science and Innovation: Global Competitiveness for our Nation

FY 2009 Budget Request
for the Office of Science

Dr. Raymond L. Orbach
Under Secretary for Science

February 4, 2008
www.science.doe.gov

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Setting the Nation's Priorities

"To build a future of energy security, we must trust in the creative genius of American researchers and entrepreneurs and empower them to pioneer a new generation of clean energy technology. . .

So I ask Congress to double Federal support for critical basic research in the physical sciences and ensure America remains the most dynamic nation on Earth."

President George W. Bush
State of the Union Address
January 28, 2008

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The Office of Science

Office of Science
FY 2009 Budget Request to Congress

(dollars in thousands)

	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request to Congress	FY 2009 Request to Congress vs. FY 2008 Approp.	
Basic Energy Sciences	1,221,380	1,269,902	1,568,160	+298,258	+23.5%
Advanced Scientific Computing Research	275,734	351,173	368,820	+17,647	+5.0%
Biological and Environmental Research	480,104	544,397	568,540	+24,143	+4.4%
High Energy Physics	732,434	689,331	804,960	+115,629	+16.8%
Nuclear Physics	412,330	432,726	510,080	+77,354	+17.9%
Fusion Energy Sciences	311,664	286,548	493,050	+206,502	+72.1%
Science Laboratories Infrastructure	41,986	66,861	110,260	+43,399	+64.9%
Science Program Direction	166,469	177,779	203,913	+26,134	+14.7%
Workforce Dev. for Teachers & Scientists	7,952	8,044	13,583	+5,539	+68.9%
Safeguards and Security (gross)	75,830	75,946	80,603	+4,657	+6.1%
SBIR/STTR (SC funding)	86,936	———	———	———	———
Subtotal, Office of Science	3,812,819	3,902,707	4,721,969	+819,262	+21.0%
Adjustments*	23,794	70,435	———	-70,435	———
Total, Office of Science	3,836,613	3,973,142	**4,721,969**	**+748,827**	**+18.8%**

* Adjustments include SBIR/STTR funding transferred from other DOE offices (FY 2007 only), a charge to reimbursable customers for their share of safeguards and security costs (FY 2007 and FY 2008), Congressionally-directed projects and a rescission of a prior year Congressionally-directed project (FY 2008 only), and offsets for the use of prior year balances to fund current year activities (FY 2007 and FY 2008).

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Energy Independence and Security Act of 2007

Energy Independence and Security Act (EISA) of 2007

[Public Law 110-140]

This law will help reduce America's dependence on oil, improve efficiency, and cut emissions.

But "you can't get there from here" — without transformational basic research

- Mandates use of at least 36 billion gallons of biofuel by 2022 – Target is not possible without transformational breakthroughs in deriving fuels from plant cellulose materials.

  The Office of Science Bioenergy Research Centers will be critical in meeting these research needs.

- Mandates a national fuel economy standard of 35 miles per gallon by 2020 – Will increase fuel economy by 40 percent and save billions of gallons of fuel.

  Office of Science basic research needed in areas such as high-strength, low–weight materials; electrical energy storage; hydrogen storage; fuel cell materials; catalysts, combustion processes, and materials under extreme environments

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The FY 2009 Budget Request: A New Era for Science

Energy Frontier Research Centers (~$100M/yr)

Innovative basic research to accelerate scientific breakthroughs needed to create advanced energy technologies for the 21st century

Awards to be $2M-$5M per year for an initial 5-year period

The Office of Science seeks to engage the Nation's intellectual and creative talent to tackle the scientific grand challenges associated with determining how nature works, leading the scientific community to direct and control matter at the quantum, atomic, and molecular levels, and harness this new knowledge and capability for some of our most critical real-world challenges.

Energy Frontier Research Centers will pursue fundamental basic research in areas such as:

- Solar Energy Utilization
- Catalysis for Energy
- Electrical Energy Storage
- Solid State Lighting
- Superconductivity
- Geosciences for Nuclear Waste and CO_2 Storage
- Advanced Nuclear Energy Systems
- Combustion of 21st Century Transportation Fuels
- Hydrogen Production, Storage, and Use
- Materials Under Extreme Environments

U.S. universities, DOE laboratories, and other institutions are eligible.

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The FY 2009 Budget Request: A New Era for Science

World-Leading Facilities

Driving transformational science and U.S. innovation

- **Spallation Neutron Source** ($177.6M) and the **High Flux Isotope Reactor** ($58.8M), together provide capabilities unavailable anywhere else in the world for study of the position and motion of atoms in materials – from liquid crystals to superconducting ceramics, from proteins to plastics, and from metals to cell walls.
- **Four Synchrotron Light Sources** – Extraordinary tools for determining protein structures, probing the physical properties of new materials, and studying chemical reactions
  - **Advanced Light Source** ($51.1M)
  - **Advanced Photon Source** ($116.5M)
  - **National Synchrotron Light Source** ($40.1M)
  - **Stanford Synchrotron Radiation Laboratory** ($33.0M)
- **Five DOE Nanoscale Science Research Centers** ($101.2M) – providing unmatched capabilities for fabrication, synthesis, and characterization of matter at the nanoscale

Next Generation Tools

- **Linac Coherent Light Source** ($56.0M) – a revolutionary x-ray free electron laser that will allow probing of chemical and biological structures and examination of chemical reactions in real time at the single molecule level
- **National Synchrotron Light Source-II** ($103.3M) – a state-of-the-art light source for x-ray imaging, capable of nanometer resolution of structures and features of individual atoms, molecules, and crystals

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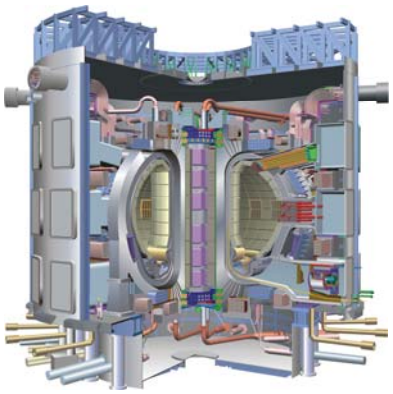
The FY 2009 Budget Request: A New Era for Science

The International ITER Fusion Project ($214.5M)

Will demonstrate feasibility of fusion power – the only realistic option to meet the world's growing needs for abundant, economical and clean energy.



