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### PROTECTING AMERICA'S COMPETITIVE EDGE THROUGH ENERGY ACT OF 2006

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APRIL 24, 2006.—Ordered to be printed

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Mr. DOMENICI, from the Committee on Energy and Natural  
Resources, submitted the following

### R E P O R T

[To accompany S. 2197]

The Committee on Energy and Natural Resources, to which was referred the bill (S. 2197) to improve the global competitiveness of the United States in science and energy technology, to strengthen basic research programs at the Department of Energy, and to provide support for mathematics and science education at all levels through the resources available through the Department of Energy, including at the National Laboratories, having considered the same, reports favorably thereon with an amendment and recommends that the bill, as amended, do pass.

The amendment is as follows:

Strike out all after the enacting clause and insert in lieu thereof the following:

**SECTION 1. SHORT TITLE.**

This Act may be cited as the “Protecting America’s Competitive Edge Through Energy Act of 2006” or the “PACE–Energy Act”.

**SEC. 2. DEFINITIONS.**

In this Act:

- (1) DEPARTMENT.—The term “Department” means the Department of Energy.
- (2) INSTITUTION OF HIGHER EDUCATION.—The term “institution of higher education” has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).
- (3) NATIONAL LABORATORY.—The term “National Laboratory” has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).
- (4) SECRETARY.—The term “Secretary” means the Secretary of Energy, acting through the Under Secretary for Science appointed under section 202(b) of the Department of Energy Organization Act (42 U.S.C. 7132(b)).

**SEC. 3. MATHEMATICS, SCIENCE, AND ENGINEERING EDUCATION AT THE DEPARTMENT OF ENERGY.**

(a) SCIENCE EDUCATION PROGRAMS.—Section 3164 of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381a) is amended—

(1) by redesignating subsections (b) through (d) as subsections (c) through (e), respectively;

(2) by inserting after subsection (a) the following:

“(b) ORGANIZATION OF MATHEMATICS, SCIENCE, AND ENGINEERING EDUCATION PROGRAMS.—

“(1) DIRECTOR OF MATHEMATICS, SCIENCE AND ENGINEERING EDUCATION.—The Secretary, acting through the Under Secretary for Science (referred to in this subsection as the ‘Under Secretary’), shall appoint a Director of Mathematics, Science, and Engineering Education (referred to in this subsection as the ‘Director’) with the principal responsibility for administering mathematics, science, and engineering education programs of the Department.

“(2) QUALIFICATIONS.—The Director shall be an individual, who by reason of professional background and experience, is specially qualified to advise the Under Secretary on all matters pertaining to mathematics, science, and engineering education at the Department.

“(3) DUTIES.—The Director shall—

“(A) oversee all mathematics, science, and engineering education programs of the Department;

“(B) represent the Department as the principal interagency liaison for all mathematics, science, and engineering education programs, unless otherwise represented by the Secretary or the Under Secretary;

“(C) prepare the annual budget and advise the Under Secretary on all budgetary issues for mathematics, science, and engineering education programs of the Department;

“(D) increase, to the maximum extent practicable, the participation and advancement of women and underrepresented minorities at every level of science, technology, engineering, and mathematics education; and

“(E) perform other such matters related to mathematics, science, and engineering education as are required by the Secretary or the Under Secretary.

“(4) STAFF AND OTHER RESOURCES.—The Secretary shall assign to the Director such personnel and other resources as the Secretary considers necessary to permit the Director to carry out the duties of the Director.

“(5) ASSESSMENT.—The Secretary shall offer to enter into a contract with the National Academy of Sciences under which the National Academy, not later than 5 years after, and not later than 10 years after, the date of enactment of this paragraph, shall assess the performance of the mathematics, science, and engineering education programs of the Department.

“(6) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated such sums as are necessary to carry out this subsection.”; and

(3) by striking subsection (d) (as redesignated by paragraph (1)) and inserting the following:

“(d) MATHEMATICS, SCIENCE, AND ENGINEERING EDUCATION FUND.—The Secretary shall establish a Mathematics, Science, and Engineering Education Fund, using not less than 0.3 percent of the amount made available to the Department for research, development, demonstration, and commercial application for each fiscal year, to carry out sections 3165, 3166, and 3167.”.

(b) DEFINITION.—Section 3168 of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381d) is amended by adding at the end the following:

“(5) NATIONAL LABORATORY.—The term ‘National Laboratory’ has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).”.

(c) MATHEMATICS, SCIENCE, AND ENGINEERING EDUCATION PROGRAMS.—The Department of Energy Science Education Enhancement Act (42 U.S.C. 7381 et seq.) is amended—

(1) by inserting after section 3162 the following:

**“Subpart A—Science Education Enhancement”;**

(2) in section 3169, by striking “part” and inserting “subpart”; and

(3) by adding at the end the following:

## **“Subpart B—Mathematics, Science, and Engineering Education Programs**

### **“SEC. 3170. DEFINITIONS.**

“In this subpart:

“(1) **DIRECTOR.**—The term ‘Director’ means the Director of Mathematics, Science, and Engineering Education.

“(2) **NATIONAL LABORATORY.**—The term ‘National Laboratory’ has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

### **“CHAPTER 1—ASSISTANCE FOR SPECIALTY SCHOOLS FOR MATHEMATICS AND SCIENCE**

#### **“SEC. 3171. ASSISTANCE FOR SPECIALTY SCHOOLS FOR MATHEMATICS AND SCIENCE.**

“(a) **IN GENERAL.**—Consistent with sections 3165 and 3166, the Director shall make available necessary funds for a program using scientific and engineering staff of the National Laboratories, in which the staff—

“(1) assists teaching courses at statewide specialty secondary schools that provide comprehensive mathematics and science (including engineering) education; and

“(2) uses National Laboratory scientific equipment in the teaching of the courses.

“(b) **REPORT TO CONGRESS.**—Not later than 2 years after the date of enactment of the Protecting America’s Competitive Edge Through Energy Act of 2006, the Director shall submit a report to the appropriate committees of Congress detailing the impact of the activities assisted with funds made available under this section.

### **“CHAPTER 2—EXPERIENTIAL-BASED LEARNING OPPORTUNITIES**

#### **“SEC. 3175. EXPERIENTIAL-BASED LEARNING OPPORTUNITIES.**

“(a) **INTERNSHIPS AUTHORIZED.**—From the amounts authorized under subsection (e), the Secretary, acting through the Director, shall establish a summer internship program for middle school and secondary school students that shall—

“(1) provide the students with internships at the National Laboratories; and

“(2) promote experiential, hands-on learning in mathematics or science.

“(b) **ELIGIBILITY CRITERIA.**—The Director shall establish criteria to determine the sufficient level of academic preparedness necessary for a student to be eligible for an internship under this section.

“(c) **PRIORITY.**—

“(1) **IN GENERAL.**—The Director shall give priority for an internship under this section to a student who meets the eligibility criteria described in subsection (b) and who attends a school—

“(A)(i) in which not less than 30 percent of the children enrolled in the school are from low-income families; or

“(ii) that is designated with a school locale code of 7 or 8 or otherwise designated as a rural school, as determined by the Secretary of Education; and

“(B) for which there is—

“(i) a high percentage of teachers who are not teaching in the academic subject areas or grade levels in which the teachers were trained to teach;

“(ii) a high teacher turnover rate; or

“(iii) a high percentage of teachers with emergency, provisional, or temporary certification or licenses.

“(2) **COORDINATION.**—The Director shall consult with the Secretary of Education in order to determine whether a student meets the priority requirements of this subsection.

“(d) **OUTREACH AND EXPERIENTIAL-BASED PROGRAMS FOR MINORITY STUDENTS.**—

“(1) **IN GENERAL.**—The Secretary, acting through the Director, in cooperation with Hispanic-serving institutions, historically Black colleges and universities, tribal colleges, and other minority-serving institutions and nonprofit entities with substantial experience relating to outreach and experiential-based learning projects, shall establish outreach and experiential-based learning programs that will encourage underrepresented minority students in kindergarten through grade 12 to pursue careers in math, science, and engineering.

