

108TH CONGRESS
2D SESSION

H. R. 4500

To provide for energy research and development.

IN THE HOUSE OF REPRESENTATIVES

JUNE 3, 2004

Mr. BOEHLERT (for himself and Mrs. BIGGERT) introduced the following bill; which was referred to the Committee on Science, and in addition to the Committees on Resources and the Budget, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To provide for energy research and development.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Energy Science Act
5 of 2004”.

6 **TITLE I—RESEARCH AND**
7 **DEVELOPMENT**

8 **SEC. 101. GOALS.**

9 (a) IN GENERAL.—The Secretary shall conduct a bal-
10 anced set of programs of energy research, development,

1 demonstration, and commercial application to support
2 Federal energy policy and programs by the Department.

3 Such programs shall be focused on—

4 (1) increasing the efficiency of all energy inten-
5 sive sectors through conservation and improved tech-
6 nologies;

7 (2) promoting diversity of energy supply;

8 (3) decreasing the Nation’s dependence on for-
9 eign energy supplies;

10 (4) improving United States energy security;
11 and

12 (5) decreasing the environmental impact of en-
13 ergy-related activities.

14 (b) GOALS.—The Secretary shall publish measurable
15 5-year cost and performance-based goals with each annual
16 budget submission in at least the following areas:

17 (1) Energy efficiency for buildings, energy-con-
18 suming industries, and vehicles.

19 (2) Electric energy generation (including dis-
20 tributed generation), transmission, and storage.

21 (3) Renewable energy technologies including
22 wind power, photovoltaics, solar thermal systems,
23 geothermal energy, hydrogen-fueled systems, bio-
24 mass-based systems, biofuels, and hydropower.

1 (4) Fossil energy including power generation,
2 onshore and offshore oil and gas resource recovery,
3 and transportation.

4 (5) Nuclear energy including programs for ex-
5 isting and advanced reactors and education of future
6 specialists.

7 (c) PUBLIC COMMENT.—The Secretary shall provide
8 mechanisms for input on the annually published goals
9 from industry, university, and other public sources.

10 (d) EFFECT OF GOALS.—

11 (1) NO NEW AUTHORITY OR REQUIREMENT.—
12 Nothing in subsection (a) or the annually published
13 goals shall—

14 (A) create any new—

15 (i) authority for any Federal agency;

16 or

17 (ii) requirement for any other person;

18 (B) be used by a Federal agency to sup-
19 port the establishment of regulatory standards
20 or regulatory requirements; or

21 (C) alter the authority of the Secretary to
22 make grants or other awards.

23 (2) NO LIMITATION.—Nothing in this sub-
24 section shall be construed to limit the authority of
25 the Secretary to impose conditions on grants or

1 other awards based on the goals in subsection (a) or
2 any subsequent modification thereto.

3 **SEC. 102. DEFINITIONS.**

4 For purposes of this title:

5 (1) DEPARTMENT.—The term “Department”
6 means the Department of Energy.

7 (2) DEPARTMENTAL MISSION.—The term “de-
8 partmental mission” means any of the functions
9 vested in the Secretary of Energy by the Depart-
10 ment of Energy Organization Act (42 U.S.C. 7101
11 et seq.) or other law.

12 (3) INSTITUTION OF HIGHER EDUCATION.—The
13 term “institution of higher education” has the
14 meaning given that term in section 101(a) of the
15 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

16 (4) NATIONAL LABORATORY.—The term “Na-
17 tional Laboratory” means any of the following lab-
18 oratories owned by the Department:

19 (A) Ames Laboratory.

20 (B) Argonne National Laboratory.

21 (C) Brookhaven National Laboratory.

22 (D) Fermi National Accelerator Labora-
23 tory.

24 (E) Idaho National Engineering and Envi-
25 ronmental Laboratory.

1 (F) Lawrence Berkeley National Labora-
2 tory.

3 (G) Lawrence Livermore National Labora-
4 tory.

5 (H) Los Alamos National Laboratory.

6 (I) National Energy Technology Labora-
7 tory.

8 (J) National Renewable Energy Labora-
9 tory.

10 (K) Oak Ridge National Laboratory.

11 (L) Pacific Northwest National Labora-
12 tory.

13 (M) Princeton Plasma Physics Laboratory.

14 (N) Sandia National Laboratories.

15 (O) Stanford Linear Accelerator Center.

16 (P) Thomas Jefferson National Accelerator
17 Facility.

18 (5) NONMILITARY ENERGY LABORATORY.—The
19 term “nonmilitary energy laboratory” means the lab-
20 oratories listed in paragraph (4), except for those
21 listed in subparagraphs (G), (H), and (N).

22 (6) SECRETARY.—The term “Secretary” means
23 the Secretary of Energy.

24 (7) SINGLE-PURPOSE RESEARCH FACILITY.—
25 The term “single-purpose research facility” means

any of the primarily single-purpose entities owned by the Department or any other organization of the Department designated by the Secretary.

Subtitle A—Energy Efficiency

SEC. 104. ENERGY EFFICIENCY.

(a) IN GENERAL.—The following sums are authorized to be appropriated to the Secretary for energy efficiency and conservation research, development, demonstration, and commercial application activities, including activities authorized under this subtitle:

(1) For fiscal year 2004, \$616,000,000.

(2) For fiscal year 2005, \$695,000,000.

(3) For fiscal year 2006, \$772,000,000.

(4) For fiscal year 2007, \$865,000,000.

(5) For fiscal year 2008, \$920,000,000.

(b) ALLOCATIONS.—From amounts authorized under subsection (a), the following sums are authorized:

(1) For activities under section 105—

(A) for fiscal year 2004, \$20,000,000;

(B) for fiscal year 2005, \$30,000,000;

(C) for fiscal year 2006, \$50,000,000;

(D) for fiscal year 2007, \$50,000,000; and

(E) for fiscal year 2008, \$50,000,000.

(2) For activities under section 107—

(A) for fiscal year 2004, \$4,000,000; and

1 (B) for each of fiscal years 2005 through
2 2008, \$7,000,000.

3 (3) For activities under section 108—

4 (A) for fiscal year 2004, \$20,000,000;

5 (B) for fiscal year 2005, \$25,000,000;

6 (C) for fiscal year 2006, \$30,000,000;

7 (D) for fiscal year 2007, \$35,000,000; and

8 (E) for fiscal year 2008, \$40,000,000.

9 (4) For activities under section 109,
10 \$2,000,000 for each of fiscal years 2005 through
11 2008.

12 (c) EXTENDED AUTHORIZATION.—There are author-
13 ized to be appropriated to the Secretary for activities
14 under section 105, \$50,000,000 for each of fiscal years
15 2009 through 2013.

16 (d) LIMITATION ON USE OF FUNDS.—None of the
17 funds authorized to be appropriated under this section
18 may be used for—

19 (1) the issuance and implementation of energy
20 efficiency regulations;

21 (2) the Weatherization Assistance Program
22 under part A of title IV of the Energy Conservation
23 and Production Act (42 U.S.C. 6861 et seq.);

1 (3) the State Energy Program under part D of
2 title III of the Energy Policy and Conservation Act
3 (42 U.S.C. 6321 et seq.); or

4 (4) the Federal Energy Management Program
5 under part 3 of title V of the National Energy Con-
6 servation Policy Act (42 U.S.C. 8251 et seq.).

7 **SEC. 105. NEXT GENERATION LIGHTING INITIATIVE.**

8 (a) IN GENERAL.—The Secretary shall carry out a
9 Next Generation Lighting Initiative in accordance with
10 this section to support research, development, demonstra-
11 tion, and commercial application activities related to ad-
12 vanced solid-state lighting technologies based on white
13 light emitting diodes.

14 (b) OBJECTIVES.—The objectives of the initiative
15 shall be to develop advanced solid-state organic and inor-
16 ganic lighting technologies based on white light emitting
17 diodes that, compared to incandescent and fluorescent
18 lighting technologies, are longer lasting; more energy-effi-
19 cient; and cost-competitive, and have less environmental
20 impact.

21 (c) INDUSTRY ALLIANCE.—The Secretary shall, not
22 later than 3 months after the date of enactment of this
23 section, competitively select an Industry Alliance to rep-
24 resent participants that are private, for-profit firms which,
25 as a group, are broadly representative of United States

1 solid state lighting research, development, infrastructure,
2 and manufacturing expertise as a whole.

3 (d) RESEARCH.—

4 (1) IN GENERAL.—The Secretary shall carry
5 out the research activities of the Next Generation
6 Lighting Initiative through competitively awarded
7 grants to researchers, including Industry Alliance
8 participants, National Laboratories, and institutions
9 of higher education.

10 (2) ASSISTANCE FROM THE INDUSTRY ALLI-
11 ANCE.—The Secretary shall annually solicit from the
12 Industry Alliance—

13 (A) comments to identify solid-state light-
14 ing technology needs;

15 (B) assessment of the progress of the Ini-
16 tiative's research activities; and

17 (C) assistance in annually updating solid-
18 state lighting technology roadmaps.

19 (3) AVAILABILITY OF INFORMATION AND ROAD-
20 MAPS.—The information and roadmaps under para-
21 graph (2) shall be available to the public and public
22 response shall be solicited by the Secretary.

23 (e) DEVELOPMENT, DEMONSTRATION, AND COMMER-
24 CIAL APPLICATION.—The Secretary shall carry out a de-
25 velopment, demonstration, and commercial application

1 program for the Next Generation Lighting Initiative
2 through competitively selected awards. The Secretary may
3 give preference to participants of the Industry Alliance se-
4 lected pursuant to subsection (c).

5 (f) INTELLECTUAL PROPERTY.—The Secretary may
6 require, in accordance with the authorities provided in sec-
7 tion 202(a)(ii) of title 35, United States Code, section 152
8 of the Atomic Energy Act of 1954 (42 U.S.C. 2182), and
9 section 9 of the Federal Nonnuclear Energy Research and
10 Development Act of 1974 (42 U.S.C. 5908), that—

11 (1) for any new invention resulting from activi-
12 ties under subsection (d)—

13 (A) the Industry Alliance members that
14 are active participants in research, development,
15 and demonstration activities related to the ad-
16 vanced solid-state lighting technologies that are
17 the subject of this section shall be granted first
18 option to negotiate with the invention owner
19 nonexclusive licenses and royalties for uses of
20 the invention related to solid-state lighting on
21 terms that are reasonable under the cir-
22 cumstances; and

23 (B)(i) for 1 year after a United States pat-
24 ent is issued for the invention, the patent hold-
25 er shall not negotiate any license or royalty

1 with any entity that is not a participant in the
2 Industry Alliance described in subparagraph
3 (A); and

4 (ii) during the year described in clause (i),
5 the invention owner shall negotiate nonexclusive
6 licenses and royalties in good faith with any in-
7 terested participant in the Industry Alliance de-
8 scribed in subparagraph (A); and

9 (2) such other terms as the Secretary deter-
10 mines are required to promote accelerated commer-
11 cialization of inventions made under the Initiative.