- ITER puts us on a R&D and demonstration timeline for commercialization of abundant, economical and clean fusion energy by mid-century.
- ITER will, for the first time, demonstrate the technical and scientific feasibility of a sustained, magnetically confined fusion burning plasma.
- First-of-a-kind international partnership consisting of the U.S., China, the European Union, India, Japan, Korea and Russia.

- The U.S. will provide in-kind components, personnel and cash to support our 9.1% share of the overall construction of the ITER project.
- U.S. procurement, fabrication, and delivery of medium-and high-technology components and U.S. share of the common costs at the ITER site are fully supported

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The FY 2009 Budget Request: A New Era for Science

High Energy Physics ($805M)

Understanding the fundamental nature of matter, energy, space, and time

High Energy Physics Research investigates the elementary building blocks of matter and energy to address the big questions

- Do particles and forces unify at extremely high energies?
- Are there extra dimensions of space?
- What are the "dark energy" and "dark matter" that make up 95% of the universe?
- What is the role of the elusive neutrino?

The tools used to explore these fundamental questions are high energy accelerator facilities and other tools such as detectors underground and in space.

- Reaching milestones in the search to understand the fundamental forces of nature with the world's most powerful particle collider – **Tevatron Collider** at Fermilab. The **Neutrinos at the Main Injector** beam-line at Fermilab is the world's most intense neutrino source
- Participation of U.S. researchers in the discoveries of the **Large Hadron Collider** at CERN
- Enabling the most compelling science opportunities with next generation accelerators through support of **Advanced Accelerator and Detector R&D** – for future particle colliders such as an International Linear Collider, light sources, accelerators for nuclear medicine and cancer treatment

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The FY 2009 Budget Request: A New Era for Science

Nuclear Physics ($510M)

The U.S. is today a world-leader in the studies of quark structure of the atomic nucleus, and behavior of matter under extreme conditions

Nuclear Physics Research seeks to understand the origin of the universe and the evolution of the cosmos

- What is the nature of the nuclear force that binds protons and neutrons into stable nuclei and rare isotopes?
- What is the nature of neutron stars and dense nuclear matter?
- What is the nature of neutrinos and how have they shaped the evolution of the universe?

Maintaining U.S. leadership in nuclear physics research – understanding the nature of matter and energy – is also central to the development of technologies for nuclear energy, nuclear medicine, and national security

- Maintaining status as the world's most powerful "microscope" for studying the underlying structure of protons and neutrons – **Continuous Electron Beam Accelerator Facility Upgrade** – Thomas Jefferson National Accelerator Facility
- Leading studies of the nature of the universe several microseconds after the Big Bang – **Relativistic Heavy Ion Collider** – Brookhaven National Lab
- Developing advanced capabilities for rare isotope beams and a next generation U.S. facility for nuclear structure studies and astrophysics – **Facility for Rare Isotope Beams** – competition in 2008

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The FY 2009 Budget Request: A New Era for Science

Climate Change Modeling and Research ($155M)

Providing policy makers with options for mitigating greenhouse gases and responding and adapting to climate change.

The FY 2009 budget ensures the U.S. is a leader in climate prediction tools and environmental observation and measurement

- Developing, testing, and applying fully coupled climate and Earth system models for projecting the response to natural and human-induced climate forcing at regional to global scales over decades to centuries.
- Climate modeling activities leverage the Office of Science's leadership class computing capabilities.
- Environmental measurements and field studies to understand the effects of climate change and inform and validate predictive models.
- Partnering with National Oceanic and Atmospheric Administration and the U.S. Climate Change Research Program.

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The FY 2009 Budget Request: A New Era for Science

High-Performance Computation

High Performance Computing is the "third pillar" for scientific discovery, along with experiment and theory

New achievements in High Performance Computing are opening new frontiers in science and industrial innovation.

- **Leadership Computing Facilities (LCF)** expanding capabilities for breakthrough discoveries – moving to petascale
  - **Oak Ridge LCF** ($85.0M) is reaching one petaflop computing capability – a 100x increase from the Office of Science's capability in 2004
  - **Argonne LCF** ($30.0M) reaches 500 teraflop computing capability
- **National Energy Research Scientific Computing Center** ($54.8M), at least 120 teraflops, introduces researchers to high performance computing for science applications
- **ESnet** ($25.0M) high speed optical networks are connecting laboratories and universities to leadership computing facilities and allow rapid transfer of large scientific datasets

Innovative and Novel Computation Impact on Theory and Experiment program is successfully applying the "third pillar" for scientific discovery to expand the frontiers of science

- University and laboratory researchers are advancing the science mission with simulation in areas like systems biology, chemical catalysis and climate modeling
- Enabling industry to dramatically reduced the time for product and technology development

The FY 2009 Budget Request: A New Era for Science

DOE Bioenergy Research Centers ($75M)

Transformational scientific breakthroughs to meet future goals for biofuels

DOE BioEnergy Science Center – led by Oak Ridge National Laboratory, includes 9 other partnering institutions.

DOE Great Lakes Bioenergy Research Center – led by University of Wisconsin-Madison, in close partnership with Michigan State University, includes 6 other partnering institutions.