“(2) **COMMUNITY INVOLVEMENT.**—The Secretary shall ensure that the programs established under paragraph (1) involve, to the maximum extent practicable—

- “(A) participation by parents and educators; and
- “(B) the establishment of partnerships with business organizations and appropriate Federal, State, and local agencies.
- “(3) DISTRIBUTION.—The Secretary shall ensure that the programs established under paragraph (1) are located in various geographic regions of the United States, to the maximum extent practicable.
- “(e) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to carry out this section \$50,000,000 for each of the fiscal years 2007 through 2013.

### **“CHAPTER 3—NATIONAL LABORATORIES CENTERS OF EXCELLENCE IN MATHEMATICS AND SCIENCE EDUCATION**

#### **“SEC. 3181. NATIONAL LABORATORIES CENTERS OF EXCELLENCE IN MATHEMATICS AND SCIENCE EDUCATION.**

- “(a) IN GENERAL.—The Secretary shall establish at each of the National Laboratories a program to support a Center of Excellence in Mathematics and Science at 1 public secondary school located in the region of the National Laboratory to provide assistance in accordance with subsection (c).
- “(b) GOALS.—The Secretary shall establish goals and performance assessments for each Center of Excellence authorized under subsection (a).
- “(c) ASSISTANCE.—Consistent with sections 3165 and 3166, the Director shall make available necessary funds for a program using scientific and engineering staff of the National Laboratories, during which the staff—
  - “(1) assists teaching courses at the Centers of Excellence in Mathematics and Science; and
  - “(2) uses National Laboratory scientific equipment in the teaching of the courses.
- “(d) EVALUATION.—The Secretary shall consider the results of the performance assessments required under subsection (b) in any performance review of a National Laboratories management and operations contractor.

### **“CHAPTER 4—SUMMER INSTITUTES**

#### **“SEC. 3185. SUMMER INSTITUTES.**

- “(a) DEFINITION OF SUMMER INSTITUTE.—In this section, the term ‘summer institute’ means an institute at a National Laboratory, conducted during the summer, that—
  - “(1) is conducted for a period of not less than 2 weeks;
  - “(2) includes, as a component, a program that provides direct interaction between students and faculty; and
  - “(3) provides for follow-up training during the academic year.
- “(b) SUMMER INSTITUTE PROGRAMS AUTHORIZED.—The Secretary, acting through the Director, shall establish or expand program of summer institutes at each of the National Laboratories to provide additional training to strengthen the mathematics and science teaching skills of teachers employed at public schools in kindergarten through grade 12 education, with a particular focus on teachers of kindergarten through grade 8.

### **“CHAPTER 5—DISTINGUISHED SCIENTIST PROGRAM**

#### **“SEC. 3191. DISTINGUISHED SCIENTIST PROGRAM.**

- “(a) PURPOSE.—The purpose of this section is to promote scientific and academic excellence at National Laboratories.
- “(b) ESTABLISHMENT.—The Secretary, acting through the Director and in consultation with the Director of the Office of Science, shall establish a program to support the appointment of distinguished scientists by National Laboratories.
- “(c) QUALIFICATIONS.—Successful candidates under this section shall be persons who, by reason of professional background and experience, are able to bring international recognition to the appointing National Laboratory in their field of scientific endeavor.
- “(d) SELECTION.—A distinguished scientist appointed under this section shall be selected through an open peer review process.
- “(e) APPOINTMENT.—An appointment by a National Laboratory under this section shall be at the rank of the highest grade of distinguished scientist or technical staff of the National Laboratory.
- “(f) DURATION.—An appointment under this section shall be for 6 years, consisting of 2 3-year funding allotments.
- “(g) USE OF FUNDS.—Funds made available under this section may be used for—
  - “(1) the salary of the distinguished scientist and support staff;
  - “(2) undergraduate, graduate, and post-doctoral appointments;

- “(3) research-related equipment;
- “(4) professional travel; and
- “(5) such other requirements as the Director determines are necessary to carry out the purpose of the program.

“(h) REVIEW.—

“(1) IN GENERAL.—The appointment of a distinguished scientist under this section shall be reviewed at the end of the first 3-year allotment for the distinguished scientist through an open peer review process to determine if the appointment is meeting the purpose of this section under subsection (a).

“(2) FUNDING.—Funding of the appointment of the distinguished scientist for the second 3-year allotment shall be determined based on the review conducted under paragraph (1).

**“CHAPTER 6—NUCLEAR SCIENCE EDUCATION**

**“SEC. 3195. NUCLEAR SCIENCE TALENT EXPANSION PROGRAM FOR INSTITUTIONS OF HIGHER EDUCATION.**

“(a) PURPOSES.—The purposes of this section are—

“(1) to address the decline in the number of and resources available to nuclear science programs of institutions of higher education; and

“(2) to increase the number of graduates with degrees in nuclear science, an area of strategic importance to the economic competitiveness and energy security of the United States.

“(b) DEFINITION OF NUCLEAR SCIENCE.—In this section, the term ‘nuclear science’ includes—

“(1) nuclear science;

“(2) nuclear engineering;

“(3) nuclear chemistry;

“(4) radiochemistry; and

“(5) health physics.

“(c) ESTABLISHMENT.—The Secretary, acting through the Director, shall establish in accordance with this section a program to expand and enhance institution of higher education nuclear science educational capabilities.

“(d) NUCLEAR SCIENCE PROGRAM EXPANSION GRANTS FOR INSTITUTIONS OF HIGHER EDUCATION.—

“(1) IN GENERAL.—The Secretary, acting through the Director, shall award up to 3 competitive grants for each fiscal year to institutions of higher education that establish new academic degree programs in nuclear science.

“(2) ELIGIBILITY.—To be eligible for a grant under this subsection, an applicant shall partner with a National Laboratory or other eligible nuclear entity, as determined by the Secretary.

“(3) CRITERIA.—Criteria for a grant awarded under this subsection shall be based on—

“(A) the potential to attract new students to the program;

“(B) academic rigor; and

“(C) the ability to offer hands-on learning opportunities.

“(4) DURATION AND AMOUNT.—

“(A) DURATION.—A grant under this subsection shall be 5 years in duration.

“(B) AMOUNT.—An institution of higher education that receives a grant under this subsection shall be eligible for up to \$500,000 for each year of the grant period.

“(5) USE OF FUNDS.—An institution of higher education that receives a grant under this subsection may use the grant to—

“(A) recruit and retain new faculty;

“(B) develop core and specialized course content;

“(C) encourage collaboration between faculty and researchers in the nuclear science field; or

“(D) support outreach efforts to recruit students.

“(e) NUCLEAR SCIENCE COMPETITIVENESS GRANTS FOR INSTITUTIONS OF HIGHER EDUCATION.—

“(1) IN GENERAL.—The Secretary, acting through the Director shall award up to 10 competitive grants for each fiscal year to institutions of higher education with existing academic degree programs that produce graduates in nuclear science.

“(2) CRITERIA.—Criteria for a grant awarded under this subsection shall be based on the potential for increasing the number and academic quality of graduates in the nuclear sciences that enter into careers in nuclear-related fields.

“(3) DURATION AND AMOUNT.—

“(A) DURATION.—A grant under this subsection shall be 5 years in duration.

“(B) AMOUNT.—An institution of higher education that receives a grant under this subsection shall be eligible for up to \$250,000 for each year of the grant period.

“(4) USE OF FUNDS.—An institution of higher education that receives a grant under this subsection may use the grant to—

“(A) increase the number of graduates in nuclear science that enter into careers in the nuclear science field;

“(B) enhance the teaching of advanced nuclear technologies;

“(C) aggressively pursue collaboration opportunities with industry and National Laboratories; and

“(D) bolster or sustain nuclear infrastructure and research facilities of the institution of higher education, such as research and training reactors or laboratories.

“(f) NUCLEAR SCIENCE TALENT EXPANSION SCHOLARSHIPS.—

“(1) IN GENERAL.—The Secretary, acting through the Director, shall award up to 150 competitive scholarships for each fiscal year to be used to provide for educational expenses for students at eligible institutions of higher education who enter into academic degree programs in nuclear science.

“(2) CRITERIA.—Scholarships under this subsection shall be awarded competitively based on academic merit.

“(3) DURATION AND AMOUNT.—

“(A) DURATION.—Scholarship assistance under this subsection may be awarded for up to 4 years.

“(B) AMOUNT.—A student who receives a grant under this subsection shall be eligible for up to \$40,000 for each year of the scholarship period to be used for educational expenses (including tuition, books, fees, equipment, room, and board).