12 (g) NATIONAL ACADEMY REVIEW.—The Secretary
13 shall enter into an arrangement with the National Acad-
14 emy of Sciences to conduct periodic reviews of the Next
15 Generation Lighting Initiative. The Academy shall review
16 the research priorities, technical milestones, and plans for
17 technology transfer and progress towards achieving them.
18 The Secretary shall consider the results of such reviews
19 in evaluating the information obtained under subsection
20 (d)(2).

21 (h) DEFINITIONS.—As used in this section:

22 (1) ADVANCED SOLID-STATE LIGHTING.—The
23 term “advanced solid-state lighting” means a
24 semiconducting device package and delivery system

1 that produces white light using externally applied
2 voltage.

3 (2) RESEARCH.—The term “research” includes
4 research on the technologies, materials, and manu-
5 facturing processes required for white light emitting
6 diodes.

7 (3) INDUSTRY ALLIANCE.—The term “Industry
8 Alliance” means an entity selected by the Secretary
9 under subsection (c).

10 (4) WHITE LIGHT EMITTING DIODE.—The term
11 “white light emitting diode” means a
12 semiconducting package, utilizing either organic or
13 inorganic materials, that produces white light using
14 externally applied voltage.

15 **SEC. 106. NATIONAL BUILDING PERFORMANCE INITIATIVE.**

16 (a) INTERAGENCY GROUP.—Not later than 90 days
17 after the date of enactment of this Act, the Director of
18 the Office of Science and Technology Policy shall establish
19 an interagency group to develop, in coordination with the
20 advisory committee established under subsection (e), a
21 National Building Performance Initiative (in this section
22 referred to as the “Initiative”). The interagency group
23 shall be co-chaired by appropriate officials of the Depart-
24 ment and the Department of Commerce, who shall jointly

1 arrange for the provision of necessary administrative sup-
2 port to the group.

3 (b) INTEGRATION OF EFFORTS.—The Initiative,
4 working with the National Institute of Building Sciences,
5 shall integrate Federal, State, and voluntary private sector
6 efforts to reduce the costs of construction, operation,
7 maintenance, and renovation of commercial, industrial, in-
8 stitutional, and residential buildings.

9 (c) PLAN.—Not later than 1 year after the date of
10 enactment of this Act, the interagency group shall submit
11 to Congress a plan for carrying out the appropriate Fed-
12 eral role in the Initiative. The plan shall include—

13 (1) research, development, demonstration, and
14 commercial application of systems and materials for
15 new construction and retrofit relating to the building
16 envelope and building system components; and

17 (2) the collection, analysis, and dissemination of
18 research results and other pertinent information on
19 enhancing building performance to industry, govern-
20 ment entities, and the public.

21 (d) DEPARTMENT OF ENERGY ROLE.—Within the
22 Federal portion of the Initiative, the Department shall be
23 the lead agency for all aspects of building performance re-
24 lated to use and conservation of energy.

25 (e) ADVISORY COMMITTEE.—

1 (1) ESTABLISHMENT.—The Secretary, in con-
2 sultation with the Secretary of Commerce and the
3 Director of the Office of Science and Technology
4 Policy, shall establish an advisory committee to—

5 (A) analyze and provide recommendations
6 on potential private sector roles and participa-
7 tion in the Initiative; and

8 (B) review and provide recommendations
9 on the plan described in subsection (c).

10 (2) MEMBERSHIP.—Membership of the advisory
11 committee shall include representatives with a broad
12 range of appropriate expertise, including expertise
13 in—

14 (A) building research and technology;

15 (B) architecture, engineering, and building
16 materials and systems; and

17 (C) the residential, commercial, and indus-
18 trial sectors of the construction industry.

19 (f) CONSTRUCTION.—Nothing in this section provides
20 any Federal agency with new authority to regulate build-
21 ing performance.

22 **SEC. 107. SECONDARY ELECTRIC VEHICLE BATTERY USE**
23 **PROGRAM.**

24 (a) DEFINITIONS.—For purposes of this section:

1 (1) ASSOCIATED EQUIPMENT.—The term “asso-
2 ciated equipment” means equipment located where
3 the batteries will be used that is necessary to enable
4 the use of the energy stored in the batteries.

5 (2) BATTERY.—The term “battery” means an
6 energy storage device that previously has been used
7 to provide motive power in a vehicle powered in
8 whole or in part by electricity.

9 (b) PROGRAM.—The Secretary shall establish and
10 conduct a research, development, demonstration, and com-
11 mercial application program for the secondary use of bat-
12 teries if the Secretary finds that there are sufficient num-
13 bers of such batteries to support the program. The pro-
14 gram shall be—

15 (1) designed to demonstrate the use of batteries
16 in secondary applications, including utility and com-
17 mercial power storage and power quality;

18 (2) structured to evaluate the performance, in-
19 cluding useful service life and costs, of such bat-
20 teries in field operations, and the necessary sup-
21 porting infrastructure, including reuse and disposal
22 of batteries; and

23 (3) coordinated with ongoing secondary battery
24 use programs at the National Laboratories and in
25 industry.

1 (c) SOLICITATION.—Not later than 180 days after
2 the date of enactment of this Act, if the Secretary finds
3 under subsection (b) that there are sufficient numbers of
4 batteries to support the program, the Secretary shall so-
5 licit proposals to demonstrate the secondary use of bat-
6 teries and associated equipment and supporting infra-
7 structure in geographic locations throughout the United
8 States. The Secretary may make additional solicitations
9 for proposals if the Secretary determines that such solici-
10 tations are necessary to carry out this section.

11 (d) SELECTION OF PROPOSALS.—

12 (1) IN GENERAL.—The Secretary shall, not
13 later than 90 days after the closing date established
14 by the Secretary for receipt of proposals under sub-
15 section (c), select up to 5 proposals which may re-
16 ceive financial assistance under this section, subject
17 to the availability of appropriations.

18 (2) DIVERSITY; ENVIRONMENTAL EFFECT.—In
19 selecting proposals, the Secretary shall consider di-
20 versity of battery type, geographic and climatic di-
21 versity, and life-cycle environmental effects of the
22 approaches.

23 (3) LIMITATION.—No 1 project selected under
24 this section shall receive more than 25 percent of the
25 funds authorized for the program under this section.

1 (4) OPTIMIZATION OF FEDERAL RESOURCES.—

2 The Secretary shall consider the extent of involve-
3 ment of State or local government and other persons
4 in each demonstration project to optimize use of
5 Federal resources.

6 (5) OTHER CRITERIA.—The Secretary may con-
7 sider such other criteria as the Secretary considers
8 appropriate.

9 (e) CONDITIONS.—The Secretary shall require that—

10 (1) relevant information be provided to the De-
11 partment, the users of the batteries, the proposers,
12 and the battery manufacturers;

13 (2) the proposer provide at least 50 percent of
14 the costs associated with the proposal; and

15 (3) the proposer provide to the Secretary such
16 information regarding the disposal of the batteries
17 as the Secretary may require to ensure that the pro-
18 poser disposes of the batteries in accordance with
19 applicable law.

20 **SEC. 108. ENERGY EFFICIENCY SCIENCE INITIATIVE.**

21 (a) ESTABLISHMENT.—The Secretary shall establish
22 an Energy Efficiency Science Initiative to be managed by
23 the Assistant Secretary in the Department with responsi-
24 bility for energy conservation under section 203(a)(9) of
25 the Department of Energy Organization Act (42 U.S.C.

1 7133(a)(9)), in consultation with the Director of the Of-
 2 fice of Science, for grants to be competitively awarded and
 3 subject to peer review for research relating to energy effi-
 4 ciency.

5 (b) REPORT.—The Secretary shall submit to Con-
 6 gress, along with the President’s annual budget request
 7 under section 1105(a) of title 31, United States Code, a
 8 report on the activities of the Energy Efficiency Science
 9 Initiative, including a description of the process used to
 10 award the funds and an explanation of how the research
 11 relates to energy efficiency.

12 **SEC. 109. ELECTRIC MOTOR CONTROL TECHNOLOGY.**

13 The Secretary shall conduct a research, development,
 14 demonstration, and commercial application program on
 15 advanced control devices to improve the energy efficiency
 16 of electric motors used in heating, ventilation, air condi-
 17 tioning, and comparable systems.

18 **SEC. 110. ADVANCED ENERGY TECHNOLOGY TRANSFER**
 19 **CENTERS.**

20 (a) GRANTS.—Not later than 18 months after the
 21 date of enactment of this Act, the Secretary shall make
 22 grants to nonprofit institutions, State and local govern-
 23 ments, or universities (or consortia thereof), to establish
 24 a geographically dispersed network of Advanced Energy
 25 Technology Transfer Centers, to be located in areas the

1 Secretary determines have the greatest need of the serv-
2 ices of such Centers.

3 (b) ACTIVITIES.—

4 (1) IN GENERAL.—Each Center shall operate a
5 program to encourage demonstration and commer-
6 cial application of advanced energy methods and
7 technologies through education and outreach to
8 building and industrial professionals, and to other
9 individuals and organizations with an interest in ef-
10 ficient energy use.

11 (2) ADVISORY PANEL.—Each Center shall es-
12 tablish an advisory panel to advise the Center on
13 how best to accomplish the activities under para-
14 graph (1).

15 (c) APPLICATION.—A person seeking a grant under
16 this section shall submit to the Secretary an application
17 in such form and containing such information as the Sec-
18 retary may require. The Secretary may award a grant
19 under this section to an entity already in existence if the
20 entity is otherwise eligible under this section.

21 (d) SELECTION CRITERIA.—The Secretary shall
22 award grants under this section on the basis of the fol-
23 lowing criteria, at a minimum:

24 (1) The ability of the applicant to carry out the
25 activities in subsection (b).

1 (2) The extent to which the applicant will co-
2 ordinate the activities of the Center with other enti-
3 ties, such as State and local governments, utilities,
4 and educational and research institutions.

