

AAAS R&D Funding Update August 3, 2005 -

## Energy Bill Sets Ambitious Targets for DOE R&D

### Highlights

- **Congress has finalized a comprehensive energy policy bill that establishes U.S. energy policy for the remainder of the decade.** The bill includes authorizations for science and energy R&D programs in the Department of Energy (DOE) and creates a new program for ultra-deepwater oil and gas R&D.

- **The energy bill authorizes \$14.5 billion in funding for DOE's Office of Science between FY 2007 and 2009, but funding is highly unlikely to match the authorization (see Table). The FY 2006 request for the Office of Science falls nearly \$1 billion short of the authorization for 2007.**

After more than four years of debate and numerous stops and starts, Congress has finally approved a comprehensive energy authorization bill (HR 6) that sets U.S. energy policy for the remainder of the decade. On July 29, Congress gave final approval to the 1725-page conference report (final version) of the bill, which provides tax incentives for U.S. energy production, sets federal standards for energy use and energy efficiency, changes federal regulations on extracting energy from public lands, extends daylight savings time by a month, and authorizes programs in the Department of Energy (DOE). The bill includes authorizations for DOE's energy and science R&D programs which provide both policy guidance and suggested funding levels for the years 2007 through 2009, with authorizations extending through 2015 for some programs.

**The energy bill authorizes \$14.5 billion in funding for DOE's Office of Science (OS) between 2007 and 2009** on a funding trajectory that could see the OS budget double over the next decade, from \$3.6 billion this year (see Table). The bill authorizes \$4.4 billion in 2007, rising to \$5.3 billion in 2009, a gain of 48 percent over this year's funding level. The bill authorizes similar increases in funding for DOE's energy R&D programs in the areas of energy efficiency, fossil energy, renewable energy, distributed energy and electricity transmission, and nuclear energy. In all, the bill authorizes \$24.2 billion over the three-year period between 2007 and 2009 for primarily R&D programs in energy and science.

**Authorization bills, however, only contain suggested funding levels and do not actually provide funding.** Unlike the billions of dollars in tax cuts over the next decade that are included in the bill and would take effect without further action, funding for these DOE programs and others will continue to be provided year by year in annual appropriations bills and could fall well short of the authorized funding levels. Authorizations are intended as guides for future Congresses as they make budget decisions one year at a time, and are intended to set policy guidelines for how programs operate.

**Actual appropriations are likely to fall well short of the authorized levels in the energy bill.** Of the six key energy programs authorized to receive large increases in coming years, five would actually see their funding fall in the FY 2006 request. Although Congress has generally reversed the proposed cuts in FY 2006 appropriations action so far, even the congressional funding levels would require enormous increases in FY 2007 for the appropriations to meet authorizations. For the Office of Science, for example, the FY 2006 request would cut the total OS budget from \$3.6 billion down to \$3.5 billion; although the House and the Senate would boost it to \$3.7 billion in their pending appropriations, they would still require a highly unlikely 21 percent increase the next year to reach the \$4.4 billion FY 2007 authorization. The experience of the National Science Foundation (NSF) authorization bill may be instructive: like OS, in 2002 Congress authorized a doubling trajectory for the NSF budget, but appropriations have fallen far behind the authorizations; in FY 2006, the NSF budget is likely to be \$3 billion lower than the authorized level. (The

---

June 20 AAAS R&D Funding Update on the AAAS R&D web site provides details of DOE appropriations so far in the FY 2006 budget process).

Only one R&D program received guaranteed funding: the energy bill creates a new federal R&D program in ultra-deepwater oil and unconventional natural gas research funded at \$50 million a year between FY 2007 and 2017 out of federal royalties on oil and gas leases. The program would explore new technologies to extract underwater oil at depths greater than 1500 meters and to extract natural gas from sources that are uneconomical with current technologies. The bill also authorizes up to \$100 million a year in additional funding through the usual appropriations process. In an unusual move, the bill funnels most of the money through an unnamed consortium of institutions that will administer the program instead of DOE managers; although DOE staff at the National Energy Technology Center in West Virginia will select the consortium and administer a quarter of the funds, the bill language appears to have been crafted to favor a Texas-based energy nonprofit.