“(4) TERMINATION.—A student who receives a scholarship under this subsection but fails to maintain appropriate academic achievement for a year, as determined by the Director, shall not be eligible for a scholarship under this subsection for subsequent years.

“(5) INTERNSHIP.—The Secretary shall ensure that each student who receives a scholarship under this subsection has the opportunity to participate in an internship at a National Laboratory during the course of study of the student.

“(g) AUTHORIZATION OF APPROPRIATIONS.—

“(1) NUCLEAR SCIENCE PROGRAM EXPANSION GRANTS FOR INSTITUTIONS OF HIGHER EDUCATION.—There are authorized to be appropriated to carry out subsection (d)—

“(A) \$1,500,000 for fiscal year 2007;

“(B) \$3,000,000 for fiscal year 2008;

“(C) \$4,500,000 for fiscal year 2009;

“(D) \$6,000,000 for fiscal year 2010; and

“(E) \$7,500,000 for fiscal year 2011.

“(2) NUCLEAR SCIENCE COMPETITIVENESS GRANTS FOR INSTITUTIONS OF HIGHER EDUCATION.—There are authorized to be appropriated to carry out subsection (e)—

“(A) \$2,500,000 for fiscal year 2007;

“(B) \$5,000,000 for fiscal year 2008;

“(C) \$7,500,000 for fiscal year 2009;

“(D) \$10,000,000 for fiscal year 2010; and

“(E) \$12,500,000 for fiscal year 2011.

“(3) NUCLEAR SCIENCE TALENT EXPANSION SCHOLARSHIPS.—There are authorized to be appropriated to carry out subsection (f)—

“(A) \$6,000,000 for fiscal year 2007;

“(B) \$12,000,000 for fiscal year 2008;

“(C) \$18,000,000 for fiscal year 2009;

“(D) \$24,000,000 for fiscal year 2010; and

“(E) \$30,000,000 for fiscal year 2011.”.

#### SEC. 4. DEPARTMENT OF ENERGY EARLY-CAREER RESEARCH GRANTS.

(a) PURPOSE.—It is the purpose of this section to authorize research grants in the Department for early-career scientists and engineers for purposes of pursuing independent research.

(b) DEFINITION OF ELIGIBLE EARLY-CAREER RESEARCHER.—In this section, the term “eligible early-career researcher” means an individual who—

(1) completed a doctorate or other terminal degree not more than 10 years before the date of application for a grant authorized under this section; and

(2) has demonstrated promise in the field of science, technology, engineering, mathematics, computer science, or computational science.

(c) GRANT PROGRAM AUTHORIZED.—

(1) IN GENERAL.—The Secretary shall award not less than 65 grants per year to outstanding eligible early-career researchers to support the work of such researchers in the Department, particularly the National Laboratories, or other federally-funded research and development centers.

(2) APPLICATION.—An eligible early-career researcher who desires to receive a grant under this section shall submit to the Secretary an application at such time, in such manner, and accompanied by such information as the Secretary may require.

(3) SPECIAL CONSIDERATION.—In awarding grants under this section, the Secretary shall give special consideration to eligible early-career researchers who have followed alternative career paths such as working part-time or in non-academic settings, or who have taken a significant career break or other leave of absence.

(4) DURATION AND AMOUNT.—A grant under this section shall be 5 years in duration. An eligible early career-researcher who receives a grant under this section shall receive \$100,000 for each year of the grant period.

(5) USE OF FUNDS.—An eligible early career-researcher who receives a grant under this section shall use the grant funds for basic research in natural sciences, engineering, mathematics, or computer sciences at the Department, particularly the National Laboratories, or other federally-funded research and development center.

(6) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section—

- (A) \$6,500,000 for fiscal year 2007;
- (B) \$13,000,000 for fiscal year 2008;
- (C) \$19,500,000 for fiscal year 2009;
- (D) \$26,000,000 for fiscal year 2010; and
- (E) \$32,500,000 for fiscal year 2011.

**SEC. 5. ADVANCED RESEARCH PROJECTS AUTHORITY-ENERGY.**

(a) DEFINITIONS.—In this section:

(1) ADVISORY BOARD.—The term “Advisory Board” means the Advisory Board established under subsection (d).

(2) APPLIED ENERGY TECHNOLOGY.—The term “applied technology” means technology used for—

- (A) fossil energy;
- (B) carbon sequestration;
- (C) nuclear energy;
- (D) renewable energy;
- (E) energy distribution; or
- (F) energy efficiency technology.

(3) AUTHORITY.—The term “Authority” means the Advanced Research Projects Authority—Energy established under subsection (b).

(4) DIRECTOR.—The term “Director” means the Director of the Authority appointed under subsection (c)(1).

(b) ESTABLISHMENT.—The Secretary shall establish an Advanced Research Projects Authority-Energy to overcome the long-term and high-risk technological barriers in the development of applied energy technologies (including carbon neutral technologies) that hinder the successful implementation of the technologies in commercial markets.

(c) DIRECTOR.—

(1) APPOINTMENT.—The Secretary shall appoint a Director of the Authority.

(2) QUALIFICATIONS.—The Director shall be an individual who, by reason of professional background and experience, is especially qualified to advise the Secretary on matters pertaining to long-term, high-risk programs to overcome long-term and high-risk technological barriers to the development of applied energy technologies in commercial markets.

(3) DUTIES.—The Director shall—

(A) employ such qualified technical staff as are necessary to carry out the duties of the Authority, including providing staff for the Advisory Committee;

(B) serve as the selection official for proposals relating to applied energy technologies that are solicited within the Department;

(C) terminate programs carried out under this section that are not achieving the goals of the programs; and

(D) perform such duties related to long-term and high-risk technological barriers in the development of applied energy technologies as are determined appropriate by the Secretary.

(d) **ADVISORY BOARD.**—

(1) **APPOINTMENT.**—The Secretary shall, consistent with the Federal Advisory Committee Act (5 U.S.C. App.), establish, and appoint members to, an Advisory Board to make recommendations to the Secretary and the Director on actions necessary to carry out this section.

(2) **QUALIFICATIONS.**—The Advisory Board shall consist of individuals who—

(A) by reason of professional background and experience, are especially qualified to advise the Secretary and the Director on matters pertaining to long-term and high-risk technological barriers in the development of applied energy technologies in commercial markets; and

(B) are not employees or former employees of the Federal Government.

(3) **TERM.**—A member of the Advisory Board shall be appointed for a term of 5 years.

(4) **INFORMATION.**—Each fiscal year, individuals who carry out applied energy technology programs of the Department and staff of the Authority shall provide to the Advisory Board written proposals and oral briefings on long-term and high-risk technological barriers that are critical to overcome for the successful development of applied energy technologies in commercial markets.

(5) **DUTIES.**—Each fiscal year, the Advisory Board shall—

(A) recommend to the Secretary and the Director—

(i) in order of priority, proposals of applied energy programs of the Department that are critical to overcoming long-term and high-risk technological barriers to enable the successful development of applied energy technologies in commercial markets; and

(ii) additional programs not covered in the proposals that are critical to overcoming the barriers described in clause (i); and

(B) make recommendations to the Secretary and the Director concerning whether programs funded under this section are achieving the goals of the programs.

(e) **REVIEW.**—Not later than 3 and 6 years after the date of enactment of this Act, the Secretary shall enter into an agreement with the National Academy of Sciences under which the Academy shall—

(1) conduct a review to determine whether the activities carried out under this section are overcoming long-term and high risk technological barriers to the successful implementation of applied energy technologies in commercial markets; and

(2) submit to Congress, the Secretary, and the Director a report describing the results of the review.

(f) **AUTHORIZATION OF APPROPRIATIONS.**—There is authorized to be appropriated to carry out this section \$250,000,000 for each of fiscal years 2007 through 2011.

**SEC. 6. AUTHORIZATION OF APPROPRIATIONS FOR THE DEPARTMENT OF ENERGY FOR BASIC RESEARCH.**

Section 971(b) of the Energy Policy Act of 2005 (42 U.S.C. 16311(b)) is amended—

(1) in paragraph (2), by striking “and” at the end;

(2) in paragraph (3), by striking the period at the end and inserting a semicolon; and

(3) by adding at the end the following:

“(4) \$5,320,000,000 for fiscal year 2010;

“(5) \$5,851,000,000 for fiscal year 2011;

“(6) \$6,436,000,000 for fiscal year 2012; and

“(7) \$7,080,000,000 for fiscal year 2013.”.

