



CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

March 15, 2006

S. 2197 **Protecting America's Competitive Edge Through** **Energy Act of 2006**

*As ordered reported by the Senate Committee on Energy and Natural Resources
on March 8, 2006*

SUMMARY

S. 2197 would establish programs within the Department of Energy (DOE) to encourage and support pre-college education in the areas of mathematics, science, and engineering; encourage advanced education in nuclear and other sciences; promote independent research; and direct research efforts within DOE. CBO estimates that implementing S. 2197 would cost \$241 million in 2007 and \$10.3 billion over the 2007-2011 period, assuming appropriation of the necessary funds. Enacting the bill would have no impact on direct spending or revenues.

S. 2197 contains no intergovernmental or private-sector mandates as defined by the Unfunded Mandates Reform Act (UMRA); any costs to state, local, or tribal governments would result from complying with conditions of federal assistance.

ESTIMATED COST TO THE FEDERAL GOVERNMENT

The estimated budgetary impact of S. 2197 is shown in the following table. The costs of this legislation fall within function 250 (general science, space, and technology).

	By Fiscal Year, in Millions of Dollars					
	2006	2007	2008	2009	2010	2011
SPENDING SUBJECT TO APPROPRIATION						
DOE Office of Science						
Authorization Level ^a	3,597	4,153	4,586	5,200	0	0
Estimated Outlays	3,601	3,907	4,342	4,871	2,569	260
Proposed Changes:						
DOE Office of Science						
Authorization Level	0	0	0	0	5,320	5,851
Estimated Outlays	0	0	0	0	2,660	5,320
Director of Mathematics, Science, and Engineering Education						
Estimated Authorization Level	0	1	1	1	1	1
Estimated Outlays	0	1	1	1	1	1
Education Programs for Teachers and Students in Grades K-12						
Estimated Authorization Level	0	61	72	78	84	85
Estimated Outlays	0	52	70	77	83	85
Nuclear Science Grants and Scholarships for Post-Secondary Education						
Authorization Level	0	10	20	30	40	50
Estimated Outlays	0	1	9	19	29	39
Programs Encouraging Research Innovation						
Estimated Authorization Level	0	327	358	405	431	453
Estimated Outlays	0	186	336	393	422	445
Protecting America's Competitive Edge (PACE) Graduate Fellowship Program						
Authorization Level	0	6	10	16	28	39
Estimated Outlays	0	2	6	12	19	30
Total Changes						
Estimated Authorization Level	0	404	461	530	5,904	6,479
Estimated Outlays	0	241	423	501	3,214	5,919
Spending Under S. 2197						
Estimated Authorization Level	3,597	4,557	5,047	5,730	5,904	6,479
Estimated Outlays	3,601	4,149	4,765	5,373	5,784	6,179

NOTE: Components may not sum to totals because of rounding.

a. The 2006 level is the amount appropriated for that year to DOE's Office of Science. The 2007-2009 levels are specifically authorized to be appropriated under current law.

BASIS OF ESTIMATE

For this estimate, CBO assumes that S. 2197 will be enacted during 2006 and that the amounts specifically authorized to be appropriated and estimated to be necessary are appropriated each year. CBO estimates that implementing the bill would cost \$241 million in fiscal year 2007 and \$10.3 billion over the 2007-2011 period, mostly to continue the operations of DOE's Office of Science after its current authorization expires in 2009.

DOE Office of Science

Section 6 would authorize the appropriation of \$11.2 billion over fiscal years 2010 and 2011 to continue programs operating under the Office of Science, including most national laboratories and certain major science research facilities. CBO estimates that implementing this section would cost nearly \$8 billion over the 2010-2011 period.

Director of Mathematics, Science, and Engineering Education

The bill would authorize the appointment of a Director of Mathematics, Science, and Engineering Education to oversee all educational efforts of the Department of Energy. CBO estimates that implementing this provision would cost less than \$1 million in each fiscal year over the 2007-2011 period because many of the functions of the new director are already being conducted within the Office of Science.

Education Programs for Teachers and Students in Grades K-12

CBO estimates that the bill also would authorize the appropriation of \$61 million in 2007 and \$380 million over the 2007-2011 period to establish several programs focused on improving technical education in grades K-12. CBO estimates that implementing these programs would cost \$52 million in 2007 and \$368 million over the 2007-2011 period.