5 (e) MATCHING FUNDS.—The Secretary shall require
6 a non-Federal matching requirement of at least 50 percent
7 of the costs of establishing and operating each Center.

8 (f) ADVISORY COMMITTEE.—The Secretary shall es-
9 tablish an advisory committee to advise the Secretary on
10 the establishment of Centers under this section. The advi-
11 sory committee shall be composed of individuals with ex-
12 pertise in the area of advanced energy methods and tech-
13 nologies, including at least 1 representative from—

- 14 (1) State or local energy offices;
15 (2) energy professionals;
16 (3) trade or professional associations;
17 (4) architects, engineers, or construction profes-
18 sionals;
19 (5) manufacturers;
20 (6) the research community; and
21 (7) nonprofit energy or environmental organiza-
22 tions.

23 (g) DEFINITIONS.—For purposes of this section:

24 (1) ADVANCED ENERGY METHODS AND TECH-
25 NOLOGIES.—The term “advanced energy methods

1 and technologies” means all methods and tech-
 2 nologies that promote energy efficiency and con-
 3 servation, including distributed generation tech-
 4 nologies, and life-cycle analysis of energy use.

5 (2) CENTER.—The term “Center” means an
 6 Advanced Energy Technology Transfer Center estab-
 7 lished pursuant to this section.

8 (3) DISTRIBUTED GENERATION.—The term
 9 “distributed generation” means an electric power
 10 generation facility that is designed to serve retail
 11 electric consumers at or near the facility site.

12 **Subtitle B—Distributed Energy and** 13 **Electric Energy Systems**

14 **SEC. 111. DISTRIBUTED ENERGY AND ELECTRIC ENERGY** 15 **SYSTEMS.**

16 (a) IN GENERAL.—The following sums are author-
 17 ized to be appropriated to the Secretary for distributed
 18 energy and electric energy systems activities, including ac-
 19 tivities authorized under this subtitle:

20 (1) For fiscal year 2004, \$190,000,000.

21 (2) For fiscal year 2005, \$200,000,000.

22 (3) For fiscal year 2006, \$220,000,000.

23 (4) For fiscal year 2007, \$240,000,000.

24 (5) For fiscal year 2008, \$260,000,000.

1 (b) MICRO-COGENERATION ENERGY TECH-
2 NOLOGY.—From amounts authorized under subsection
3 (a), \$20,000,000 for each of fiscal years 2004 and 2005
4 is authorized for activities under section 114.

5 **SEC. 112. HYBRID DISTRIBUTED POWER SYSTEMS.**

6 (a) REQUIREMENT.—Not later than 1 year after the
7 date of enactment of this Act, the Secretary shall develop
8 and transmit to Congress a strategy for a comprehensive
9 research, development, demonstration, and commercial ap-
10 plication program to develop hybrid distributed power sys-
11 tems that combine—

12 (1) 1 or more renewable electric power genera-
13 tion technologies of 10 megawatts or less located
14 near the site of electric energy use; and

15 (2) nonintermittent electric power generation
16 technologies suitable for use in a distributed power
17 system.

18 (b) CONTENTS.—The strategy shall—

19 (1) identify the needs best met with such hybrid
20 distributed power systems and the technological bar-
21 riers to the use of such systems;

22 (2) provide for the development of methods to
23 design, test, integrate into systems, and operate
24 such hybrid distributed power systems;

1 (3) include, as appropriate, research, develop-
2 ment, demonstration, and commercial application on
3 related technologies needed for the adoption of such
4 hybrid distributed power systems, including energy
5 storage devices and environmental control tech-
6 nologies;

7 (4) include research, development, demonstra-
8 tion, and commercial application of interconnection
9 technologies for communications and controls of dis-
10 tributed generation architectures, particularly tech-
11 nologies promoting real-time response to power mar-
12 ket information and physical conditions on the elec-
13 trical grid; and

14 (5) describe how activities under the strategy
15 will be integrated with other research, development,
16 demonstration, and commercial application activities
17 supported by the Department related to electric
18 power technologies.

19 **SEC. 113. HIGH POWER DENSITY INDUSTRY PROGRAM.**

20 The Secretary shall establish a comprehensive re-
21 search, development, demonstration, and commercial ap-
22 plication program to improve energy efficiency of high
23 power density facilities, including data centers, server
24 farms, and telecommunications facilities. Such program
25 shall consider technologies that provide significant im-

1 provement in thermal controls, metering, load manage-
2 ment, peak load reduction, or the efficient cooling of elec-
3 tronics.

4 **SEC. 114. MICRO-COGENERATION ENERGY TECHNOLOGY.**

5 The Secretary shall make competitive, merit-based
6 grants to consortia for the development of micro-cogenera-
7 tion energy technology. The consortia shall explore—

8 (1) the use of small-scale combined heat and
9 power in residential heating appliances; and

10 (2) the use of excess power to operate other ap-
11 pliances within the residence and supply excess gen-
12 erated power to the power grid.

13 **SEC. 115. DISTRIBUTED ENERGY TECHNOLOGY DEM-**
14 **ONSTRATION PROGRAM.**

15 The Secretary, within the sums authorized under sec-
16 tion 111(a), may provide financial assistance to coordi-
17 nating consortia of interdisciplinary participants for dem-
18 onstrations designed to accelerate the utilization of dis-
19 tributed energy technologies, such as fuel cells, microtur-
20 bines, reciprocating engines, thermally activated tech-
21 nologies, and combined heat and power systems, in highly
22 energy intensive commercial applications.

23 **SEC. 116. RECIPROCATING POWER.**

24 The Secretary shall conduct a research, development,
25 and demonstration program regarding fuel system optimi-

1 zation and emissions reduction after-treatment tech-
 2 nologies for industrial reciprocating engines. Such after-
 3 treatment technologies shall use processes that reduce
 4 emissions by recirculating exhaust gases and shall be de-
 5 signed to be retrofitted to any new or existing diesel or
 6 natural gas engine used for power generation, peaking
 7 power generation, combined heat and power, or compres-
 8 sion.

9 **Subtitle C—Renewable Energy**

10 **SEC. 118. RENEWABLE ENERGY.**

11 (a) IN GENERAL.—The following sums are author-
 12 ized to be appropriated to the Secretary for renewable en-
 13 ergy research, development, demonstration, and commer-
 14 cial application activities, including activities authorized
 15 under this subtitle:

16 (1) For fiscal year 2004, \$480,000,000.

17 (2) For fiscal year 2005, \$550,000,000.

18 (3) For fiscal year 2006, \$610,000,000.

19 (4) For fiscal year 2007, \$659,000,000.

20 (5) For fiscal year 2008, \$710,000,000.

21 (b) BIOENERGY.—From the amounts authorized
 22 under subsection (a), the following sums are authorized
 23 to be appropriated to carry out section 119:

24 (1) For fiscal year 2004, \$135,425,000.

25 (2) For fiscal year 2005, \$155,600,000.

1 (3) For fiscal year 2006, \$167,650,000.

2 (4) For fiscal year 2007, \$180,000,000.

3 (5) For fiscal year 2008, \$192,000,000.

4 (c) CONCENTRATING SOLAR POWER.—From
5 amounts authorized under subsection (a), the following
6 sums are authorized to be appropriated to carry out sec-
7 tion 120:

8 (1) For fiscal year 2004, \$20,000,000.

9 (2) For fiscal year 2005, \$40,000,000.

10 (3) For each of fiscal years 2006, 2007 and
11 2008, \$50,000,000.

12 (d) PUBLIC BUILDINGS.—From the amounts author-
13 ized under subsection (a), \$30,000,000 for each of the fis-
14 cal years 2004 through 2008 are authorized to be appro-
15 priated to carry out section 122.

16 (e) LIMITS ON USE OF FUNDS.—

17 (1) NO FUNDS FOR RENEWABLE SUPPORT AND
18 IMPLEMENTATION.—None of the funds authorized to
19 be appropriated under this section may be used for
20 Renewable Support and Implementation.

21 (2) GRANTS.—Of the funds authorized under
22 subsection (b), not less than \$5,000,000 for each fis-
23 cal year shall be made available for grants to His-
24 torically Black Colleges and Universities, Tribal Col-
25 leges, and Hispanic-Serving Institutions.

1 (3) REGIONAL FIELD VERIFICATION PRO-
 2 GRAM.—Of the funds authorized under subsection
 3 (a), not less than \$4,000,000 for each fiscal year
 4 shall be made available for the Regional Field
 5 Verification Program of the Department.

6 (4) OFF-STREAM PUMPED STORAGE HYDRO-
 7 POWER.—Of the funds authorized under subsection
 8 (a), such sums as may be necessary shall be made
 9 available for demonstration projects of off-stream
 10 pumped storage hydropower.

11 (f) CONSULTATION.—In carrying out this subtitle,
 12 the Secretary, in consultation with the Secretary of Agri-
 13 culture, shall demonstrate the use of advanced wind power
 14 technology, including combined use with coal gasification;
 15 biomass; geothermal energy systems; and other renewable
 16 energy technologies to assist in delivering electricity to
 17 rural and remote locations.

18 **SEC. 119. BIOENERGY PROGRAMS.**

19 (a) DEFINITIONS.—For the purposes of this section:

20 (1) The term “agricultural byproducts” in-
 21 cludes waste products, including poultry fat and
 22 poultry waste.

23 (2) The term “cellulosic biomass” means any
 24 portion of a crop containing lignocellulose or hemi-
 25 cellulose, including barley grain, grapeseed, forest

1 thinnings, rice bran, rice hulls, rice straw, soybean
2 matter, and sugarcane bagasse, or any crop grown
3 specifically for the purpose of producing cellulosic
4 feedstocks.

5 (b) PROGRAM.—The Secretary shall conduct a pro-
6 gram of research, development, demonstration, and com-
7 mercial application for bioenergy, including—

8 (1) biopower energy systems;

9 (2) biofuels;

10 (3) bio-based products;

11 (4) integrated biorefineries that may produce
12 biopower, biofuels, and bio-based products;

13 (5) cross-cutting research and development in
14 feedstocks and enzymes; and

15 (6) economic analysis.