**SEC. 7. DISCOVERY SCIENCE AND ENGINEERING INNOVATION INSTITUTES.**

(a) **IN GENERAL.**—The Secretary shall establish distributed, multidisciplinary institutes (referred to in this section as “Institutes”) centered at National Laboratories to apply fundamental science and engineering discoveries to technological innovations for the creation of products, processes, and services related to the missions of the Department and the global competitiveness of the United States.

(b) **TOPICAL AREAS.**—The Institutes shall support scientific and engineering research and education activities on critical emerging technologies determined by the Secretary to be essential to global competitiveness, including activities related to—

(1) sustainable energy technologies;

(2) multi-scale materials and processes;

(3) micro- and nano-engineering;

(4) computational and information engineering; and

(5) genomics and proteomics.

(c) PARTNERSHIPS.—In carrying out this section, the Secretary shall establish partnerships between the Institutes and—

- (1) institutions of higher education to—
  - (A) train undergraduate and graduate engineering and science students;
  - (B) develop innovative educational curricula; and
  - (C) conduct research within the topical areas described in subsection (b);
- (2) private industry to develop innovative technologies within the topical areas described in subsection (b);
- (3) State and local governments to promote regionally-based commercialization and entrepreneurship; and
- (4) financing entities to guide successful technology commercialization.

(d) MERIT-BASED SELECTION.—The selection of Institutes under this section shall be based on merit.

(e) REVIEW.—Not later than 3 and 6 years after the date of enactment of this Act, the Secretary shall enter into an agreement with the National Academy of Sciences under which the Academy shall—

- (1) conduct a review of the performance of the Institutes under this section; and
- (2) submit to Congress and the Secretary a report describing the results of the review.

(f) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to carry out the activities of each Institute selected under this section \$50,000,000 for each of fiscal years 2007 through 2013.

**SEC. 8. PROTECTING AMERICA'S COMPETITIVE EDGE (PACE) GRADUATE FELLOWSHIP PROGRAM.**

(a) DEFINITION OF ELIGIBLE STUDENT.—In this section, the term “eligible student” means a student who attends an institution of higher education that offers a doctoral degree in a field relevant to a mission area of the Department.

(b) ESTABLISHMENT.—The Secretary shall establish a graduate fellowship program for eligible students pursuing a doctoral degree in a mission area of the Department.

(c) SELECTION.—

(1) IN GENERAL.—The Secretary shall award fellowships to eligible students under this section through a competitive merit review process (involving written and oral interviews) that will result in a wide distribution of awards throughout the United States.

(2) CRITERIA.—The Secretary shall establish selection criteria for awarding fellowships under this section that require an eligible student to—

- (A) pursue a field of science or engineering of importance to the mission area of the Department;
- (B) rank in the upper 10 percent of the class of the eligible student;
- (C) demonstrate to the Secretary—
  - (i) the capacity to understand technical topics related to the fellowship that can be derived from the first principles of the technical topics;
  - (ii) imagination and creativity;
  - (iii) leadership skills in organizations or intellectual endeavors, demonstrated through awards and past experience; and
  - (iv) excellent verbal and communication skills to explain, defend, and demonstrate an understanding of technical subjects related to the fellowship; and
- (D) be a citizen or permanent resident alien of the United States.

(d) AWARDS.—

(1) AMOUNT.—A fellowship awarded under this section shall—

- (A) provide an annual living stipend; and
- (B) cover—
  - (i) graduate tuition at an institution of higher education; and
  - (ii) incidental expenses associated with curricula and research at the institution of higher education (including books, computers and software).

(2) DURATION.—A fellowship awarded under this section shall be for a period of not longer than 5 years.

(3) PORTABILITY.—A fellowship awarded under this section shall be portable with the fellow.

(e) ADMINISTRATION.—The Secretary (acting through the Director of Mathematics, Science, and Engineering Education)—

- (1) shall administer the program established under this section; and,
- (2) may enter into a contract with a nonprofit entity to administer the program, including the selection and award of fellowships.

(f) REVOCATION.—

(1) IN GENERAL.—Nothing in this section prevents the Secretary from refusing or revoking a fellowship award, in whole or on part, in the case of any applicant or recipient, if the Secretary determines that such an award is not in the best interests of the United States.

(2) NON-DELEGABLE.—The Secretary may not delegate a determination made under paragraph (1).

(g) AUTHORIZATION OF APPROPRIATIONS.—

(1) FELLOWSHIPS.—There are authorized to be appropriated to award fellowships under this section—

- (A) \$4,500,000 for 100 fellowships for fiscal year 2007;
- (B) \$9,300,000 for 200 fellowships for fiscal year 2008 (including non-expiring fellowships for the prior fiscal year);
- (C) \$14,500,000 for 300 fellowships for fiscal year 2009 (including non-expiring fellowships for prior fiscal years);
- (D) \$25,000,000 for 500 fellowships for fiscal year 2010 (including non-expiring fellowships for prior fiscal years);
- (E) \$35,500,000 for 700 fellowships for fiscal year 2011 (including non-expiring fellowships for prior fiscal years);
- (F) \$52,500,000 for 1,000 fellowships for fiscal year 2012 (including non-expiring fellowships for prior fiscal years); and
- (G) \$54,000,000 for 1,000 fellowships for fiscal year 2013 (including non-expiring fellowships for prior fiscal years).

(2) ADMINISTRATION.—There are authorized to be appropriated for administrative expenses incurred in carrying out this section—

- (A) \$1,000,000 for each of fiscal years 2007 and 2008;
- (B) \$1,000,000 for fiscal year 2008;
- (C) \$1,500,000 for fiscal year 2009;
- (D) \$2,500,000 for fiscal year 2010;
- (E) \$3,500,000 for fiscal year 2011;
- (F) \$5,500,000 for fiscal year 2012; and
- (G) \$5,500,000 for fiscal year 2013.

#### SEC. 9. TITLE IX COMPLIANCE.

(a) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary of Energy shall submit to the Committee on Energy and Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report that describes actions taken by the Department of Energy to implement the recommendations in the report of the Government Accountability Office numbered 04–639.

(b) COMPLIANCE.—To comply with title IX of the Education Amendments of 1972 (20 U.S.C. 1681 et seq.), the Secretary of Energy shall annually conduct compliance reviews of at least 2 recipients of Department of Energy grants.

#### PURPOSE OF THE MEASURE

The purpose of S. 2197 is to improve the global competitiveness of the United States in science and energy technology, to strengthen basic research programs at the Department of Energy, and to provide support for mathematics and science education at all levels through the resources available through the Department of Energy, including at the National Laboratories.

#### SUMMARY OF MAJOR PROVISIONS

S. 2197 broadens the Department of Energy’s existing responsibilities in mathematics and science education. The Act establishes a Director of Mathematics, Science, and Engineering Education at the Department. Other provisions authorize staff of the National Laboratories to assist in teaching at statewide specialty schools in mathematics and science, and to use National Laboratory equipment in support of these efforts. The Act establishes internship programs at the National Laboratories, and requires each National Laboratory to establish a Center of Excellence at one public secondary school in each region for the purpose of strengthening mathematics and science education. Another provision establishes

summer institutes, hosted by National Laboratories, to provide training for mathematics and science teachers on best practices.

The Act establishes the Advanced Research Projects Authority-Energy, to overcome the long-term and high-risk technological barriers to the development of applied energy technologies (including carbon neutral technologies), which hinder the successful implementation of the technologies in commercial markets.

#### BACKGROUND AND NEED

The National Academy of Sciences and the National Academy of Engineering Councils, at their joint meeting in February 2005, examined the position of the United States in the context of the global knowledge and discovery enterprise. Participants expressed concern that a weakening of science and technology in the United States would inevitably degrade its social and economic conditions and in particular erode the ability of its citizens to compete for high-quality jobs. Based on the urgency expressed by the council, the National Academies' Committee on Science, Engineering, and Public Policy was charged with organizing a planning meeting, which took place on May 11, 2005. Speaking at that meeting, Senator Lamar Alexander indicated that the Energy Subcommittee of the Senate Committee on Energy and Natural Resources, which he chairs, had been given authority by the full committee's chair, Senator Pete V. Domenici, to hold a series of hearings to identify specific steps that the federal government should take to ensure the pre-eminence of America's science and technology enterprise.