### **Office of Science programs in the Energy bill**

The energy bill legally authorizes the activities of **DOE's Office of Science (OS) through 2009, and authorizes \$14.5 billion between 2007 and 2009 on a budget path that would see its budget grow from \$3.6 billion this year to \$5.3 billion by FY 2009.** 93 percent of the OS budget goes to R&D activities, with the remainder for overhead costs and infrastructure support.

Only a few OS programs receive specific authorized funding levels, leaving DOE with greater flexibility to determine the shape of future budgets. **The Fusion Energy Sciences program** is authorized at \$356 million for domestic fusion research in FY 2007, increasing to \$385 million in FY 2009 for a 43 percent increase over this year. The authorization covers only U.S.-based fusion research, and excludes the U.S. share of costs for the **International Thermonuclear Experimental Reactor (ITER)** program, a multi-national multi-billion dollar fusion research facility that will begin construction shortly in Europe. Separately, the energy bill authorizes DOE to negotiate U.S. participation in ITER, calls on DOE to create a written plan to fully document the U.S. role in ITER, and calls on DOE to prepare a plan to ensure that ITER funding will not reduce funding for other OS programs, especially domestic fusion research. The ITER request for FY 2006 is \$55 million, and the U.S. contribution is expected to increase in future years. The Advanced Scientific Computing Research (ASCR) program would grow from \$233 million this year to \$375 million in 2009 if appropriations follow the authorization, a gain of 61 percent. Other major OS programs do not receive specific authorizations.

The energy bill also authorizes the construction of another major science facility, the Rare Isotope Accelerator (RIA), and instructs DOE to begin construction no later than September 2008 for this nuclear physics facility. The bill also authorizes \$397 million for the finishing touches on the **Spallation Neutron Source (SNS)** under construction in Tennessee as part of the OS Basic Energy Sciences program.

The energy bill authorizes several R&D efforts within the OS portfolio. The bill authorizes continuing efforts in catalysis research and development. Catalysis R&D in the OS Basic Energy Sciences program funds R&D on catalyst design, catalyst synthesis, and basic molecular research to better synthesize catalyst compounds. The bill also authorizes a new program in R&D for energy-related issues associated with water resources, including desalination research, arsenic treatment research, water supply technology development, and some water management demonstration projects, at an authorization of \$40 million a year. The program does not exist now, but the FY 2006 Senate appropriation would initiate the program.

Included in the final Energy bill, after being left out of an early version, is the creation of a post of Under Secretary for Science in the DOE to provide a high-visibility science figure in the Department with direct responsibility to the Energy Secretary. Many advocates for DOE's science activities have called for this step. The new position is a promotion for the Director of DOE OS, currently several steps lower than an Under Secretary in the DOE hierarchy. The bill also creates a new Assistant Secretary for Nuclear Energy to raise the profile of DOE's nuclear energy programs.

---

## Energy R&D Programs in the Energy Bill

In addition to the Office of Science, **DOE funds energy-related R&D programs through programs in Energy Efficiency, Fossil Energy, Renewable Energy, Distributed Energy, and Nuclear Energy**, all of which are authorized in the final energy bill. The bill envisions steadily increasing budgets for all of these programs (see Table), including a more-than-doubling of the Renewable Energy budget from \$380 million in FY 2005 to \$852 million in FY 2009. The Energy Efficiency program funds R&D on energy efficiency technologies in energy-using industries, buildings, transportation, and the energy distribution network, in addition to non-R&D activities to encourage greater use of energy-efficient technologies in housing. The Fossil Energy program funds R&D on new technologies to reduce the use of coal, oil, and natural gas or to reduce their environmental impacts. The Renewable Energy program funds R&D on solar, geothermal, wind, hydrogen, biomass, and other renewable energy technologies, and also funds efforts to deploy these technologies on a wider scale. Elsewhere in the energy bill is a comprehensive authorization for a hydrogen program to develop, deploy, and encourage the use of hydrogen in vehicles, energy production, and fuel cells. The Distributed Energy and Electricity Transmission is a program that funds R&D on more efficient electricity transmission and distributed energy generation technologies. The Nuclear Energy program funds a variety of programs related to nuclear power, including a Nuclear Energy R&D Initiative to develop next-generation nuclear power technologies and university programs to encourage nuclear R&D. All told, these energy R&D programs are authorized to receive \$9.7 billion over three years, of which roughly two-thirds would go to R&D activities. But again, the FY 2006 request and appropriations for these programs will fall far short of the authorized levels, making large increases in appropriations in FY 2007 to reach these targets highly unlikely.