16 (c) BIOFUELS AND BIO-BASED PRODUCTS.—The
17 goals of the biofuels and bio-based products programs
18 shall be to develop, in partnership with industry—

19 (1) advanced biochemical and thermochemical
20 conversion technologies capable of making biofuels
21 that are price-competitive with gasoline or diesel in
22 either internal combustion engines or fuel cell-pow-
23 ered vehicles, and bio-based products from a variety
24 of feedstocks, including grains, cellulosic biomass,
25 and other agricultural byproducts; and

1 (2) advanced biotechnology processes capable of
2 making biofuels and bio-based products with empha-
3 sis on development of biorefinery technologies using
4 enzyme-based processing systems.

5 **SEC. 120. CONCENTRATING SOLAR POWER RESEARCH AND**
6 **DEVELOPMENT PROGRAM.**

7 (a) IN GENERAL.—The Secretary shall conduct a
8 program of research and development to evaluate the po-
9 tential of concentrating solar power for hydrogen produc-
10 tion, including cogeneration approaches for both hydrogen
11 and electricity. Such program shall take advantage of ex-
12 isting facilities to the extent possible and shall include—

13 (1) development of optimized technologies that
14 are common to both electricity and hydrogen produc-
15 tion;

16 (2) evaluation of thermochemical cycles for hy-
17 drogen production at the temperatures attainable
18 with concentrating solar power;

19 (3) evaluation of materials issues for the
20 thermochemical cycles described in paragraph (2);

21 (4) system architectures and economics studies;
22 and

23 (5) coordination with activities in the Advanced
24 Reactor Hydrogen Cogeneration Project on high

1 temperature materials, thermochemical cycles, and
2 economic issues.

3 (b) ASSESSMENT.—In carrying out the program
4 under this section, the Secretary shall—

5 (1) assess conflicting guidance on the economic
6 potential of concentrating solar power for electricity
7 production received from the National Research
8 Council report entitled “Renewable Power Pathways:
9 A Review of the U.S. Department of Energy’s Re-
10 newable Energy Programs” in 2000 and subsequent
11 Department-funded reviews of that report; and

12 (2) provide an assessment of the potential im-
13 pact of the technology before, or concurrent with,
14 submission of the fiscal year 2006 budget.

15 (c) REPORT.—Not later than 5 years after the date
16 of enactment of this Act, the Secretary shall provide a re-
17 port to Congress on the economic and technical potential
18 for electricity or hydrogen production, with or without co-
19 generation, with concentrating solar power, including the
20 economic and technical feasibility of potential construction
21 of a pilot demonstration facility suitable for commercial
22 production of electricity or hydrogen from concentrating
23 solar power.

1 **SEC. 121. MISCELLANEOUS PROJECTS.**

2 The Secretary may conduct research, development,
3 demonstration, and commercial application programs
4 for—

5 (1) ocean energy, including wave energy; and

6 (2) the combined use of renewable energy tech-
7 nologies with one another and with other energy
8 technologies, including the combined use of wind
9 power and coal gasification technologies.

10 **SEC. 122. RENEWABLE ENERGY IN PUBLIC BUILDINGS.**

11 (a) **DEMONSTRATION AND TECHNOLOGY TRANSFER**
12 **PROGRAM.**—The Secretary shall establish a program for
13 the demonstration of innovative technologies for solar and
14 other renewable energy sources in buildings owned or op-
15 erated by a State or local government, and for the dissemi-
16 nation of information resulting from such demonstration
17 to interested parties.

18 (b) **LIMIT ON FEDERAL FUNDING.**—The Secretary
19 shall provide under this section no more than 40 percent
20 of the incremental costs of the solar or other renewable
21 energy source project funded.

22 (c) **REQUIREMENT.**—As part of the application for
23 awards under this section, the Secretary shall require all
24 applicants—

1 (1) to demonstrate a continuing commitment to
2 the use of solar and other renewable energy sources
3 in buildings they own or operate; and

4 (2) to state how they expect any award to fur-
5 ther their transition to the significant use of renew-
6 able energy.

7 **SEC. 123. STUDY OF MARINE RENEWABLE ENERGY OP-**
8 **TIONS.**

9 (a) IN GENERAL.—The Secretary shall enter into an
10 arrangement with the National Academy of Sciences to
11 conduct a study on—

12 (1) the feasibility of various methods of renew-
13 able generation of energy from the ocean, including
14 energy from waves, tides, currents, and thermal gra-
15 dients; and

16 (2) the research, development, demonstration,
17 and commercial application activities required to
18 make marine renewable energy generation competi-
19 tive with other forms of electricity generation.

20 (b) TRANSMITTAL.—Not later than 1 year after the
21 date of enactment of this Act, the Secretary shall transmit
22 the study to Congress along with the Secretary's rec-
23 ommendations for implementing the results of the study.

1 **Subtitle D—Nuclear Energy**

2 **SEC. 124. NUCLEAR ENERGY.**

3 (a) CORE PROGRAMS.—The following sums are au-
4 thorized to be appropriated to the Secretary for nuclear
5 energy research, development, demonstration, and com-
6 mercial application activities, including activities author-
7 ized under this subtitle, other than those described in sub-
8 section (b):

9 (1) For fiscal year 2004, \$273,000,000.

10 (2) For fiscal year 2005, \$355,000,000.

11 (3) For fiscal year 2006, \$430,000,000.

12 (4) For fiscal year 2007, \$455,000,000.

13 (5) For fiscal year 2008, \$545,000,000.

14 (b) NUCLEAR INFRASTRUCTURE SUPPORT.—The fol-
15 lowing sums are authorized to be appropriated to the Sec-
16 retary for activities under section 125(e):

17 (1) For fiscal year 2004, \$125,000,000.

18 (2) For fiscal year 2005, \$130,000,000.

19 (3) For fiscal year 2006, \$135,000,000.

20 (4) For fiscal year 2007, \$140,000,000.

21 (5) For fiscal year 2008, \$145,000,000.

22 (c) ALLOCATIONS.—From amounts authorized under
23 subsection (a), the following sums are authorized:

24 (1) For activities under section 126—

25 (A) for fiscal year 2004, \$140,000,000;

1 (B) for fiscal year 2005, \$145,000,000;
 2 (C) for fiscal year 2006, \$150,000,000;
 3 (D) for fiscal year 2007, \$155,000,000;
 4 and
 5 (E) for fiscal year 2008, \$275,000,000.

6 (2) For activities under section 127—

7 (A) for fiscal year 2004, \$35,200,000;
 8 (B) for fiscal year 2005, \$44,350,000;
 9 (C) for fiscal year 2006, \$49,200,000;
 10 (D) for fiscal year 2007, \$54,950,000; and
 11 (E) for fiscal year 2008, \$60,000,000.

12 (3) For activities under section 129, for each of
 13 fiscal years 2004 through 2008, \$6,000,000.

14 (d) LIMITATION ON USE OF FUNDS.—None of the
 15 funds authorized under this section may be used for de-
 16 commissioning the Fast Flux Test Facility.

17 **SEC. 125. NUCLEAR ENERGY RESEARCH AND DEVELOP-**
 18 **MENT PROGRAMS.**

19 (a) NUCLEAR ENERGY RESEARCH INITIATIVE.—The
 20 Secretary shall carry out a Nuclear Energy Research Ini-
 21 tiative for research and development related to nuclear en-
 22 ergy.

23 (b) NUCLEAR ENERGY PLANT OPTIMIZATION PRO-
 24 GRAM.—The Secretary shall carry out a Nuclear Energy
 25 Plant Optimization Program to support research and de-

1 velopment activities addressing reliability, availability, pro-
2 ductivity, component aging, safety, and security of existing
3 nuclear power plants.

4 (c) NUCLEAR POWER 2010 PROGRAM.—The Sec-
5 retary shall carry out a Nuclear Power 2010 Program,
6 consistent with recommendations in the October 2001 re-
7 port entitled “A Roadmap to Deploy New Nuclear Power
8 Plants in the United States by 2010” issued by the Nu-
9 clear Energy Research Advisory Committee of the Depart-
10 ment. Whatever type of reactor is chosen for the hydrogen
11 cogeneration project under subtitle C of title VI, that type
12 shall not be addressed in the Program under this section.
13 The Program shall include—

14 (1) support for first-of-a-kind engineering de-
15 sign and certification expenses of advanced nuclear
16 power plant designs, which offer improved safety
17 and economics over current conventional plants and
18 the promise of near-term to medium-term commer-
19 cial deployment;

20 (2) action by the Secretary to encourage domes-
21 tic power companies to install new nuclear plant ca-
22 pacity as soon as possible;

23 (3) utilization of the expertise and capabilities
24 of industry, universities, and National Laboratories

1 in evaluation of advanced nuclear fuel cycles and
2 fuels testing;

3 (4) consideration of proliferation-resistant pas-
4 sively-safe, small reactors suitable for long-term elec-
5 tricity production without refueling and suitable for
6 use in remote installations;

7 (5) participation of international collaborators
8 in research, development, design, and deployment ef-
9 forts as appropriate and consistent with United
10 States interests in nonproliferation of nuclear weap-
11 ons;

12 (6) encouragement for university and industry
13 participation; and

14 (7) selection of projects such as to strengthen
15 the competitive position of the domestic nuclear
16 power industrial infrastructure.

17 (d) GENERATION IV NUCLEAR ENERGY SYSTEMS
18 INITIATIVE.—The Secretary shall carry out a Generation
19 IV Nuclear Energy Systems Initiative to develop an over-
20 all technology plan and to support research and develop-
21 ment necessary to make an informed technical decision
22 about the most promising candidates for eventual commer-
23 cial application. The Initiative shall examine advanced
24 proliferation-resistant and passively safe reactor designs,
25 including designs that—

1 (1) are economically competitive with other elec-
2 tric power generation plants;

3 (2) have higher efficiency, lower cost, and im-
4 proved safety compared to reactors in operation on
5 the date of enactment of this Act;

6 (3) use fuels that are proliferation-resistant and
7 have substantially reduced production of high-level
8 waste per unit of output; and

9 (4) use improved instrumentation.

10 (e) NUCLEAR INFRASTRUCTURE SUPPORT.—The
11 Secretary shall develop and implement a strategy for the
12 facilities of the Office of Nuclear Energy, Science, and
13 Technology and shall transmit a report containing the
14 strategy along with the President’s budget request to Con-
15 gress for fiscal year 2006.