In a letter dated May 27, 2005, Senator Alexander and Senator Jeff Bingaman requested that the National Academy of Sciences undertake a formal study on the issue and identify the ten most important policy measures that could best ensure future U.S. competitiveness. The Academy subsequently formed a committee of twenty individuals including leaders in industry, presidents of American universities, and retired Federal officials. The resulting report, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, was released in September 2005.

The *Gathering Storm* provided twenty specific recommendations for policy action. These recommendations pertained to kindergarten through twelfth grade education, higher education, research, workforce issues, immigration, and tax policy. The report emphasized that efforts to strengthen America's standing in science and technology were most likely to succeed if targeted toward a central goal. The Academy committee recommended that this goal should be two-fold: to create high technology jobs in the United States, and to ensure that the United States maintains a lasting supply of clean, affordable, and reliable energy.

Senator Domenici, Senator Bingaman and Senator Alexander developed legislation to address the twenty recommendations included in *The Gathering Storm*. The result was a legislative package of three bills (S. 2197, S. 2198, and S. 2199) introduced on January 26, 2006. Those recommendations requiring action by the Department of Energy were included in S. 2197.

## LEGISLATIVE HISTORY

S. 2197 was introduced by Senator Domenici for himself, Mr. Bingaman, Mr. Alexander, Ms. Mikulski, Mr. Lugar, Mr. Dodd, Mr. Hatch, Mr. Obama, Mr. Warner, Mr. Lieberman, Mr. Bond, Mrs. Murray, Mr. Burns, Mr. Bayh, Mr. Craig, Ms. Cantwell, Mrs. Hutchison, Mr. Menendez, Mr. DeWine, Mr. Kohl, Mr. Thomas, Mr. Kerry, Mr. Smith, Mr. Nelson of Florida, Mr. Voinovich, Mr. Leahy, Mr. Allen, Mr. Akaka, Mr. Talent, Mrs. Clinton, Mr. Chambliss, Ms. Stabenow, Mr. Cornyn, Mr. Dayton, Mr. Coleman, Mr. Salazar, Mr. Martinez, Mr. Inouye, Mr. Stevens, Mr. Biden, Mr. Cochran, Mr. Hagel, Ms. Murkowski, Mr. Pryor, Ms. Collins, Mr. Vitter, and Ms. Landrieu on January 26, 2006. The Committee on Energy and Natural Resources held a hearing on S. 2197 on February 15, 2006. At the business meeting on March 8, 2006, the Committee on Energy and Natural Resources ordered S. 2197, as amended, favorably reported.

## COMMITTEE RECOMMENDATION

The Committee on Energy and Natural Resources, in open business session on March 8, 2006, by a unanimous voice vote of a quorum present, recommends that the Senate pass S. 2197, if amended as described herein.

## COMMITTEE AMENDMENTS

During the consideration of S. 2197, the Committee adopted an amendment in the nature of a substitute. The amendment makes technical corrections; authorizes the nuclear science talent expansion program for institutions of higher education, the Advanced Research Projects Authority-Energy, Discovery Science and Engineering Innovation Institutes, and the Protecting America's Competitive Edge (PACE) Graduate Fellowship Program; and ensures Department of Energy compliance with Title IX of the Education Amendments of 1972. The Committee first adopted a second-degree amendment to the substitute to require the Department of Energy to increase, to the maximum extent practicable, the participation and advancement of women and under-represented minorities in every level of science, technology, engineering, and mathematics education.

## SECTION-BY-SECTION ANALYSIS

*Section 1* provides the short title for the Act.

*Section 2* provides definitions of key terms used in the Act.

*Section 3* amends the Department of Energy Science Education Enhancement Act.

*Subsection 3(a)* adds a new section 3164(b), which directs the Secretary to appoint a Director of Mathematics, Science, and Mathematics Education with the principle responsibility for administering the mathematics, science, and engineering education programs of the Department. The new subsection 3164(b) also describes the qualifications and duties of the Director, authorizes staff and resources to be provided to the Director, and requires the Secretary to enter into an arrangement with the National Academy of Sciences to assess the Department's mathematics, science, and

engineering programs not later than five years and not later than ten years after enactment.

*Subsection 3(b)* adds a new definition of the term “National Laboratory” to section 3168 of the Department of Energy Science Education Enhancement Act.

*Subsection 3(c)* adds a new Subpart B, containing 6 new chapters, to the Department of Energy Science Education Enhancement Act. *Chapter 1*, section 3171, authorizes the Director to create a program using scientific and engineering staff of the National Laboratories to assist in teaching courses in statewide specialty schools that provide comprehensive mathematics and science (including engineering) education, and using National Laboratory scientific equipment in the teaching of courses. *Chapter 2*, section 3172, directs the Secretary to establish a summer internship program for middle school and secondary school students at the National Laboratories, and to establish outreach and experiential-based learning projects for minority students. The Secretary is encouraged to carry out such programs in States with significant representation (fifteen percent or more) of both Hispanic and African American students in their public schools. *Chapter 3*, Section 3181, directs the Secretary to establish a program to support a Center of Excellence in Mathematics and Science at one public secondary school located in the region of the National Laboratory. *Chapter 4*, Sec. 3185, directs the Secretary to establish or expand a program of summer institutes at each of the National Laboratories to provide additional training to strengthen the mathematics, science, and hands-on learning teaching skills of teachers employed at public schools in kindergarten through grade 12 education, with a particular focus on teachers of kindergarten through grade 8. *Chapter 5*, Section 3191, directs the Secretary to establish a program to support the appointment of up to one hundred distinguished scientists at the National Laboratories. *Chapter 6*, Section 3195, directs the Secretary to establish a program to expand or enhance the nuclear science capabilities of institutions of higher education.

*Section 4* authorizes research grants for early-career scientists and engineers for purposes of pursuing independent research. Early-career scientists and engineers are defined as individuals who have completed a doctorate or other terminal degree not more than 10 years before the date of application for a grant authorized under this section, and have demonstrated promise in the field of science, technology, engineering, mathematics, computer science, or computational science. Grants awarded under this section are for 5 years at a level of \$100,000 per year during the grant period.

*Section 5* establishes the Advanced Research Programs Authority—Energy (ARPA-E).

*Subsection 5(a)* provides definitions for the terms “advisory board”, “applied energy technologies”, and “director”.

*Subsection 5(b)* directs the Secretary to establish the Advanced Research Programs Authority—Energy (ARPA-E) to overcome the long-term and high-risk technological barriers in the development of applied energy technologies (including carbon neutral technologies) that hinder the successful implementation of the technologies in commercial markets.

*Subsection 5(c)* requires the Secretary to appoint a director, who by reason of professional background or experience, is especially

qualified to advise the Secretary on matters pertaining to long-term, high-risk technological barriers to the development of applied energy technologies in commercial markets.

*Subsection 5(d)* requires that, consistent with the Federal Advisory Committee Act (5 U.S.C. App.), the Secretary shall establish, and appoint members to, an Advisory Board to make recommendations to the Secretary and the Director on actions necessary to carry out this section. Subsection 5(d) further requires the Advisory Board to recommend to the Secretary and to the Director, each fiscal year and in order of priority, proposals of applied energy programs of the Department that are critical to overcoming long-term and high-risk technological barriers to enable the successful development of applied energy technologies in commercial markets. The Advisory Board may include additional programs not covered in the Department's submitted proposals that the Board determines to be critical to overcoming long-term and high-risk technological barriers.

*Section 6* provides authorizations of appropriations for the Department of Energy Office of Science for fiscal years 2010 through 2013.

*Section 7* requires the Secretary to establish distributed, multidisciplinary institutes centered at National Laboratories to apply fundamental science and engineering discoveries to technological innovations for the creation of products, processes, and services related to the missions of the Department and the global competitiveness of the United States. The Institutes are required to support scientific and engineering research and education activities on critical emerging technologies determined by the Secretary to be essential to global competitiveness.