DOE Joint BioEnergy Institute – led by Lawrence Berkeley National Laboratory, includes 5 other partnering institutions.

- Centers are conducting basic research on microbes and plants to harness nature's own conversion methods and develop a new generation of optimized bioenergy crops to make production of cellulosic ethanol, sunlight-to-fuels, and other biofuels cost-effective.

  The 36 billion gallons per year goal by 2022 cannot be reached with current technologies.

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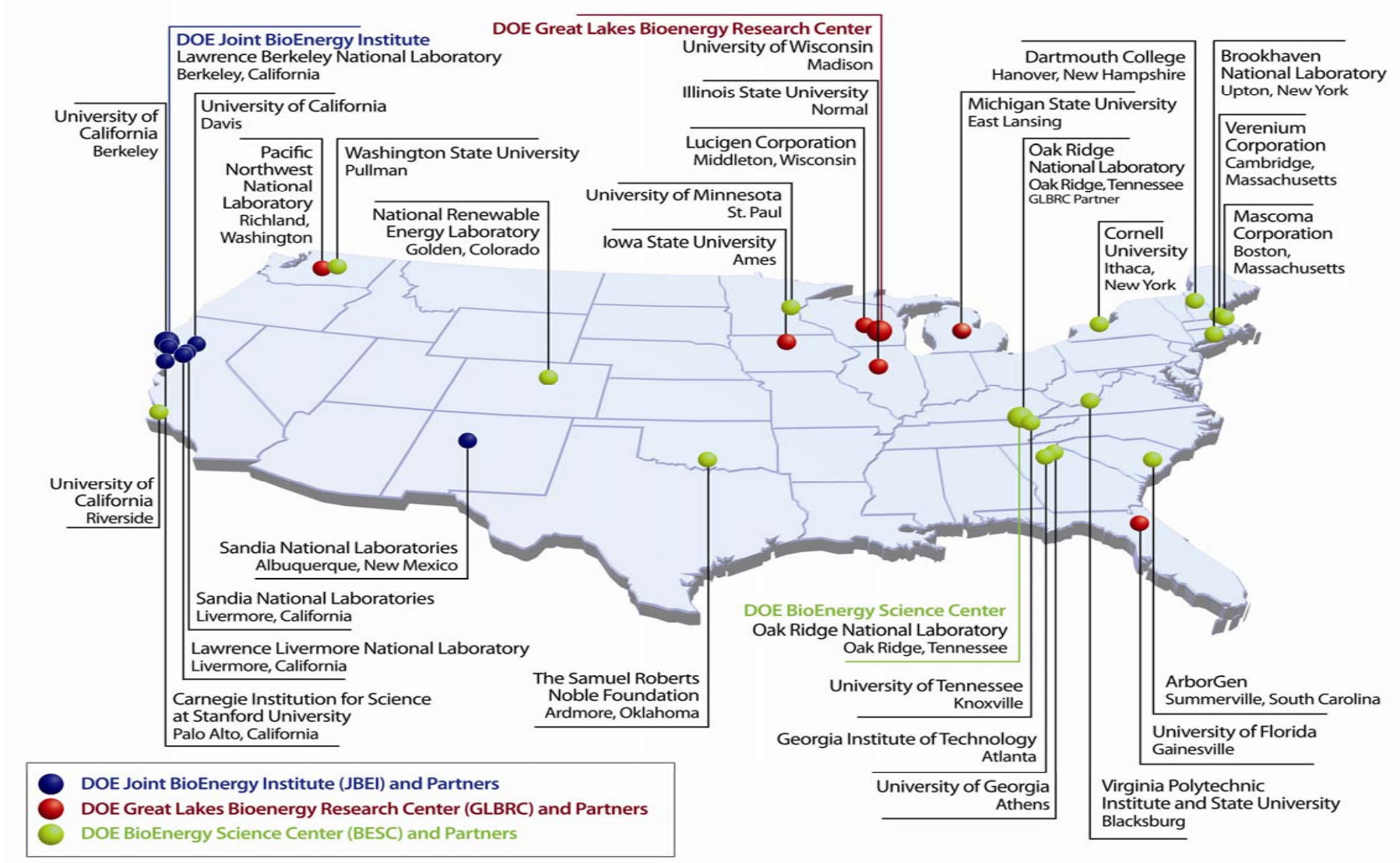
DOE Bioenergy Research Centers: Multi-Institution Partnerships



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A Scientific Workforce for our Nation's Future

DOE has played an important role in training America's scientists and engineers for more than 50 years, making historic contributions to U.S. scientific preeminence.

The total FY 2009 Request for the Office of Science will:

- Support about 23,700 Ph.D.s, graduate students, undergraduates and technical staff; an increase of 2,600 over FY 2008
- Support over 21,000 individual researchers from universities, national laboratories, and industry to use the Office of Science's world-leading suite of scientific user facilities this year; and increase of 1,000 over FY 2008

Preparing educators to be effective teacher scientists and inspire America's youth to engage in science and mathematics.

- **DOE Academies Creating Teacher Scientists** ($6.4M) – supports approximately 225 new K-12 educators (~340 total) in FY 2009 for hands-on research experiences at DOE laboratories and creating educational leaders
- **DOE National Science Bowl** for High School Students and Middle School Students ($1.4M) – providing prestigious academic events to challenge and inspire the Nation's youth to excel in science and mathematics:

  High School Finals (May 1-6, 2008, in Washington, DC)
  Middle School Finals (June 19-22, 2008, in Golden, CO)

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The President's FY 2009 Request: Eight Years of Accomplishments for SC

Strong, bipartisan support for the Office of Science has created opportunities for innovative facilities and opened new research areas that will advance us toward energy independence.