16 **SEC. 126. ADVANCED FUEL CYCLE INITIATIVE.**

17 (a) IN GENERAL.—The Secretary, through the Direc-
18 tor of the Office of Nuclear Energy, Science, and Tech-
19 nology, shall conduct an advanced fuel recycling tech-
20 nology research and development program to evaluate pro-
21 liferation-resistant fuel recycling and transmutation tech-
22 nologies that minimize environmental or public health and
23 safety impacts as an alternative to aqueous reprocessing
24 technologies deployed as of the date of enactment of this
25 Act in support of evaluation of alternative national strate-

gies for spent nuclear fuel and the Generation IV advanced reactor concepts, subject to annual review by the Secretary's Nuclear Energy Research Advisory Committee or other independent entity, as appropriate. Opportunities to enhance progress of the program through international cooperation should be sought.

(b) REPORTS.—The Secretary shall report on the activities of the advanced fuel recycling technology research and development program as part of the Department's annual budget submission.

SEC. 127. UNIVERSITY NUCLEAR SCIENCE AND ENGINEERING SUPPORT.

(a) ESTABLISHMENT.—The Secretary shall support a program to invest in human resources and infrastructure in the nuclear sciences and engineering and related fields (including health physics and nuclear and radiochemistry), consistent with departmental missions related to civilian nuclear research and development.

(b) DUTIES.—In carrying out the program under this section, the Secretary shall establish fellowship and faculty assistance programs, as well as provide support for fundamental research and encourage collaborative research among industry, National Laboratories, and universities through the Nuclear Energy Research Initiative. The Secretary is encouraged to support activities addressing the

1 entire fuel cycle through involvement of both the Office
2 of Nuclear Energy, Science, and Technology and the Of-
3 fice of Civilian Radioactive Waste Management. The Sec-
4 retary shall support communication and outreach related
5 to nuclear science, engineering, and nuclear waste man-
6 agement, consistent with interests of the United States in
7 nonproliferation of nuclear weapons capabilities.

8 (c) STRENGTHENING UNIVERSITY RESEARCH AND
9 TRAINING REACTORS AND ASSOCIATED INFRASTRUC-
10 TURE.—Activities under this section may include—

11 (1) converting research and training reactors
12 currently using high-enrichment fuels to low-enrich-
13 ment fuels, upgrading operational instrumentation,
14 and sharing of reactors among institutions of higher
15 education;

16 (2) providing technical assistance, in collabora-
17 tion with the United States nuclear industry, in reli-
18 censing and upgrading research and training reac-
19 tors as part of a student training program; and

20 (3) providing funding, through the Innovations
21 in Nuclear Infrastructure and Education Program,
22 for reactor improvements as part of a focused effort
23 that emphasizes research, training, and education.

24 (d) UNIVERSITY NATIONAL LABORATORY INTER-
25 ACTIONS.—The Secretary shall develop sabbatical fellow-

1 ship and visiting scientist programs to encourage sharing
2 of personnel between National Laboratories and univer-
3 sities.

4 (e) OPERATING AND MAINTENANCE COSTS.—Fund-
5 ing for a research project provided under this section may
6 be used to offset a portion of the operating and mainte-
7 nance costs of a research and training reactor at an insti-
8 tution of higher education used in the research project.

9 **SEC. 128. SECURITY OF REACTOR DESIGNS.**

10 The Secretary, through the Director of the Office of
11 Nuclear Energy, Science, and Technology, shall conduct
12 a research and development program on cost-effective
13 technologies for increasing the safety of reactor designs
14 from natural phenomena and the security of reactor de-
15 signs from deliberate attacks.

16 **SEC. 129. ALTERNATIVES TO INDUSTRIAL RADIOACTIVE**
17 **SOURCES.**

18 (a) STUDY.—The Secretary shall conduct a study and
19 provide a report to Congress not later than August 1,
20 2004. The study shall—

21 (1) survey industrial applications of large radio-
22 active sources, including well-logging sources;

23 (2) review current domestic and international
24 Department, Department of Defense, Department of

1 State, and commercial programs to manage and dis-
2 pose of radioactive sources;

3 (3) discuss disposal options and practices for
4 currently deployed or future sources and, if defi-
5 ciencies are noted in existing disposal options or
6 practices for either deployed or future sources, rec-
7 ommend options to remedy deficiencies; and

8 (4) develop a program plan for research and de-
9 velopment to develop alternatives to large industrial
10 sources that reduce safety, environmental, or pro-
11 liferation risks to either workers using the sources or
12 the public.

13 (b) PROGRAM.—The Secretary shall establish a re-
14 search and development program to implement the pro-
15 gram plan developed under subsection (a)(4). The pro-
16 gram shall include miniaturized particle accelerators for
17 well-logging or other industrial applications and portable
18 accelerators for production of short-lived radioactive mate-
19 rials at an industrial site.

20 **SEC. 130. GEOLOGICAL ISOLATION OF SPENT FUEL.**

21 The Secretary shall conduct a study to determine the
22 feasibility of deep borehole disposal of spent nuclear fuel
23 and high-level radioactive waste. The study shall empha-
24 size geological, chemical, and hydrological characterization
25 of, and design of engineered structures for, deep borehole

1 environments. Not later than 1 year after the date of en-
 2 actment of this Act, the Secretary shall transmit the study
 3 to Congress.

4 **Subtitle E—Fossil Energy**

5 **PART I—RESEARCH PROGRAMS**

6 **SEC. 131. FOSSIL ENERGY.**

7 (a) IN GENERAL.—The following sums are author-
 8 ized to be appropriated to the Secretary for fossil energy
 9 research, development, demonstration, and commercial ap-
 10 plication activities, including activities authorized under
 11 this part:

12 (1) For fiscal year 2004, \$530,000,000.

13 (2) For fiscal year 2005, \$556,000,000.

14 (3) For fiscal year 2006, \$583,000,000.

15 (4) For fiscal year 2007, \$611,000,000.

16 (5) For fiscal year 2008, \$626,000,000.

17 (b) ALLOCATIONS.—From amounts authorized under
 18 subsection (a), the following sums are authorized:

19 (1) For activities under section 132(b)(2),
 20 \$28,000,000 for each of the fiscal years 2004
 21 through 2008.

22 (2) For activities under section 134—

23 (A) for fiscal year 2004, \$12,000,000;

24 (B) for fiscal year 2005, \$15,000,000; and

1 (C) for each of fiscal years 2006 through
2 2008, \$20,000,000.

3 (3) For activities under section 135—

4 (A) for fiscal year 2004, \$259,000,000;

5 (B) for fiscal year 2005, \$272,000,000;

6 (C) for fiscal year 2006, \$285,000,000;

7 (D) for fiscal year 2007, \$298,000,000;

8 and

9 (E) for fiscal year 2008, \$308,000,000.

10 (4) For the Office of Arctic Energy under sec-
11 tion 3197 of the Floyd D. Spence National Defense
12 Authorization Act for Fiscal Year 2001 (42 U.S.C.
13 7144d), \$25,000,000 for each of fiscal years 2004
14 through 2008.

15 (5) For activities under section 133,
16 \$4,000,000 for fiscal year 2004 and \$2,000,000 for
17 each of fiscal years 2005 through 2008.

18 (c) EXTENDED AUTHORIZATION.—There are author-
19 ized to be appropriated to the Secretary for the Office of
20 Arctic Energy under section 3197 of the Floyd D. Spence
21 National Defense Authorization Act for Fiscal Year 2001
22 (42 U.S.C. 7144d), \$25,000,000 for each of fiscal years
23 2009 through 2012.

24 (d) LIMITS ON USE OF FUNDS.—

1 (1) NO FUNDS FOR CERTAIN PROGRAMS.—None
2 of the funds authorized under this section may be
3 used for Fossil Energy Environmental Restoration
4 or Import/Export Authorization.

5 (2) INSTITUTIONS OF HIGHER EDUCATION.—Of
6 the funds authorized under subsection (b)(2), not
7 less than 20 percent of the funds appropriated for
8 each fiscal year shall be dedicated to research and
9 development carried out at institutions of higher
10 education.

11 **SEC. 132. OIL AND GAS RESEARCH PROGRAMS.**

12 (a) OIL AND GAS RESEARCH.—The Secretary shall
13 conduct a program of research, development, demonstra-
14 tion, and commercial application on oil and gas, includ-
15 ing—

- 16 (1) exploration and production;
- 17 (2) gas hydrates;
- 18 (3) reservoir life and extension;
- 19 (4) transportation and distribution infrastruc-
- 20 ture;
- 21 (5) ultraclean fuels;
- 22 (6) heavy oil and oil shale;
- 23 (7) related environmental research; and
- 24 (8) compressed natural gas marine transport.

25 (b) FUEL CELLS.—

1 (1) IN GENERAL.—The Secretary shall conduct
2 a program of research, development, demonstration,
3 and commercial application on fuel cells for low-cost,
4 high-efficiency, fuel-flexible, modular power systems.

5 (2) IMPROVED MANUFACTURING PRODUCTION
6 AND PROCESSES.—The demonstrations under para-
7 graph (1) shall include fuel cell technology for com-
8 mercial, residential, and transportation applications,
9 and distributed generation systems, utilizing im-
10 proved manufacturing production and processes.

11 (c) NATURAL GAS AND OIL DEPOSITS REPORT.—
12 Not later than 2 years after the date of enactment of this
13 Act, and every 2 years thereafter, the Secretary of the In-
14 terior, in consultation with other appropriate Federal
15 agencies, shall transmit a report to Congress of the latest
16 estimates of natural gas and oil reserves, reserves growth,
17 and undiscovered resources in Federal and State waters
18 off the coast of Louisiana and Texas.

19 (d) INTEGRATED CLEAN POWER AND ENERGY RE-
20 SEARCH.—

21 (1) NATIONAL CENTER OR CONSORTIUM OF EX-
22 CELLENCE.—The Secretary shall establish a na-
23 tional center or consortium of excellence in clean en-
24 ergy and power generation, utilizing the resources of
25 the existing Clean Power and Energy Research Con-

1 consortium, to address the Nation's critical dependence
2 on energy and the need to reduce emissions.

3 (2) PROGRAM.—The center or consortium shall
4 conduct a program of research, development, dem-
5 onstration, and commercial application on inte-
6 grating the following focus areas:

7 (A) Efficiency and reliability of gas tur-
8 bines for power generation.

9 (B) Reduction in emissions from power
10 generation.

11 (C) Promotion of energy conservation
12 issues.

13 (D) Effectively utilizing alternative fuels
14 and renewable energy.

15 (E) Development of advanced materials
16 technology for oil and gas exploration and utili-
17 zation in harsh environments.