*Section 8* requires the Secretary to establish a graduate fellowship program for students pursuing doctoral degrees in mission areas of the Department. The section requires that students be selected for the fellowship program through a competitive merit review process (involving written and oral interviews) that will result in a wide distribution of awards throughout the United States. A fellowship awarded under this section shall provide an annual living stipend, graduate tuition at an institution of higher education; and incidental expenses associated with curricula and research at the institution of higher education (including books, computers and software). The Committee notes that in similar fellowship programs, such tuition rates are generally negotiated between Federal agency providing the fellowship and the Institution of Higher Education. The Fellowships awarded under this section shall be for a period of not longer than 5 years. Fellowships awarded under this section shall be portable with the fellow.

*Section 9* requires that not later than 180 days after the date of enactment of this Act, the Secretary of Energy shall submit to the Committee on Energy and Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report that describes actions taken by the Department of Energy to implement the recommendations in the report of the Government Accountability Office numbered 04-639. The section further requires that to comply with title IX of the Education Amendments of 1972 (20 U.S.C. 1681 et seq.), the Secretary shall

annually conduct compliance reviews of at least 2 recipients of Department of Energy grants.

#### COST AND BUDGETARY CONSIDERATIONS

The Congressional Budget Office estimate of the costs of this measure has been requested but was not received at the time the report was filed. When the report is available, the Chairman will request it to be printed in the Congressional Record for the advice of the Senate.

#### REGULATORY IMPACT EVALUATION

In compliance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee makes the following evaluation of the regulatory impact which would be incurred in carrying out S. 2197. The bill is not a regulatory measure in the sense of imposing Government-established standards or significant economic responsibilities on private individuals and businesses.

The Secretary may need to collect some personal information from applicants for the internships, grants, scholarships, and fellowships authorized by S. 2197. The Committee expects the Secretary to limit the collection of personal information to the minimum amount needed to adequately administer the programs, and therefore anticipates little impact on personal privacy.

Enactment of S. 2197 will result in the production of various applications, reports, and performance assessments necessary to the administration of the various programs authorized by the bill. Again, the Committee expects the Secretary to limit paperwork requirements to the minimum amount needed to adequately administer the program.

#### EXECUTIVE COMMUNICATIONS

At a hearing before the Committee on Energy and Natural Resources on February 15, 2006, the Department of Energy provided the following testimony with respect to S. 2197:

##### STATEMENT OF RAYMOND L. ORBACH, DIRECTOR OF THE OFFICE OF SCIENCE, DEPARTMENT OF ENERGY

Good morning, Chairman Domenici, Ranking Member Bingaman, and members of the Committee. I am pleased to appear before you to discuss S. 2197, the Protecting America's Competitive Edge through Energy Act of 2006—also known as the PACE–Energy Act—which you introduced on January 26th.

The President's American Competitiveness Initiative (ACI), unveiled in his State of the Union message, demonstrates the President's strong commitment to continued U.S. competitiveness through a renewed national effort in basic scientific research and math education. To repeat the President's own words: "We must continue to lead the world in human talent and creativity. Our greatest advantage in the world has always been our educated, hard-working, ambitious people—and we're going to keep that edge. Tonight I announce an American Competitiveness

Initiative, to encourage innovation throughout our economy, and to give our nation's children a firm grounding in math and science.”

The State of the Union message, and the subsequent release of the President's FY 2007 budget that contains substantial increases for basic research in the physical sciences, are all part of the strategy. America's competitiveness is truly a result of the ingenuity of the American people. This native ingenuity can be nurtured and brought to fruition through the precise application of the President's ACT.

The FY 2007 budget includes a \$505 million increase in DOE's Science programs, which is part of a commitment to double funding for certain high-leverage science agencies over the next ten years. The ACI recognizes that scientific discovery and understanding help drive economic strength and security. Developing revolutionary, science-driven technology is at the heart of the Department of Energy's mission. The increase proposed for the Department's Science programs reflects the significant contribution DOE and its world-class research facilities make to the Nation.

The President's ACI will encourage American innovation and bolster our ability to compete in the global economy through increased federal investment in critical areas of research, especially in the physical sciences and engineering, in large part through DOE's Office of Science. This initiative will generate scientific and technological advances for decades to come and will help ensure that future generations have an even brighter future. The Office of Science is educating and training our next generation of scientists and engineers. Roughly half of the researchers at Office of Science-run facilities are university faculty or graduate or postdoctoral students (who work side by side with scientists and researchers employed directly by the labs), and about a third of Office of Science research funds go to institutions of higher learning.

Finally, the Administration welcomes the opportunity to discuss with Congress methods to accelerate progress in promising energy technologies, some of which may well require breakthroughs in basic science research. These important concerns were articulated very clearly in the Augustine Report. The specific proposal for the creation of an ARPA-E is not in the President's budget, and we have concerns about the creation of this additional mechanism, the resources that would be required to fund it, and whether there might be alternative and better ways to accomplish its goals. However, we are ready to work with you to explore these questions.

The DOE's Office of Science is the steward of government funding for the physical sciences in this country. We operate 10 national laboratories, and a number of scientific facilities, that provide superb facilities for the Nation's scientists, allowing them to perform multi-disciplinary scientific research at the frontiers of discovery. Yet, it falls to us to inspire our young people with the possibilities of

science, mathematics, and engineering at DOE facilities, if we are to maintain our edge.

I thank the Chair and the committee for this opportunity to testify and look forward to answering any questions you may have.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill S. 2197, as ordered reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

**DEPARTMENT OF ENERGY SCIENCE EDUCATION  
ENHANCEMENT ACT**

**PART E OF TITLE XXXI OF PUBLIC LAW 101-510, AS  
AMENDED (42 U.S.C. 7381-7381E)**

**SEC. 3161. SHORT TITLE.**

This part may be cited as the “Department of Energy Science Education Enhancement Act”.

**SEC. 3162. FINDINGS AND PURPOSES.**

\* \* \* \* \*

(b) PURPOSES.—The purposes of this part are—

(1) to encourage the development and implementation of science, mathematics, and engineering education programs at the Department of Energy and at its research and development facilities as part of a national effort to improve science, mathematics, and engineering education; and

(2) to provide more efficient coordination among science, mathematics, and engineering education programs.

***Subpart A—Science Education Enhancement***

\* \* \* \* \*

**SEC. 3164. SCIENCE EDUCATION PROGRAMS.**

(a) PROGRAMS.—The Secretary is authorized to establish programs to enhance the quality of mathematics, science, and engineering education. Any such programs shall be operated at or through the support of Department research and development facilities, shall use the scientific resources of the Department, and shall be consistent with the overall Federal plan for education and human resources in science and technology developed by the Federal Coordinating Council for Science, Engineering, and Technology.

(b) ORGANIZATION OF MATHEMATICS, SCIENCE, AND ENGINEERING EDUCATION PROGRAMS.—

(1) DIRECTOR OF MATHEMATICS, SCIENCE AND ENGINEERING EDUCATION.—*The Secretary, acting through the Under Secretary for Science (referred to in this subsection as the “Under Secretary”), shall appoint a Director of Mathematics, Science, and Engineering Education (referred to in this subsection as the “Director”) with the principal responsibility for administering*

*mathematics, science, and engineering education programs of the Department.*

(2) **QUALIFICATIONS.**—*The Director shall be an individual, who by reason of professional background and experience, is specially qualified to advise the Under Secretary on all matters pertaining to mathematics, science, and engineering education at the Department.*

(3) **DUTIES.**—*The Director shall—*

(A) *oversee all mathematics, science, and engineering education programs of the Department;*

(B) *represent the Department as the principal interagency liaison for all mathematics, science, and engineering education programs, unless otherwise represented by the Secretary or the Under Secretary;*

(C) *prepare the annual budget and advise the Under Secretary on all budgetary issues for mathematics, science, and engineering education programs of the Department;*

(D) *increase, to the maximum extent practicable, the participation and advancement of women and underrepresented minorities at every level of science, technology, engineering, and mathematics education; and*

(E) *perform other such matters related to mathematics, science, and engineering education as are required by the Secretary or the Under Secretary.*

(4) **STAFF AND OTHER RESOURCES.**—*The Secretary shall assign to the Director such personnel and other resources as the Secretary considers necessary to permit the Director to carry out the duties of the Director.*

(5) **ASSESSMENT.**—*The Secretary shall offer to enter into a contract with the National Academy of Sciences under which the National Academy, not later than 5 years after, and not later than 10 years after, the date of enactment of this paragraph, shall assess the performance of the mathematics, science, and engineering education programs of the Department.*