Over the past eight years:

- The U.S. has taken the lead in high performance computing for science
- The Office of Science has moved the frontiers of research in areas such as materials, biology and chemistry through investments in Nanoscale Science Research Centers, next generation light sources and neutron scattering
- The U.S. has joined ITER, the international fusion energy research facility, the only realistic hope for abundant, economical and environmentally benign energy
- Assisted industry in dramatically reducing time for product development and technology innovation through use of Office of Science research facilities
- Prioritized future facilities in the *Twenty Year Facility Outlook* based on identified research opportunities and readiness for deployment – updated in 2007
- Use of the Funding Opportunity Announcement – a mechanism for fair and open competition among universities, DOE National Laboratories and non-profit organizations for SC funding. Applied to the Bioenergy Research Centers, the Facility for Rare Isotope Beams, and Energy Frontier Research Centers

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The Future

"To keep America competitive into the future, we must trust in the skill of our scientists and engineers and empower them to pursue the breakthroughs of tomorrow . . . This funding is essential to keeping our scientific edge."

President George W. Bush
State of the Union Address
January 28, 2008

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BACKGROUND MATERIALS

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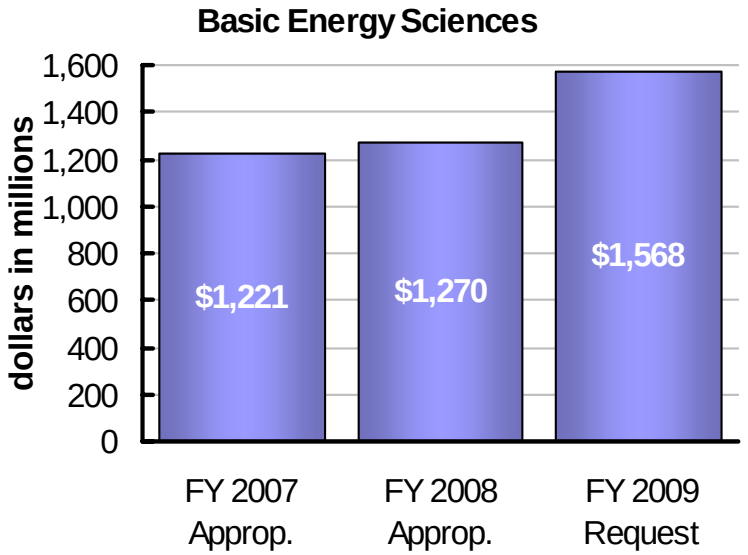
Basic Energy Sciences (BES)

(FY 2009=$1,568M)

- **Core research programs in support of principal investigators.** Research activities are supported in FY 2009 in areas of condensed matter and materials physics, chemistry, biosciences, and geosciences with increased support in areas of solar energy utilization, electric-energy storage, basic research for the hydrogen economy, advanced nuclear energy systems, and other energy-related research. To accelerate the rate of scientific breakthroughs in these areas, Energy Frontier Centers will be initiated to address Grand Challenges for Basic Energy Sciences. (FY 2007=$445.6M; FY 2008=$451.6M; **FY 2009=$629.9M)**
- **Facilities operations.** Facility operations are increased in FY 2009 to provide for optimal operations of the four light sources, three neutron sources, and five Nanoscale Science Research Centers. (FY 2007=$547.9M; FY 2008=$555.8M; **FY 2009=$593.5M)**
- **National Synchrotron Light Source II (NSLS-II) Project.** FY 2009 supports Project Engineering Design. Other Project Costs, and construction for NSLS-II. NSLS-II will provide the world's finest capabilities for x-ray imaging and enable the study of material properties and functions at the nanoscale. (FY 2007=$25.0M; FY 2008=$49.7M; **FY 2009=$103.3M)**
- **Linac Coherent Light Source (LCLS) Project.** The LCLS will continue construction and Other Project Costs. Funding is also provided in FY 2009 to fully support operation of the SLAC linac. (FY 2007=151.7M; FY 2008=$127.9M; **FY 2009=$152.7M**)
- **Instrumentation Fabrication and Other Construction Projects.** Instrumentation for major scientific user facilities and other construction activities. (FY 2007=$39.8M; FY 2008=$43.8M; **FY 2009=$49.3M**)
- **All other.** Includes SBIR/STTR and GPP/GPE. (FY 2007=$11.4M; FY 2008=$41.1M; **FY 2009=$39.5M**)



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Advanced Scientific Computing Research (ASCR)

(FY 2009=$368.8M)

Research in applied mathematics and computer science. (FY 2007=$59.7M; FY 2008=$77.4M; **FY 2009=$93.2M**)

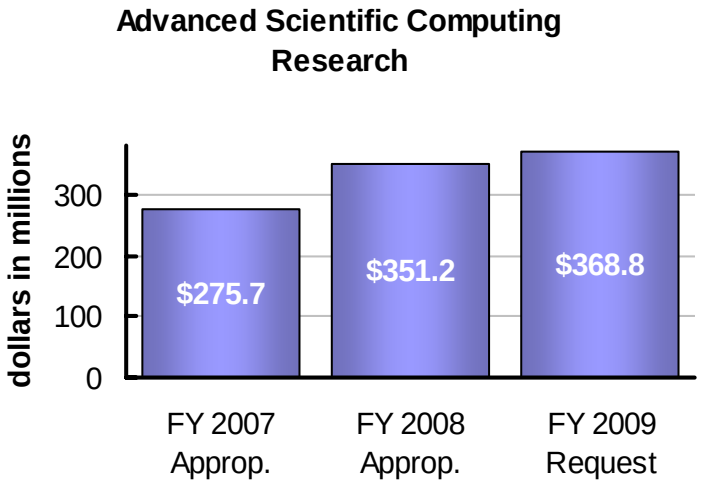
- Support long-term research that underpins: the development of advanced algorithms to describe, model & simulate physical systems; effective utilization of high-performance computers; advanced networks.
- Develop joint Applied Mathematics-Computer Science Institute to focus on the challenges of computing at extreme scales that blur the boundaries between these disciplines.
- Provide direct support for science application "leading edge developers" willing to take on the risks of working with new and emerging languages and tools.
- Support Small Business Innovation Research.