18 (F) Education on energy and power gen-
19 eration issues.

20 **SEC. 133. TECHNOLOGY TRANSFER.**

21 The Secretary shall establish a competitive program
22 to award a contract to a nonprofit entity for the purpose
23 of transferring technologies developed with public funds.
24 The entity selected under this section shall have experi-
25 ence in offshore oil and gas technology research manage-

1 ment, in the transfer of technologies developed with public
2 funds to the offshore and maritime industry, and in man-
3 agement of an offshore and maritime industry consortium.
4 The program consortium selected under section 142 shall
5 not be eligible for selection under this section. When ap-
6 propriate, the Secretary shall consider utilizing the entity
7 selected under this section when implementing the activi-
8 ties authorized by section 175.

9 **SEC. 134. RESEARCH AND DEVELOPMENT FOR COAL MIN-**
10 **ING TECHNOLOGIES.**

11 (a) ESTABLISHMENT.—The Secretary shall carry out
12 a program of research and development on coal mining
13 technologies. The Secretary shall cooperate with appro-
14 priate Federal agencies, coal producers, trade associations,
15 equipment manufacturers, institutions of higher education
16 with mining engineering departments, and other relevant
17 entities.

18 (b) PROGRAM.—The research and development activi-
19 ties carried out under this section shall—

20 (1) be guided by the mining research and devel-
21 opment priorities identified by the Mining Industry
22 of the Future Program and in the recommendations
23 from relevant reports of the National Academy of
24 Sciences on mining technologies;

1 (2) include activities exploring minimization of
2 contaminants in mined coal that contribute to envi-
3 ronmental concerns including development and dem-
4 onstration of electromagnetic wave imaging ahead of
5 mining operations;

6 (3) develop and demonstrate electromagnetic
7 wave imaging and radar techniques for horizontal
8 drilling in coal beds in order to increase methane re-
9 covery efficiency, prevent spoilage of domestic coal
10 reserves, and minimize water disposal associated
11 with methane extraction; and

12 (4) expand mining research capabilities at insti-
13 tutions of higher education.

14 **SEC. 135. COAL AND RELATED TECHNOLOGIES PROGRAM.**

15 (a) IN GENERAL.—In addition to the programs au-
16 thorized under title IV, the Secretary shall conduct a pro-
17 gram of technology research, development, demonstration,
18 and commercial application for coal and power systems,
19 including programs to facilitate production and generation
20 of coal-based power through—

- 21 (1) innovations for existing plants;
22 (2) integrated gasification combined cycle;
23 (3) advanced combustion systems;
24 (4) turbines for synthesis gas derived from coal;

1 (5) carbon capture and sequestration research
2 and development;

3 (6) coal-derived transportation fuels and chemi-
4 cals;

5 (7) solid fuels and feedstocks;

6 (8) advanced coal-related research;

7 (9) advanced separation technologies; and

8 (10) a joint project for permeability enhance-
9 ment in coals for natural gas production and carbon
10 dioxide sequestration.

11 (b) COST AND PERFORMANCE GOALS.—In carrying
12 out programs authorized by this section, the Secretary
13 shall identify cost and performance goals for coal-based
14 technologies that would permit the continued cost-com-
15 petitive use of coal for electricity generation, as chemical
16 feedstocks, and as transportation fuel in 2007, 2015, and
17 the years after 2020. In establishing such cost and per-
18 formance goals, the Secretary shall—

19 (1) consider activities and studies undertaken
20 to date by industry in cooperation with the Depart-
21 ment in support of such assessment;

22 (2) consult with interested entities, including
23 coal producers, industries using coal, organizations
24 to promote coal and advanced coal technologies, en-

1 vironmental organizations, and organizations rep-
2 resenting workers;

3 (3) not later than 120 days after the date of
4 enactment of this Act, publish in the Federal Reg-
5 ister proposed draft cost and performance goals for
6 public comments; and

7 (4) not later than 180 days after the date of
8 enactment of this Act and every 4 years thereafter,
9 submit to Congress a report describing final cost
10 and performance goals for such technologies that in-
11 cludes a list of technical milestones as well as an ex-
12 planation of how programs authorized in this section
13 will not duplicate the activities authorized under the
14 Clean Coal Power Initiative authorized under sub-
15 title A of title IV.

16 **SEC. 136. COMPLEX WELL TECHNOLOGY TESTING FACIL-**
17 **ITY.**

18 The Secretary, in coordination with industry leaders
19 in extended research drilling technology, shall establish a
20 Complex Well Technology Testing Facility at the Rocky
21 Mountain Oilfield Testing Center to increase the range of
22 extended drilling technologies.

1 **PART II—ULTRA-DEEPWATER AND UNCONVEN-**
2 **TIONAL NATURAL GAS AND OTHER PETRO-**
3 **LEUM RESOURCES**

4 **SEC. 141. PROGRAM AUTHORITY.**

5 (a) IN GENERAL.—The Secretary shall carry out a
6 program under this part of research, development, dem-
7 onstration, and commercial application of technologies for
8 ultra-deepwater and unconventional natural gas and other
9 petroleum resource exploration and production, including
10 addressing the technology challenges for small producers,
11 safe operations, and environmental mitigation (including
12 reduction of greenhouse gas emissions and sequestration
13 of carbon).

14 (b) PROGRAM ELEMENTS.—The program under this
15 part shall address the following areas, including improving
16 safety and minimizing environmental impacts of activities
17 within each area:

18 (1) Ultra-deepwater technology, including drill-
19 ing to formations in the Outer Continental Shelf to
20 depths greater than 15,000 feet.

21 (2) Ultra-deepwater architecture.

22 (3) Unconventional natural gas and other petro-
23 leum resource exploration and production tech-
24 nology, including the technology challenges of small
25 producers.

1 (c) LIMITATION ON LOCATION OF FIELD ACTIVI-
2 TIES.—Field activities under the program under this part
3 shall be carried out only—

4 (1) in—

5 (A) areas in the territorial waters of the
6 United States not under any Outer Continental
7 Shelf moratorium as of September 30, 2002;

8 (B) areas onshore in the United States on
9 public land administered by the Secretary of the
10 Interior available for oil and gas leasing, where
11 consistent with applicable law and land use
12 plans; and

13 (C) areas onshore in the United States on
14 State or private land, subject to applicable law;
15 and

16 (2) with the approval of the appropriate Fed-
17 eral or State land management agency or private
18 land owner.

19 (d) RESEARCH AT NATIONAL ENERGY TECHNOLOGY
20 LABORATORY.—The Secretary, through the National En-
21 ergy Technology Laboratory, shall carry out research com-
22 plementary to research under subsection (b).

23 (e) CONSULTATION WITH SECRETARY OF THE INTE-
24 RIOR.—In carrying out this part, the Secretary shall con-
25 sult regularly with the Secretary of the Interior.

1 **SEC. 142. ULTRA-DEEPWATER PROGRAM.**

2 (a) IN GENERAL.—The Secretary shall carry out the
3 activities under section 141(a), to maximize the use of the
4 ultra-deepwater natural gas and other petroleum resources
5 of the United States by increasing the supply of such re-
6 sources, through reducing the cost and increasing the effi-
7 ciency of exploration for and production of such resources,
8 while improving safety and minimizing environmental im-
9 pacts.

10 (b) ROLE OF THE SECRETARY.—The Secretary shall
11 have ultimate responsibility for, and oversight of, all as-
12 pects of the program under this section.

13 (c) ROLE OF THE PROGRAM CONSORTIUM.—

14 (1) IN GENERAL.—The Secretary may contract
15 with a consortium to—

16 (A) manage awards pursuant to subsection
17 (f)(4);

18 (B) make recommendations to the Sec-
19 retary for project solicitations;

20 (C) disburse funds awarded under sub-
21 section (f) as directed by the Secretary in ac-
22 cordance with the annual plan under subsection
23 (e); and

24 (D) carry out other activities assigned to
25 the program consortium by this section.

1 (2) LIMITATION.—The Secretary may not as-
2 sign any activities to the program consortium except
3 as specifically authorized under this section.

4 (3) CONFLICT OF INTEREST.—

5 (A) PROCEDURES.—The Secretary shall
6 establish procedures—

7 (i) to ensure that each board member,
8 officer, or employee of the program consor-
9 tium who is in a decision-making capacity
10 under subsection (f)(3) or (4) shall disclose
11 to the Secretary any financial interests in,
12 or financial relationships with, applicants
13 for or recipients of awards under this sec-
14 tion, including those of his or her spouse
15 or minor child, unless such relationships or
16 interests would be considered to be remote
17 or inconsequential; and

18 (ii) to require any board member, offi-
19 cer, or employee with a financial relation-
20 ship or interest disclosed under clause (i)
21 to recuse himself or herself from any re-
22 view under subsection (f)(3) or oversight
23 under subsection (f)(4) with respect to
24 such applicant or recipient.

1 (B) FAILURE TO COMPLY.—The Secretary
2 may disqualify an application or revoke an
3 award under this section if a board member, of-
4 ficer, or employee has failed to comply with pro-
5 cedures required under subparagraph (A)(ii).

6 (d) SELECTION OF THE PROGRAM CONSORTIUM.—

7 (1) IN GENERAL.—The Secretary shall select
8 the program consortium through an open, competi-
9 tive process.

10 (2) MEMBERS.—The program consortium may
11 include corporations, trade associations, institutions
12 of higher education, National Laboratories, or other
13 research institutions. After submitting a proposal
14 under paragraph (4), the program consortium may
15 not add members without the consent of the Sec-
16 retary.

17 (3) TAX STATUS.—The program consortium
18 shall be an entity that is exempt from tax under sec-
19 tion 501(c)(3) of the Internal Revenue Code of
20 1986.

21 (4) SCHEDULE.—Not later than 180 days after
22 the date of enactment of this Act, the Secretary
23 shall solicit proposals from eligible consortia to per-
24 form the duties in subsection (c)(1), which shall be
25 submitted not later than 360 days after the date of

1 enactment of this Act. The Secretary shall select the
2 program consortium not later than 18 months after
3 such date of enactment.

4 (5) APPLICATION.—Applicants shall submit a
5 proposal including such information as the Secretary
6 may require. At a minimum, each proposal shall—

7 (A) list all members of the consortium;

8 (B) fully describe the structure of the con-
9 sortium, including any provisions relating to in-
10 tellectual property; and

11 (C) describe how the applicant would carry
12 out the activities of the program consortium
13 under this section.