(6) **AUTHORIZATION OF APPROPRIATIONS.**—*There are authorized to be appropriated such sums as are necessary to carry out this subsection.*

**[(b)] (c) RELATIONSHIP TO OTHER DEPARTMENT ACTIVITIES.**—*The programs described in subsection (a) shall supplement and be coordinated with current activities of the Department, but shall not supplant them.*

**[(c) SCIENCE EDUCATION ENHANCEMENT FUND.**—*The Secretary shall use not less than 0.3 percent of the amount made available to the Department for research, development, demonstration, and commercial application for fiscal year 2006 and for each fiscal year thereafter to carry out activities authorized by this part.*】

**(d) MATHEMATICS, SCIENCE, AND ENGINEERING EDUCATION FUND.**—*The Secretary shall establish a Mathematics, Science, and Engineering Education Fund, using not less than 0.3 percent of the amount made available to the Department for research, development, demonstration, and commercial application for each fiscal year, to carry out sections 3165, 3166, and 3167.*

**[(d)] (e) PROGRAMS FOR STUDENTS FROM UNDER-REPRESENTED GROUPS.**—*In carrying out a program under subsection (a), the Secretary shall give priority to activities that are designed to encour-*

age students from under-represented groups to pursue scientific and technical careers.

\* \* \* \* \*

**SEC. 3168. DEFINITIONS.**

\* \* \* \* \*

(4) The Term “local education agency” has the meaning given that term by section 1471(12) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2891(12)).

(5) *NATIONAL LABORATORY.*—*The term “National Laboratory” has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).*

**SEC. 3169. AUTHORIZATION OF APPROPRIATIONS.**

There are authorized to be appropriated to the Secretary for carrying out university research support and other science, mathematics, and engineering education programs authorized by this [part] *subpart* and administered by the Office of Science of the Department of Energy, \$40,000,000 for fiscal year 1991; and \$40,000,000 for each of fiscal years 2004 through 2008.

***Subpart B—Mathematics, Science, and Engineering Education Programs***

**SEC. 3170. DEFINITIONS.**

*In this subpart:*

(1) *DIRECTOR.*—*The term “Director” means the Director of Mathematics, Science, and Engineering Education.*

(2) *NATIONAL LABORATORY.*—*The term “National Laboratory” has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).*

**CHAPTER 1—ASSISTANCE FOR SPECIALTY SCHOOLS FOR MATHEMATICS AND SCIENCE**

**SEC. 3171. ASSISTANCE FOR SPECIALTY SCHOOLS FOR MATHEMATICS AND SCIENCE.**

(a) *IN GENERAL.*—*Consistent with sections 3165 and 3166, the Director shall make available necessary funds for a program using scientific and engineering staff of the National Laboratories, in which the staff—*

(1) *assists teaching courses at statewide specialty secondary schools that provide comprehensive mathematics and science (including engineering) education; and*

(2) *uses National Laboratory scientific equipment in the teaching of the courses.*

(b) *REPORT TO CONGRESS.*—*Not later than 2 years after the date of enactment of the Protecting America’s Competitive Edge Through Energy Act of 2006, the Director shall submit a report to the appropriate committees of Congress detailing the impact of the activities assisted with funds made available under this section.*

**CHAPTER 2—EXPERIENTIAL-BASED LEARNING OPPORTUNITIES**

**SEC. 3175. EXPERIENTIAL-BASED LEARNING OPPORTUNITIES.**

(a) *INTERNSHIPS AUTHORIZED.*—From the amounts authorized under subsection (e), the Secretary, acting through the Director, shall establish a summer internship program for middle school and secondary school students that shall—

(1) provide the students with internships at the National Laboratories; and

(2) promote experiential, hands-on learning in mathematics or science.

(b) *ELIGIBILITY CRITERIA.*—The Director shall establish criteria to determine the sufficient level of academic preparedness necessary for a student to be eligible for an internship under this section.

(c) *PRIORITY.*—

(1) *IN GENERAL.*—The Director shall give priority for an internship under this section to a student who meets the eligibility criteria described in subsection (b) and who attends a school—

(A)(i) in which not less than 30 percent of the children enrolled in the school are from low-income families; or

(ii) that is designated with a school locale code of 7 or 8 or otherwise designated as a rural school, as determined by the Secretary of Education; and

(B) for which there is—

(i) a high percentage of teachers who are not teaching in the academic subject areas or grade levels in which the teachers were trained to teach;

(ii) a high teacher turnover rate; or

(iii) a high percentage of teachers with emergency, provisional, or temporary certification or licenses.

(2) *COORDINATION.*—The Director shall consult with the Secretary of Education in order to determine whether a student meets the priority requirements of this subsection.

(d) *OUTREACH AND EXPERIENTIAL-BASED PROGRAMS FOR MINORITY STUDENTS.*—

(1) *IN GENERAL.*—The Secretary, acting through the Director, in cooperation with Hispanic-serving institutions, historically black colleges and universities, tribal colleges, and other minority-serving institutions and nonprofit entities with substantial experience relating to outreach and experiential-based learning projects, shall establish outreach and experiential-based learning programs that will encourage underrepresented minority students in kindergarten through grade 12 to pursue careers in math, science, and engineering.

(2) *COMMUNITY INVOLVEMENT.*—The Secretary shall ensure that the programs established under paragraph (1) involve, to the maximum extent practicable—

(A) participation by parents and educators; and

(B) the establishment of partnerships with business organizations and appropriate Federal State, and local agencies.

(3) *DISTRIBUTION.*—The Secretary shall ensure that the programs established under paragraph (1) are located in various

*geographic regions of the United States, to the maximum extent practicable.*

(e) *AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to carry out this section \$50,000,000 for each of the fiscal years 2007 through 2013.*

### **CHAPTER 3—NATIONAL LABORATORIES CENTERS OF EXCELLENCE IN MATHEMATICS AND SCIENCE EDUCATION**

#### **SEC. 3181. NATIONAL LABORATORIES CENTERS OF EXCELLENCE IN MATHEMATICS AND SCIENCE EDUCATION.**

(a) *IN GENERAL.—The Secretary shall establish at each of the National Laboratories a program to support a Center of Excellence in Mathematics and Science at 1 public secondary school located in the region of the National Laboratory to provide assistance in accordance with subsection (c).*

(b) *GOALS.—The Secretary shall establish goals and performance assessments for each Center of Excellence authorized under subsection (a).*

(c) *ASSISTANCE.—Consistent with sections 3165 and 3166, the Director shall make available necessary funds for a program using scientific and engineering staff of the National Laboratories, during which the staff—*

(1) *assists teaching courses at the Centers of Excellence in Mathematics and Science; and*

(2) *uses National Laboratory scientific equipment in the teaching of the courses.*

(d) *EVALUATION.—The Secretary shall consider the results of the performance assessments required under subsection (b) in any performance review of a National Laboratories management and operations contractor.*

### **CHAPTER 4—SUMMER INSTITUTES**

#### **SEC. 3185. SUMMER INSTITUTES.**

(a) *DEFINITION OF SUMMER INSTITUTE.—In this section, the term “summer institute” means an institute at a National Laboratory, conducted during the summer, that—*

(1) *is conducted for a period of not less than 2 weeks;*

(2) *includes, as a component, a program that provides direct interaction between students and faculty; and*

(3) *provides for follow-up training during the academic year.*

(b) *SUMMER INSTITUTE PROGRAMS AUTHORIZED.—The Secretary, acting through the Director, shall establish or expand program of summer institutes at each of the National Laboratories to provide additional training to strengthen the mathematics and science teaching skills of teachers employed at public schools in kindergarten through grade 12 education, with a particular focus on teachers of kindergarten through grade 8.*

### **CHAPTER 5—DISTINGUISHED SCIENTIST PROGRAM**

#### **SEC. 3191. DISTINGUISHED SCIENTIST PROGRAM.**

(a) *PURPOSE.—The purpose of this section is to promote scientific and academic excellence at National Laboratories.*

(b) *ESTABLISHMENT.*—The Secretary, acting through the Director and in consultation with the Director of the Office of Science, shall establish a program to support the appointment of distinguished scientists by National Laboratories.

(c) *QUALIFICATIONS.*—Successful candidates under this section shall be persons who, by reason of professional background and experience, are able to bring international recognition to the appointing National Laboratory in their field of scientific endeavor.