Scientific Discovery through Advanced Computing (SciDAC). (FY 2007=$47.4M; FY 2008=$56.3M; **FY 2009=$58.1M**)

- Advances in high-end computation and networking technology and innovative algorithms and software are exploited as intrinsic tools for scientific discovery.
- Scientific Application Partnerships, Centers for Enabling Technologies, university based SciDAC Institutes, and a SciDAC Outreach Center are supported in FY 2009.

High-performance computing and network facilities and testbeds. (FY 2007=$168.6M; FY 2008=$217.5M; **FY 2009=$217.5M**)

- Deliver Leadership Computing for Science
  - Deliver one petaflop computing capability at Oak Ridge Leadership Computing Facility for Science applications.
  - Deliver 500 teraflop computing capability at Argonne Leadership Computing Facility with low power requirements.
- Deliver high-performance production computing at NERSC.
- Deliver the promise of optical networks for DOE's science research missions through ESnet.



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Biological & Environmental Research (BER)

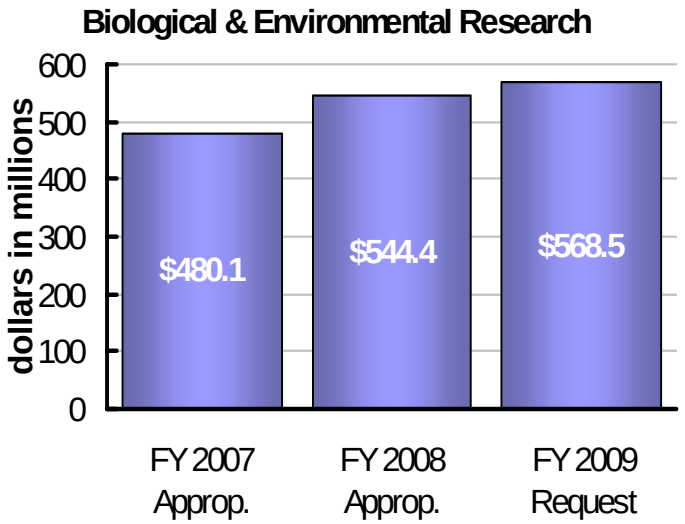
(FY 2009=$568.5M)

Biological Research:

- **Life Sciences.** Three Bioenergy Research Centers continue to accelerate research in biofuels. Genomics: GTL research is enhanced, underpinning biotech solutions for DOE energy/environmental needs. Low dose radiation research activities are enhanced. Genome sequencing at the Joint Genome Institute continues to focus mission relevant needs for energy production, carbon sequestration, bioremediation, and low dose radiation research. Radiochemical and imaging research is enhanced to develop new imaging technologies and new applications for radiotracers in biology and the environment. (FY 2007=$252.5M; FY 2008=$294.7M; **FY 2009=$296.2M**);
- **Environmental Remediation Research.** Providing the scientific basis for understanding DOE's legacy environmental contamination issues; EMSL initiates multi-year program for acquisition of new/improved instrumentation (FY 2007=$91.4M; FY 2008=$93.8M; **FY 2009=$98.4M**); and
- **Medical Applications.** Supports fundamental research and instrument development in imaging for an artificial retina that allows patients to see large objects. (FY 2007=$6.6M; FY 2008=$8.2M; **FY 2009=$8.2M**)

Climate Change Research:

- Supports the U.S. Climate Change Science Program to develop, test and improve climate models that simulate the responses of climate to increased atmospheric greenhouse gases and aerosols.
- Atmospheric Radiation Measurement Climate Research Facility adds a second mobile system to obtain observations of clouds and aerosols in poorly understood regions.
- Climate Modeling increases to exploit leadership class computing (FY 2007=$129.6M; FY 2008=$136.9M; **FY 2009=$154.9M**)



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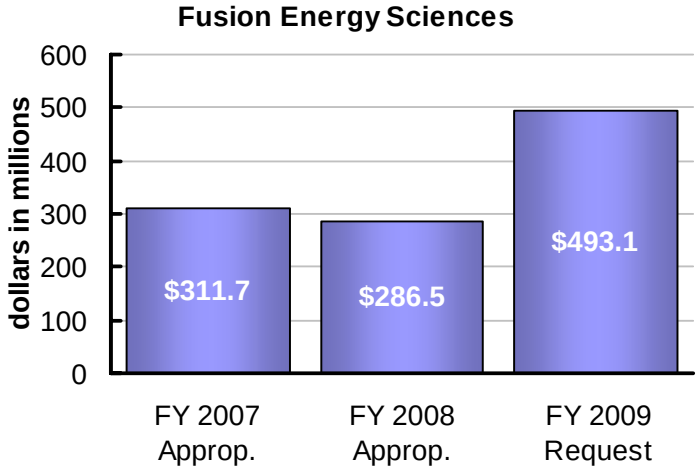
Fusion Energy Sciences (FES)

(FY 2009=$493.1M)