14 (6) ELIGIBILITY.—To be eligible to be selected
15 as the program consortium, an applicant must be an
16 entity whose members collectively have demonstrated
17 capabilities in planning and managing research, de-
18 velopment, demonstration, and commercial applica-
19 tion programs in natural gas or other petroleum ex-
20 ploration or production.

21 (7) CRITERION.—The Secretary shall consider
22 the amount of the fee an applicant proposes to re-
23 ceive under subsection (g) in selecting a consortium
24 under this section.

25 (e) ANNUAL PLAN.—

1 (1) IN GENERAL.—The program under this sec-
2 tion shall be carried out pursuant to an annual plan
3 prepared by the Secretary in accordance with para-
4 graph (2).

5 (2) DEVELOPMENT.—

6 (A) SOLICITATION OF RECOMMENDA-
7 TIONS.—Before drafting an annual plan under
8 this subsection, the Secretary shall solicit spe-
9 cific written recommendations from the pro-
10 gram consortium for each element to be ad-
11 dressed in the plan, including those described in
12 paragraph (4). The Secretary may request that
13 the program consortium submit its rec-
14 ommendations in the form of a draft annual
15 plan.

16 (B) SUBMISSION OF RECOMMENDATIONS;
17 OTHER COMMENT.—The Secretary shall submit
18 the recommendations of the program consor-
19 tium under subparagraph (A) to the Ultra-
20 Deepwater Advisory Committee established
21 under section 145(a) for review, and such Advi-
22 sory Committee shall provide to the Secretary
23 written comments by a date determined by the
24 Secretary. The Secretary may also solicit com-
25 ments from any other experts.

1 (C) CONSULTATION.—The Secretary shall
2 consult regularly with the program consortium
3 throughout the preparation of the annual plan.

4 (3) PUBLICATION.—The Secretary shall trans-
5 mit to Congress and publish in the Federal Register
6 the annual plan, along with any written comments
7 received under paragraph (2)(A) and (B).

8 (4) CONTENTS.—The annual plan shall describe
9 the ongoing and prospective activities of the pro-
10 gram under this section and shall include—

11 (A) a list of any solicitations for awards
12 that the Secretary plans to issue to carry out
13 research, development, demonstration, or com-
14 mercial application activities, including the top-
15 ics for such work, who would be eligible to
16 apply, selection criteria, and the duration of
17 awards; and

18 (B) a description of the activities expected
19 of the program consortium to carry out sub-
20 section (f)(4).

21 (5) ESTIMATES OF INCREASED ROYALTY RE-
22 CEIPTS.—The Secretary, in consultation with the
23 Secretary of the Interior, shall provide an annual re-
24 port to Congress with the President’s budget on the
25 estimated cumulative increase in Federal royalty re-

1 ceipts (if any) resulting from the implementation of
2 this part. The initial report under this paragraph
3 shall be submitted in the first President's budget fol-
4 lowing the completion of the first annual plan re-
5 quired under this subsection.

6 (f) AWARDS.—

7 (1) IN GENERAL.—The Secretary shall make
8 awards to carry out research, development, dem-
9 onstration, and commercial application activities
10 under the program under this section. The program
11 consortium shall not be eligible to receive such
12 awards, but members of the program consortium
13 may receive such awards.

14 (2) PROPOSALS.—The Secretary shall solicit
15 proposals for awards under this subsection in such
16 manner and at such time as the Secretary may pre-
17 scribe, in consultation with the program consortium.

18 (3) REVIEW.—The Secretary shall make awards
19 under this subsection through a competitive process,
20 which shall include a review by individuals selected
21 by the Secretary. Such individuals shall include, for
22 each application, Federal officials, the program con-
23 sortium, and non-Federal experts who are not board
24 members, officers, or employees of the program con-
25 sortium or of a member of the program consortium.

1 (4) OVERSIGHT.—

2 (A) IN GENERAL.—The program consor-
3 tium shall oversee the implementation of
4 awards under this subsection, consistent with
5 the annual plan under subsection (e), including
6 disbursing funds and monitoring activities car-
7 ried out under such awards for compliance with
8 the terms and conditions of the awards.

9 (B) EFFECT.—Nothing in subparagraph
10 (A) shall limit the authority or responsibility of
11 the Secretary to oversee awards, or limit the
12 authority of the Secretary to review or revoke
13 awards.

14 (C) PROVISION OF INFORMATION.—The
15 Secretary shall provide to the program consor-
16 tium the information necessary for the program
17 consortium to carry out its responsibilities
18 under this paragraph.

19 (g) ADMINISTRATIVE COSTS.—

20 (1) IN GENERAL.—To compensate the program
21 consortium for carrying out its activities under this
22 section, the Secretary shall provide to the program
23 consortium funds sufficient to administer the pro-
24 gram. This compensation may include a manage-

1 ment fee consistent with Department of Energy con-
2 tracting practices and procedures.

3 (2) ADVANCE.—The Secretary shall advance
4 funds to the program consortium upon selection of
5 the consortium, which shall be deducted from
6 amounts to be provided under paragraph (1).

7 (h) AUDIT.—The Secretary shall retain an inde-
8 pendent, commercial auditor to determine the extent to
9 which funds provided to the program consortium, and
10 funds provided under awards made under subsection (f),
11 have been expended in a manner consistent with the pur-
12 poses and requirements of this part. The auditor shall
13 transmit a report annually to the Secretary, who shall
14 transmit the report to Congress, along with a plan to rem-
15 edy any deficiencies cited in the report.

16 **SEC. 143. UNCONVENTIONAL NATURAL GAS AND OTHER PE-**
17 **TROLEUM RESOURCES PROGRAM.**

18 (a) IN GENERAL.—The Secretary shall carry out ac-
19 tivities under subsection 141(b)(3), to maximize the use
20 of the onshore unconventional natural gas and other petro-
21 leum resources of the United States, by increasing the
22 supply of such resources, through reducing the cost and
23 increasing the efficiency of exploration for and production
24 of such resources, while improving safety and minimizing
25 environmental impacts.

1 (b) AWARDS.—

2 (1) IN GENERAL.—The Secretary shall carry
3 out this section through awards to research con-
4 sortia made through an open, competitive process.
5 As a condition of award of funds, qualified research
6 consortia shall—

7 (A) demonstrate capability and experience
8 in unconventional onshore natural gas or other
9 petroleum research and development;

10 (B) provide a research plan that dem-
11 onstrates how additional natural gas or oil pro-
12 duction will be achieved; and

13 (C) at the request of the Secretary, provide
14 technical advice to the Secretary for the pur-
15 poses of developing the annual plan required
16 under subsection (e).

17 (2) PRODUCTION POTENTIAL.—The Secretary
18 shall seek to ensure that the number and types of
19 awards made under this subsection have reasonable
20 potential to lead to additional oil and natural gas
21 production on Federal lands.

22 (3) SCHEDULE.—To carry out this subsection,
23 not later than 180 days after the date of enactment
24 of this Act, the Secretary shall solicit proposals from
25 research consortia, which shall be submitted not

1 later than 360 days after the date of enactment of
2 this Act. The Secretary shall select the first group
3 of research consortia to receive awards under this
4 subsection not later than 18 months after such date
5 of enactment.

6 (c) AUDIT.—The Secretary shall retain an inde-
7 pendent, commercial auditor to determine the extent to
8 which funds provided under awards made under this sec-
9 tion have been expended in a manner consistent with the
10 purposes and requirements of this part. The auditor shall
11 transmit a report annually to the Secretary, who shall
12 transmit the report to Congress, along with a plan to rem-
13 edy any deficiencies cited in the report.

14 (d) FOCUS AREAS FOR AWARDS.—

15 (1) UNCONVENTIONAL RESOURCES.—Awards
16 from allocations under section 149(d)(2) shall focus
17 on areas including advanced coalbed methane, deep
18 drilling, natural gas production from tight sands,
19 natural gas production from gas shales, stranded
20 gas, innovative exploration and production tech-
21 niques, enhanced recovery techniques, and environ-
22 mental mitigation of unconventional natural gas and
23 other petroleum resources exploration and produc-
24 tion.

1 (2) SMALL PRODUCERS.—Awards from alloca-
2 tions under section 149(d)(3) shall be made to con-
3 sortia consisting of small producers or organized pri-
4 marily for the benefit of small producers, and shall
5 focus on areas including complex geology involving
6 rapid changes in the type and quality of the oil and
7 gas reservoirs across the reservoir; low reservoir
8 pressure; unconventional natural gas reservoirs in
9 coalbeds, deep reservoirs, tight sands, or shales; and
10 unconventional oil reservoirs in tar sands and oil
11 shales.

12 (e) ANNUAL PLAN.—

13 (1) IN GENERAL.—The program under this sec-
14 tion shall be carried out pursuant to an annual plan
15 prepared by the Secretary in accordance with para-
16 graph (2).

17 (2) DEVELOPMENT.—

18 (A) WRITTEN RECOMMENDATIONS.—Be-
19 fore drafting an annual plan under this sub-
20 section, the Secretary shall solicit specific writ-
21 ten recommendations from the research con-
22 sortia receiving awards under subsection (b)
23 and the Unconventional Resources Technology
24 Advisory Committee for each element to be ad-

1 dressed in the plan, including those described in
2 subparagraph (D).

3 (B) CONSULTATION.—The Secretary shall
4 consult regularly with the research consortia
5 throughout the preparation of the annual plan.

6 (C) PUBLICATION.—The Secretary shall
7 transmit to Congress and publish in the Fed-
8 eral Register the annual plan, along with any
9 written comments received under subparagraph
10 (A).

11 (D) CONTENTS.—The annual plan shall
12 describe the ongoing and prospective activities
13 under this section and shall include a list of any
14 solicitations for awards that the Secretary plans
15 to issue to carry out research, development,
16 demonstration, or commercial application activi-
17 ties, including the topics for such work, who
18 would be eligible to apply, selection criteria, and
19 the duration of awards.

20 (3) ESTIMATES OF INCREASED ROYALTY RE-
21 CEIPTS.—The Secretary, in consultation with the
22 Secretary of the Interior, shall provide an annual re-
23 port to Congress with the President's budget on the
24 estimated cumulative increase in Federal royalty re-
25 ceipts (if any) resulting from the implementation of

1 this part. The initial report under this paragraph
2 shall be submitted in the first President's budget fol-
3 lowing the completion of the first annual plan re-
4 quired under this subsection.