Assistance for Specialty Schools for Mathematics and Science. The bill would authorize appropriation of funds for a program under which scientists and staff from national laboratories would use laboratory equipment to help to teach courses at statewide secondary schools that specialize in mathematics and science instruction. Because there are few of these schools in the regions near the national laboratories, CBO expects that the demand for such a program would not be large. We estimate that if all 17 national laboratories were to participate, this effort would cost less than \$500,000 in 2007 and about \$12 million over the 2007-2011 period.

Experiential-Based Learning Opportunities. The bill would authorize the appropriation of \$50 million in each year over the 2007-2011 period to establish an internship program for middle school and secondary school students. CBO estimates that this program would cost \$43 million in 2007 and \$243 million over the 2007-2011 period.

National Laboratory Centers of Excellence in Mathematics and Science Education. The bill would require each national laboratory to establish and support a Center of Excellence in Mathematics and Science at one local public secondary school. At each center, laboratory scientific and engineering staff would help to teach courses, using equipment from the national laboratory. Based on information from DOE, CBO expects that fully implementing this program across all 17 national laboratories would cost less than \$500,000 in 2007 and around \$3 million over the 2007-2011 period.

Summer Institutes. The bill would require DOE to establish summer institutes at each of the national laboratories to provide a minimum of two weeks of training in mathematics and science during the summer for public school teachers, with follow-up training throughout the year. Based on information from DOE, CBO estimates that this program would cost \$9 million in 2007 and \$111 million over the 2007-2011 period.

Nuclear Science Grants and Scholarships for Post-secondary Education

The bill would authorize the appropriation of \$10 million in 2007 and \$150 million over the 2007-2011 period to establish three programs to encourage education in nuclear sciences. The first would award up to three grants of up to \$500,000 each per year to institutions of higher education that establish degree programs in nuclear science. The second would award up to 10 grants of up to \$250,000 each per year to institutions of higher education to enhance existing degree programs in nuclear science. The third program would award up to 150 scholarships of up to \$40,000 each per year to students who enter degree programs in nuclear science. CBO estimates that implementing these provisions would cost \$1 million in 2007 and \$97 million over the 2007-2011 period.

Programs Encouraging Research Innovation

CBO estimates that the bill would authorize the appropriation of \$61 million in 2007 and \$380 million over the 2007-2011 period to establish four programs focused on improving technical education for kindergarten through high school (i.e., grades K-12). CBO estimates that these programs would cost \$52 million in 2007 and \$368 million over the 2007-2011 period. Each new program is described below.

Distinguished Scientist Program. Under the bill, DOE would create a program for distinguished scientists as selected by their peers to be appointed to the national laboratories for six-year terms to perform research projects. Based on information from DOE, CBO assumes that each lab would support five to 10 such scientists at an average cost of around \$1 million to support each scientist each year. CBO estimates that implementing this program would cost about \$17 million in 2007 and \$357 million over the 2007-2011 period.

DOE Early-Career Research Grants. Section 4 would authorize DOE to award research grants totaling \$500,000 over five years to individuals in the first 10 years of their careers to conduct research in mathematics, engineering, or other scientific fields. CBO estimates that implementing this section of the bill would cost around \$1 million in 2007 and \$70 million over the 2007-2011 period.

Advanced Research Projects Authority. Section 5 would authorize the appropriation of \$250 million a year over the 2007-2011 period to help overcome barriers faced by the commercial sector in the development of applied energy technologies. CBO estimates that this program would cost \$125 million in 2007 and about \$1.1 billion over the 2007-2011 period.

Discovery Science and Engineering Innovation Institutes. Section 7 would authorize the appropriation of \$50 million a year over seven years to establish institutes at the national laboratories to apply science and engineering discoveries to emerging technologies to develop innovative new products and services. CBO estimates that implementing this program would cost \$43 million in 2007 and \$243 million over the 2007-2011 period.

Protecting America's Competitive Edge (PACE) Graduate Fellowship Program

Section 8 would authorize the appropriation of \$6 million in 2007 and \$98 million over the 2007-2011 period for DOE to award fellowships to doctoral students who would work toward degrees in science, engineering, or other mission areas of the department. CBO estimates that implementing this section of the bill would cost \$2 million in 2007 and \$68 million over the 2007-2011 period.

INTERGOVERNMENTAL AND PRIVATE-SECTOR IMPACT

S. 2197 contains no intergovernmental or private-sector mandates as defined by UMRA. The bill would authorize activities and grant funds that would benefit public elementary and secondary schools in addition to public institutions of higher education. Any costs to those entities or to state, local, or tribal governments would result from complying with conditions of federal assistance.

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