- **The U.S. Contributions to ITER.** The U.S. ITER Major Item of Equipment (MIE) project is in survival mode in FY 2008 because only $10.6M of the $160.0M requested was appropriated. Funds requested for FY 2009 will be used to resume the full range of U.S. participation in ITER. The focus will be on completing the ITER design, re-starting pre-fabrication R&D and initiating long-lead procurements for U.S. in-kind hardware, supporting the U.S. ITER Project Office, providing U.S. secondees to the international ITER Organization (IO), and providing 2008 and 2009 cash contributions to the IO per the terms of the ITER Joint Implementing Agreement. Some work planned originally for FY 2009 will be delayed into FY 2010 and beyond. (FY 2007=$60.0M; FY 2008=$10.6M; **FY 2009 =$214.5M**)
- **Operation and research on major facilities.** DIII-D, Alcator C-Mod, and NSTX will focus on key issues for ITER: confinement, stability, plasma boundary, and wave-plasma interaction. In addition, DIII-D will develop the physics basis for steady-state, high performance operation for next generation facilities; Alcator C-Mod will study operation with all metal walls; and NSTX will investigate operation with a liquid metal divertor plate and explore the unique physics of the spherical torus. (FY 2007=$112.5M; FY 2008=$125.6M; **FY 2009=$116.7M**)
- **Fabrication of the National Compact Stellarator Experiment.** Continues but is under review due to cost and schedule overruns arising from system complexity. Pending a final decision in FY2008, the budget assumes a rebaselining. (FY 2007=$15.8M; FY 2008=$15.9M; **FY 2009=$19.6M**)
- **Fusion Simulation Project (FSP).** Will take advantage of improvements in computational capabilities to develop a world leading predictive capability that can be applied to fusion plasmas. (FY 2007=$0M; FY 2008=$0M; **FY 2009=$2.0M**)
- **Other core research areas.** Theory and modeling, enabling technologies, diagnostics, experimental plasma research, high energy density physics, international research, and general plasma science, will continue to develop the knowledge base needed for an economically and environmentally attractive fusion energy source. (FY 2007=$123.4M; FY 2008=$134.4M; **FY 2009=$140.3M)**



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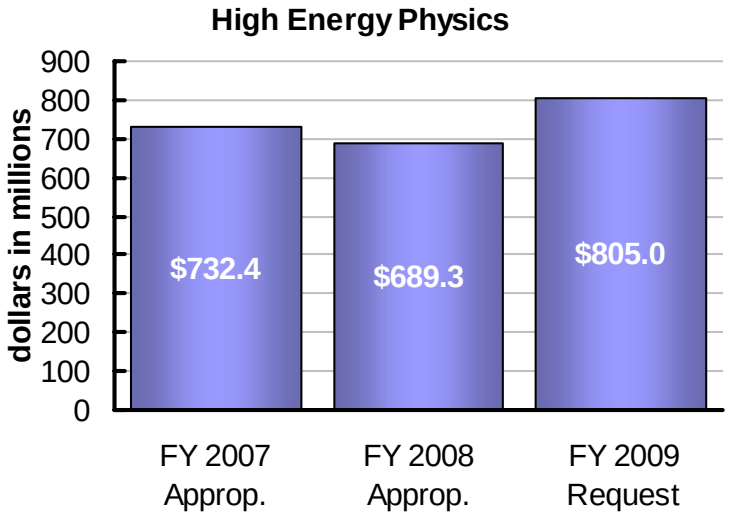
High Energy Physics (HEP)

(FY 2009=$805.0M)

- **Physics Research.** Core experimental and theoretical research at universities and laboratories are supported to carry out world-class programs, advancing scientific discovery at the Fermilab Tevatron and the CERN Large Hadron Collider (LHC) and with new initiatives in astrophysics and neutrino science. (FY 2007=$244.1M; FY 2008=$244.9M; **FY 2009=$254.8M**)
- **Facility Operations.** Fermilab Tevatron operations are fully supported (42 weeks) in its search for the Higgs Boson and funding is provided for the NOvA and Minerva projects; the B-Factory program was completed in FY 2008 and is supported for ramp-down and D&D activities; increased operational support is provided for U.S. researchers participating in the LHC at CERN. (FY 2007=$297.3M; FY 2008=$286.2M; **FY 2009=$320.1M**)
- **Non-Accelerator Projects.** Funding is provided for the Dark Energy Survey (DES), Reactor Neutrino Experiment (Daya Bay) and Cold Dark Matter Search (CDMS) Major Items of Equipment (MIEs) and R&D for a Joint Dark Energy Mission (JDEM). Each of these has the potential for shedding new information and insight on the mysteries of dark matter and energy. (FY 2007=$8.8M; FY 2008=$20.8M; **FY 2009=$32.2M**)
- **Advanced Technology Development.** Accelerator R&D efforts are directed at development of a proton source for a U.S. neutrino program; SRF technologies and infrastructure for the HEP program and the nation; demonstration of technologies for the ILC; and advanced accelerator concepts for next-generation accelerators. Detector R&D efforts are increased. (FY 2007=$166.9M; FY 2008=$102.8M; **FY 2009=$166.7M**)
- **Other.** Includes SBIR/STTR, stewardship responsibilities, and miscellaneous program activities. (FY 2007=$15.3M; FY 2008=$34.6M; **FY 2009=$31.2M**)



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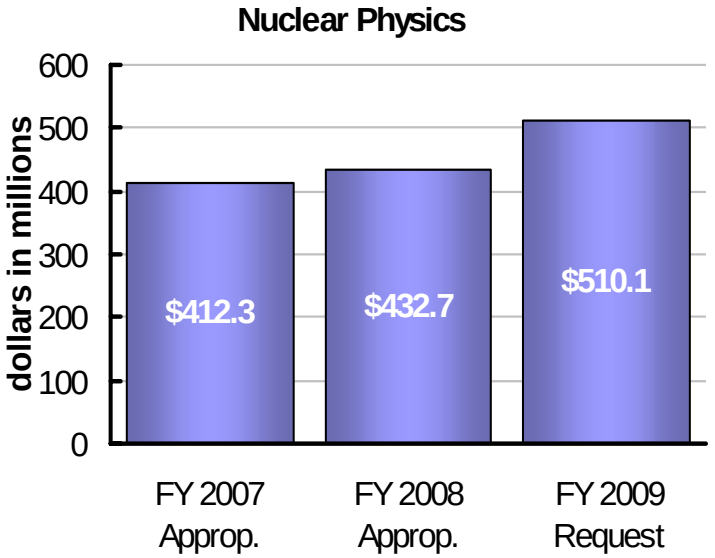
Nuclear Physics (NP)