(d) *SELECTION.*—A distinguished scientist appointed under this section shall be selected through an open peer review process.

(e) *APPOINTMENT.*—An appointment by a National Laboratory under this section shall be at the rank of the highest grade of distinguished scientist or technical staff of the National Laboratory.

(f) *DURATION.*—An appointment under this section shall be for 6 years, consisting of 2 3-year funding allotments.

(g) *USE OF FUNDS.*—Funds made available under this section may be used for—

- (1) the salary of the distinguished scientist and support staff;
- (2) undergraduate, graduate, and post-doctoral appointments;
- (3) research-related equipment;
- (4) professional travel; and
- (5) such other requirements as the Director determines are necessary to carry out the purpose of the program.

(h) *REVIEW.*—

(1) *IN GENERAL.*—The appointment of a distinguished scientist under this section shall be reviewed at the end of the first 3-year allotment for the distinguished scientist through an open peer review process to determine if the appointment is meeting the purpose of this section under subsection (a).

(2) *FUNDING.*—Funding of the appointment of the distinguished scientist for the second 3-year allotment shall be determined based on the review conducted under paragraph (1).

## **CHAPTER 6—NUCLEAR SCIENCE EDUCATION**

### **SEC. 3195. NUCLEAR SCIENCE TALENT EXPANSION PROGRAM FOR INSTITUTIONS OF HIGHER EDUCATION.**

(a) *PURPOSES.*—The purposes of this section are—

- (1) to address the decline in the number of and resources available to nuclear science programs of institutions of higher education; and
- (2) to increase the number of graduates with degrees in nuclear science, an area of strategic importance to the economic competitiveness and energy security of the United States.

(b) *DEFINITION OF NUCLEAR SCIENCE.*—In this section, the term “nuclear science” includes—

- (1) nuclear science;
- (2) nuclear engineering;
- (3) nuclear chemistry;
- (4) radiochemistry; and
- (5) health physics.

(c) *ESTABLISHMENT.*—The Secretary, acting through the Director shall establish in accordance with this section a program to expand and enhance Institution of Higher Education nuclear science educational capabilities.

(d) *NUCLEAR SCIENCE PROGRAM EXPANSION GRANTS FOR INSTITUTIONS OF HIGHER EDUCATION.*—

(1) *IN GENERAL.*—*The Secretary, acting through the Director, shall award up to 3 competitive grants for each fiscal year to institutions of higher education that establish new academic degree programs in nuclear science.*

(2) *ELIGIBILITY.*—*To be eligible for a grant under this subsection, an applicant shall partner with a National Laboratory or other eligible nuclear entity, as determined by the Secretary.*

(3) *CRITERIA.*—*Criteria for a grant awarded under this subsection shall be based on—*

(A) *the potential to attract new students to the program;*

(B) *academic rigor; and*

(C) *the ability to offer hands-on learning opportunities.*

(4) *DURATION AND AMOUNT.*—

(A) *DURATION.*—*A grant under this subsection shall be 5 years in duration.*

(B) *AMOUNT.*—*An Institution of Higher Education that receives a grant under this subsection shall be eligible for up to \$500,000 for each year of the grant period.*

(5) *USE OF FUNDS.*—*An Institution of Higher Education that receives a grant under this subsection may use the grant to—*

(A) *recruit and retain new faculty;*

(B) *develop core and specialized course content;*

(C) *encourage collaboration between faculty and researchers in the nuclear science field; or*

(D) *support outreach efforts to recruit students.*

(e) *NUCLEAR SCIENCE COMPETITIVENESS GRANTS FOR INSTITUTIONS OF HIGHER EDUCATION.*—

(1) *IN GENERAL.*—*The Secretary, acting through the Director shall award up to 10 competitive grants for each fiscal year to institutions of higher education with existing academic degree programs that produce graduates in nuclear science.*

(2) *CRITERIA.*—*Criteria for a grant awarded under this subsection shall be based on the potential for increasing the number and academic quality of graduates in the nuclear sciences that enter into careers in nuclear-related fields.*

(3) *DURATION AND AMOUNT.*—

(A) *DURATION.*—*A grant under this subsection shall be 5 years in duration.*

(B) *AMOUNT.*—*An Institution of Higher Education that receives a grant under this subsection shall be eligible for up to \$250,000 for each year of the grant period.*

(4) *USE OF FUNDS.*—*An Institution of Higher Education that receives a grant under this subsection may use the grant to—*

(A) *increase the number of graduates in nuclear science that enter into careers in the nuclear science field;*

(B) *enhance the teaching of advanced nuclear technologies*

(C) *aggressively pursue collaboration opportunities with industry and National Laboratories; and*

(D) *bolster or sustain nuclear infrastructure and research facilities of the Institution of Higher Education, such as research and training reactors or laboratories.*

(f) *NUCLEAR SCIENCE TALENT EXPANSION SCHOLARSHIPS.*—

(1) *IN GENERAL.*—The Secretary, acting through the Director, shall award up to 150 competitive scholarships for each fiscal year to be used to provide for educational expenses for students at eligible institutions of higher education who enter into academic degree programs in nuclear science.

(2) *CRITERIA.*—Scholarships under this subsection shall be awarded competitively based on academic merit.

(3) *DURATION AND AMOUNT.*—

(A) *DURATION.*—Scholarship assistance under this subsection may be awarded for up to 4 years.

(B) *AMOUNT.*—A student who receives a grant under this subsection shall be eligible for up to \$40,000 for each year of the scholarship period to be used for educational expenses (including tuition, books, fees, equipment, room, and board).

(4) *TERMINATION.*—A student who receives a scholarship under this subsection but fails to maintain appropriate academic achievement for a year, as determined by the Director, shall not be eligible for a scholarship under this subsection for subsequent years.

(5) *INTERNSHIP.*—The Secretary shall ensure that each student who receives a scholarship under this subsection, has the opportunity to participate in an internship at a National Laboratory during the course of study of the student.

(g) *AUTHORIZATION OF APPROPRIATIONS.*—

(1) *NUCLEAR SCIENCE PROGRAM EXPANSION GRANTS FOR INSTITUTIONS OF HIGHER EDUCATION.*—There are authorized to be appropriated to carry out subsection (d)—

(A) \$1,500,000 for fiscal year 2007;

(B) \$3,000,000 for fiscal year 2008;

(C) \$4,500,000 for fiscal year 2009;

(D) \$6,000,000 for fiscal year 2010; and

(E) \$7,500,000 for fiscal year 2011.

(2) *NUCLEAR SCIENCE COMPETITIVENESS GRANTS FOR INSTITUTIONS OF HIGHER EDUCATION.*—There are authorized to be appropriated to carry out subsection (e)—

(A) \$2,500,000 for fiscal year 2007;

(B) \$5,000,000 for fiscal year 2008;

(C) \$7,500,000 for fiscal year 2009;

(D) \$10,000,000 for fiscal year 2010; and

(E) \$12,500,000 for fiscal year 2011.

(3) *NUCLEAR SCIENCE TALENT EXPANSION SCHOLARSHIPS.*—There are authorized to be appropriated to carry out subsection (f)—

(A) \$6,000,000 for fiscal year 2007;

(B) \$12,000,000 for fiscal year 2008;

(C) \$18,000,000 for fiscal year 2009;

(D) \$24,000,000 for fiscal year 2010; and

(E) \$30,000,000 for fiscal year 2011.

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**ENERGY POLICY ACT OF 2005 (P. L. 109-58)**

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**SEC. 971. SCIENCE.**

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(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out research, development, demonstration, and commercial application activities of the Office of Science, including activities authorized under this subtitle (including the amounts authorized under the amendment made by section 976(b) and including basic energy sciences, advanced scientific and computing research, biological and environmental research, fusion energy sciences, high energy physics, nuclear physics, research analysis, and infrastructure support)—

- (1) \$4,153,000,000 for fiscal year 2007;
- (2) \$4,586,000,000 for fiscal year 2008; **[and]**
- (3) \$5,200,000,000 for fiscal year 2009**[.]**;
- (4) \$5,320,000,000 for fiscal year 2010;
- (5) \$5,851,000,000 for fiscal year 2011;
- (6) \$6,436,000,000 for fiscal year 2012; and
- (7) \$7,080,000,000 for fiscal year 2013.

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