## Other Provisions in the Energy Bill

There are several miscellaneous provisions in the energy bill that could affect the management of DOE's R&D portfolio. The bill calls on DOE to contract with the National Academy of Sciences for several studies, including a study on the short-term and long-term availability of skilled workers in energy and mineral industries, a study on the feasibility of procuring medical isotopes from sources other than enriched uranium, a study on DOE progress toward scientific and technical milestones in its hydrogen program, a study on fuel cell technologies, and others. In a nod to the future workforce needs of DOE, the bill also authorizes the creation of a DOE scholarship program that will prepare students for careers at DOE and its national laboratories and an energy research fellowship to encourage postdoctoral researchers as well as more senior scientists in energy-related fields. Finally, there are also earmarks (congressionally designated performer specific R&D projects) in the bill. The bill instructs DOE to build an Arctic Engineering Research Center at the University of Alaska Fairbanks and provides \$3 million a year for six years out of DOE funds for that purpose. Another facility, the Barrow Geophysical Research Facility, is authorized as a multi-agency \$61 million facility, but funds are only authorized and not appropriated. The bill also directs DOE to award a grant to a consortium of southeastern U.S. universities for a pilot program to enhance scientific, engineering, and mathematical literacy in students.

## Next Steps

The President is expected to sign the energy bill into law this week.

- August 3, 2005  
AAAS R&D Budget and Policy Program  
1200 New York Ave, NW  
Washington, DC 20005  
(202) 326-6607; -6600  
[www.aaas.org/spp/rd](http://www.aaas.org/spp/rd)



## AAAS Analysis of the 2005 Energy Bill

**Table.** AAAS Analysis of DOE Authorized Funding Levels in the Energy Policy Act of 2005  
(budget authority in millions of dollars)

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	% Change FY 05-09	
	Estimate	Request	Auth.	Auth.	Auth.	current \$	constant \$
<b>Authorized Funding Levels</b>							
Office of Science	3,600	3,463	4,449	4,710	5,324	47.9%	<b>36.4%</b>
- <i>Fusion Research</i> *	269	235	356	370	385	43.0%	<b>31.9%</b>
- <i>Adv. Sci. Computing Res.</i>	233	207	270	350	375	61.3%	<b>48.7%</b>
- <i>Spallation Neutron Source</i>	113	149	247	75	75	-33.6%	<b>-38.8%</b>
Energy Efficiency	541	531	783	865	952	75.9%	<b>62.1%</b>
Fossil Energy	572	491	661	691	681	19.1%	<b>9.8%</b>
Renewable Energy	380	354	632	743	852	124.0%	<b>106.5%</b>
Distributed Energy & Elec. Transm.	119	96	240	255	273	130.2%	<b>112.2%</b>
Nuclear Energy	375	390	465	495	640	70.6%	<b>57.2%</b>
Ultra Deepwater R&D **	0	0	150	150	150	--	--

\* - Excludes International Thermonuclear Experimental Reactor (ITER) funding.

\*\* - New program. \$50 million a year in mandatory funds, and \$100 million in authorized appropriations.

Source: AAAS analyses of funding levels in the conference report of the 2005 energy authorization bill (HR 6).

Programs in the table include both R&D and non-R&D components.

FY 2005 Estimate figures represent latest estimates of FY 2005 appropriations.

FY 2006 Request figures are President's requested appropriations.

Constant dollar conversions based on GDP deflators from OMB.

**AAAS - August 3, 2005**