(FY 2009=$510.1M)

- **Core research programs.** University and laboratory researchers will extract results from studies of hot, dense nuclear matter, the quark structure of matter, nuclear structure & astrophysics, fundamental interactions, and neutrinos. Support is provided for the program's six university centers of excellence. Support is increased for research that is relevant to the implementation of advanced fuel cycles in nuclear reactors. (FY 2007=$136.0M; FY 2008=$139.5M; **FY 2009=$159.5M**)
- **Facility Operations.** The program's four National User Facilities (RHIC, CEBAF, ATLAS and HRIBF) are operated at near optimum levels. The Electron Beam Ion Source (EBIS) being fabricated at RHIC will lead to more cost-effective operations. (FY 2007=$237.6M; FY 2008=$237.1M; **FY2 009=$257.8M**)
- **Advanced Instrumentation.** Detector upgrades at RHIC and for the heavy-ion program at LHC, the GRETINA detector for nuclear structure studies, a double-beta decay experiment (CUORE) to measure the neutrino mass, and a detector and beamline at the SNS for measurements of fundamental neutron properties. (FY 2007=$13.1M; FY 2008=$14.6M; **FY 2009=$17.2M**)
- **12 GeV CEBAF Upgrade Project.** Construction is initiated for the upgrade of the beam energy and research capabilities of CEBAF. (FY 2007=$9.5M; FY 2008=$14.4M; **FY 2009=$28.6M**)
- **Facility for Rare Isotope Beams.** Conceptual design and R&D is initiated for a next generation facility in nuclear structure and astrophysics. (FY 2007=$0; FY 2008=$0; **FY 2009=$7M**)
- **Accelerator R&D.** Accelerator R&D, including superconducting radio-frequency developments at TJNAF and electron cooling at RHIC are supported. (FY 2007=$6.8M; FY 2008=$7.3M; **FY 2009=$3.7M**)
- **Isotope Production.** The Isotope Production and Applications subprogram, transferred to the Nuclear Physics program in FY 2009, will support the R&D and production of stable and radioactive isotopes. (FY 2007=$0; FY 2008=$0; **FY 2009=$19.8M**)
- **Other.** Includes SBIR/STTR, laboratory infrastructure. (FY 2007=$9.3M; FY2008=$19.8M; **FY 2009=$16.5M**)



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Workforce Development for Students & Teachers (WDTS)

(FY 2009=$13.6M)

Educator Programs

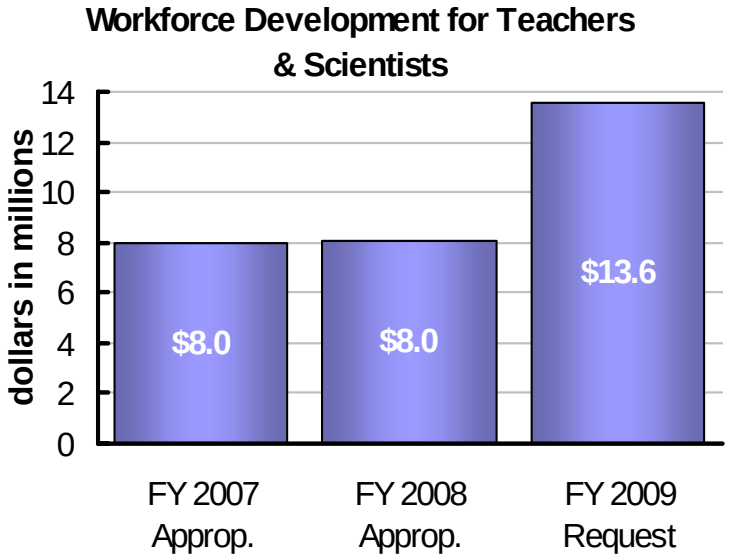
- **DOE Academies Creating Teacher Scientists (DOE ACTS).** DOE ACTS was a new program in FY 2004 for 60 teachers. K–12 teachers make a three-year commitment to the ACTS program. FY2009 funding will allow for a total of about 341 teachers (227 new and 114 continuing). (FY 2007=$2.3M; FY 2008=$2.2M; **FY 2009=$6.4M**)
- **Faculty and Student Teams (FaST).** FaST teams from colleges and universities with limited research capabilities are provided focused research projects in collaboration with National Laboratory scientists to establish a long-term research partnership with the visiting faculty. (FY 2007=$243,000; FY 2008=$250,000; **FY 2009=$300,000**)
- **Other Educator Programs.** Einstein Fellowships are supported. (FY 2007=$745,000; FY 2008=$717,000; **FY 2009=$800,000**)

Student Programs

- **Science Undergraduate Laboratory Internship (SULI), Community College Institute (CCI), and Pre-Service Teachers (PST).** Undergraduate students participate in a mentor intensive research experience at one of the National Laboratories. (FY 2007=$2.9M; FY 2008=$3.1M; **FY 2009=$3.2M**)
- **National Science Bowls (High School and Middle School).** The science bowls provide a prestigious academic event, science seminars, and a hands-on model hydrogen fuel cell car race. (FY 2007=$1.3M; FY 2008=$1.3M; **FY 2009=$1.4M**)

Program Administration and Evaluation

- Focus on effective program management and delivery – Evaluation and Workforce Studies. (FY 2007=$100,000; FY 2008=$150,000; FY 2009=$1,100,000)



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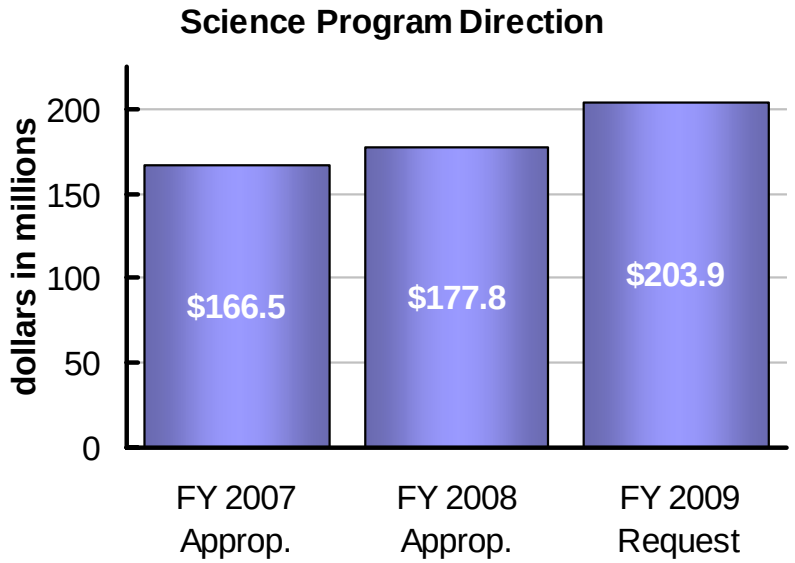
Science Program Direction (SCPD)

(FY 2009=$203.9M)

The FY 2009 SCPD increase supports:

- **Salaries and Benefits:**
  - Additional Program Managers and associated support staff to manage the growth under the ACI and address concerns of recent Committee of Visitors (COV) reports; and transfer FTEs associated with the isotope production and applications program.
    (FY 2009 = $19M; 42 FTEs)
  - Current payroll and related costs across SC complex; annual pay raise; and escalation.
    ($4.6M; 1,058 FTEs)
- **Working Capital Fund:** additional FTEs and increased/new initiatives including Standard Accounting and Reporting System; Strategic Integrated Procurement Enterprise System; On-Line Learning Center; A-123 and A-76; Forrestal-Germantown shuttle bus; and Forrestal safe haven project. **($1.4M)**
- **Energy Research analysis and studies:** relevant to DOE's energy and science missions. **($1M)**
- **Advisory Committees:** membership travel. **($125,000)**



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Science Laboratory Infrastructure (SLI)

(FY 2009=$110.3M)

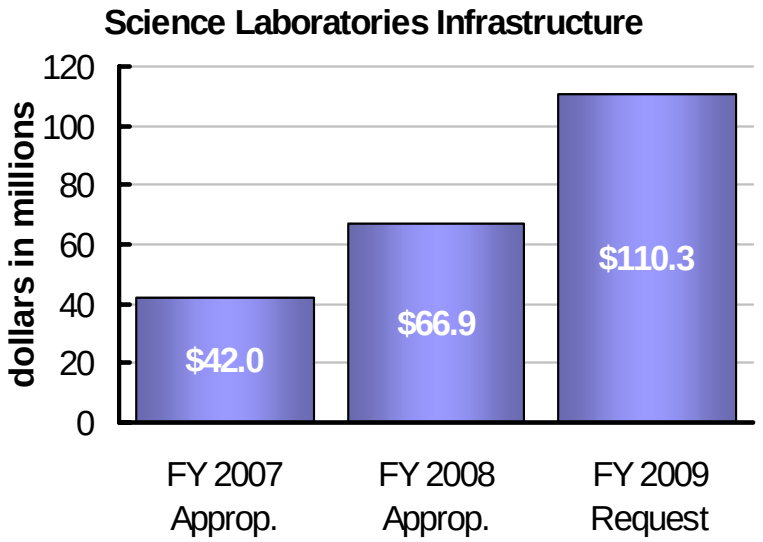
The SLI program supports the Office of Science (SC) research missions at the ten SC laboratories by funding line item construction, general plant projects, and clean-up and removal of excess facilities to maintain the general purpose infrastructure.

- **SC Infrastructure Modernization Initiative.** This modernization initiative begins in FY 2009. The goal is to, by FY 2019, have facilities and infrastructure at the SC laboratories that:
  - Offer a safer, healthier and more secure work environment for employees and visitors;
  - Ensure laboratory infrastructure will support world-class science;
  - Meet or exceed DOE sustainability goals and are more efficient to operate and maintain;
  - Support worker productivity and facilitate effective interaction with colleagues.

- **Excess Facilities Disposition.** Supports removal of excess facilities at SC sites to reduce long-term costs and liabilities and supports cleanup of facilities for reuse.

- **Oak Ridge Landlord.** Supports activities to maintain continuity of operations at the Oak Ridge Reservation (ORR), including Federal facilities in the town of Oak Ridge.

- **Line Item Construction.** Funds six projects in FY 2009 including the Physical Sciences Facility at Pacific Northwest National Laboratory (PNNL).



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Safeguards & Security (S&S)

(FY 2009=$80.6M)

The mission of the Office of Science Safeguards and Security program is to ensure appropriate levels of protection against: unauthorized access, theft, diversion, loss of custody, or destruction of Department of Energy assets and hostile acts that may cause adverse impacts on fundamental science, national security or the health and safety of DOE and contractor employees, the public or the environment.

- The FY 2009 request reflects an emphasis on the highest safeguards and security priorities within the complex. Increases are provided in Cyber Security to respond to significantly increased risks and government-wide requirements in this area and in Security Systems to replace and upgrade aging and obsolete systems.