5 (f) ACTIVITIES BY THE UNITED STATES GEOLOGI-
6 CAL SURVEY.—The Secretary of the Interior, through the
7 United States Geological Survey, shall, where appropriate,
8 carry out programs of long-term research to complement
9 the programs under this section.

10 **SEC. 144. ADDITIONAL REQUIREMENTS FOR AWARDS.**

11 (a) DEMONSTRATION PROJECTS.—An application for
12 an award under this part for a demonstration project shall
13 describe with specificity the intended commercial use of
14 the technology to be demonstrated.

15 (b) FLEXIBILITY IN LOCATING DEMONSTRATION
16 PROJECTS.—Subject to the limitation in section 141(c),
17 a demonstration project under this part relating to an
18 ultra-deepwater technology or an ultra-deepwater architec-
19 ture may be conducted in deepwater depths.

20 (c) INTELLECTUAL PROPERTY AGREEMENTS.—If an
21 award under this part is made to a consortium (other than
22 the program consortium), the consortium shall provide to
23 the Secretary a signed contract agreed to by all members
24 of the consortium describing the rights of each member
25 to intellectual property used or developed under the award.

1 (d) TECHNOLOGY TRANSFER.—2.5 percent of the
2 amount of each award made under this part shall be des-
3 ignated for technology transfer and outreach activities
4 under this title.

5 (e) COST SHARING REDUCTION FOR INDEPENDENT
6 PRODUCERS.—In applying the cost sharing requirements
7 under section 172 to an award under this part the Sec-
8 retary may reduce or eliminate the non-Federal require-
9 ment if the Secretary determines that the reduction is nec-
10 essary and appropriate considering the technological risks
11 involved in the project.

12 **SEC. 145. ADVISORY COMMITTEES.**

13 (a) ULTRA-DEEPWATER ADVISORY COMMITTEE.—

14 (1) ESTABLISHMENT.—Not later than 270 days
15 after the date of enactment of this Act, the Sec-
16 retary shall establish an advisory committee to be
17 known as the Ultra-Deepwater Advisory Committee.

18 (2) MEMBERSHIP.—The advisory committee
19 under this subsection shall be composed of members
20 appointed by the Secretary including—

21 (A) individuals with extensive research ex-
22 perience or operational knowledge of offshore
23 natural gas and other petroleum exploration
24 and production;

1 (B) individuals broadly representative of
2 the affected interests in ultra-deepwater natural
3 gas and other petroleum production, including
4 interests in environmental protection and safe
5 operations;

6 (C) no individuals who are Federal employ-
7 ees; and

8 (D) no individuals who are board members,
9 officers, or employees of the program consor-
10 tium.

11 (3) DUTIES.—The advisory committee under
12 this subsection shall—

13 (A) advise the Secretary on the develop-
14 ment and implementation of programs under
15 this part related to ultra-deepwater natural gas
16 and other petroleum resources; and

17 (B) carry out section 142(e)(2)(B).

18 (4) COMPENSATION.—A member of the advi-
19 sory committee under this subsection shall serve
20 without compensation but shall receive travel ex-
21 penses in accordance with applicable provisions
22 under subchapter I of chapter 57 of title 5, United
23 States Code.

24 (b) UNCONVENTIONAL RESOURCES TECHNOLOGY
25 ADVISORY COMMITTEE.—

1 (1) ESTABLISHMENT.—Not later than 270 days
2 after the date of enactment of this Act, the Sec-
3 retary shall establish an advisory committee to be
4 known as the Unconventional Resources Technology
5 Advisory Committee.

6 (2) MEMBERSHIP.—The advisory committee
7 under this subsection shall be composed of members
8 appointed by the Secretary including—

9 (A) a majority of members who are em-
10 ployees or representatives of independent pro-
11 ducers of natural gas and other petroleum, in-
12 cluding small producers;

13 (B) individuals with extensive research ex-
14 perience or operational knowledge of unconven-
15 tional natural gas and other petroleum resource
16 exploration and production;

17 (C) individuals broadly representative of
18 the affected interests in unconventional natural
19 gas and other petroleum resource exploration
20 and production, including interests in environ-
21 mental protection and safe operations; and

22 (D) no individuals who are Federal em-
23 ployees.

24 (3) DUTIES.—The advisory committee under
25 this subsection shall advise the Secretary on the de-

1 velopment and implementation of activities under
2 this part related to unconventional natural gas and
3 other petroleum resources.

4 (4) COMPENSATION.—A member of the advi-
5 sory committee under this subsection shall serve
6 without compensation but shall receive travel ex-
7 penses in accordance with applicable provisions
8 under subchapter I of chapter 57 of title 5, United
9 States Code.

10 (c) PROHIBITION.—No advisory committee estab-
11 lished under this section shall make recommendations on
12 funding awards to particular consortia or other entities,
13 or for specific projects.

14 **SEC. 146. LIMITS ON PARTICIPATION.**

15 An entity shall be eligible to receive an award under
16 this part only if the Secretary finds—

17 (1) that the entity's participation in the pro-
18 gram under this part would be in the economic in-
19 terest of the United States; and

20 (2) that either—

21 (A) the entity is a United States-owned en-
22 tity organized under the laws of the United
23 States; or

24 (B) the entity is organized under the laws
25 of the United States and has a parent entity or-

ganized under the laws of a country that affords—

(i) to United States-owned entities opportunities, comparable to those afforded to any other entity, to participate in any cooperative research venture similar to those authorized under this part;

(ii) to United States-owned entities local investment opportunities comparable to those afforded to any other entity; and

(iii) adequate and effective protection for the intellectual property rights of United States-owned entities.

SEC. 147. SUNSET.

The authority provided by this part shall terminate on September 30, 2011.

SEC. 148. DEFINITIONS.

In this part:

(1) DEEPWATER.—The term “deepwater” means a water depth that is greater than 200 but less than 1,500 meters.

(2) INDEPENDENT PRODUCER OF OIL OR GAS.—

(A) IN GENERAL.—The term “independent producer of oil or gas” means any person that

1 produces oil or gas other than a person to
2 whom subsection (c) of section 613A of the In-
3 ternal Revenue Code of 1986 does not apply by
4 reason of paragraph (2) (relating to certain re-
5 tailers) or paragraph (4) (relating to certain re-
6 finers) of section 613A(d) of such Code.

7 (B) RULES FOR APPLYING PARAGRAPHS (2)
8 AND (4) OF SECTION 613A(d).—For purposes of
9 subparagraph (A), paragraphs (2) and (4) of
10 section 613A(d) of the Internal Revenue Code
11 of 1986 shall be applied by substituting “cal-
12 endar year” for “taxable year” each place it ap-
13 pears in such paragraphs.

14 (3) PROGRAM CONSORTIUM.—The term “pro-
15 gram consortium” means the consortium selected
16 under section 142(d).

17 (4) REMOTE OR INCONSEQUENTIAL.—The term
18 “remote or inconsequential” has the meaning given
19 that term in regulations issued by the Office of Gov-
20 ernment Ethics under section 208(b)(2) of title 18,
21 United States Code.

22 (5) SMALL PRODUCER.—The term “small pro-
23 ducer” means an entity organized under the laws of
24 the United States with production levels of less than
25 1,000 barrels per day of oil equivalent.

1 (6) ULTRA-DEEPWATER.—The term “ultra-
2 deepwater” means a water depth that is equal to or
3 greater than 1,500 meters.

4 (7) ULTRA-DEEPWATER ARCHITECTURE.—The
5 term “ultra-deepwater architecture” means the inte-
6 gration of technologies for the exploration for, or
7 production of, natural gas or other petroleum re-
8 sources located at ultra-deepwater depths.

9 (8) ULTRA-DEEPWATER TECHNOLOGY.—The
10 term “ultra-deepwater technology” means a discrete
11 technology that is specially suited to address 1 or
12 more challenges associated with the exploration for,
13 or production of, natural gas or other petroleum re-
14 sources located at ultra-deepwater depths.

15 (9) UNCONVENTIONAL NATURAL GAS AND
16 OTHER PETROLEUM RESOURCE.—The term “uncon-
17 ventional natural gas and other petroleum resource”
18 means natural gas and other petroleum resource lo-
19 cated onshore in an economically inaccessible geo-
20 logical formation, including resources of small pro-
21 ducers.

22 **SEC. 149. FUNDING.**

23 (a) IN GENERAL.—

24 (1) OIL AND GAS LEASE INCOME.—For each of
25 fiscal years 2004 through 2013, from any Federal

1 royalties, rents, and bonuses derived from Federal
2 onshore and offshore oil and gas leases issued under
3 the Outer Continental Shelf Lands Act and the Min-
4 eral Leasing Act which are deposited in the Treas-
5 ury, and after distribution of any such funds as de-
6 scribed in subsection (c), \$150,000,000 shall be de-
7 posited into the Ultra-Deepwater and Unconven-
8 tional Natural Gas and Other Petroleum Research
9 Fund (in this section referred to as the Fund). For
10 purposes of this section, the term “royalties” ex-
11 cludes proceeds from the sale of royalty production
12 taken in kind and royalty production that is trans-
13 ferred under section 27(a)(3) of the Outer Conti-
14 nental Shelf Lands Act (43 U.S.C. 1353(a)(3)).

15 (2) AUTHORIZATION OF APPROPRIATIONS.—In
16 addition to amounts described in paragraph (1),
17 there are authorized to be appropriated to the Sec-
18 retary, to be deposited in the Fund, \$50,000,000 for
19 each of the fiscal years 2004 through 2013, to re-
20 main available until expended.

21 (b) OBLIGATIONAL AUTHORITY.—Monies in the
22 Fund shall be available to the Secretary for obligation
23 under this part without fiscal year limitation, to remain
24 available until expended.

1 (c) PRIOR DISTRIBUTIONS.—The distributions de-
2 scribed in subsection (a) are those required by law—

3 (1) to States and to the Reclamation Fund
4 under the Mineral Leasing Act (30 U.S.C. 191(a));
5 and

6 (2) to other funds receiving monies from Fed-
7 eral oil and gas leasing programs, including—

8 (A) any recipients pursuant to section 8(g)
9 of the Outer Continental Shelf Lands Act (43
10 U.S.C. 1337(g));

11 (B) the Land and Water Conservation
12 Fund, pursuant to section 2(c) of the Land and
13 Water Conservation Fund Act of 1965 (16
14 U.S.C. 4601–5(c));

15 (C) the Historic Preservation Fund, pursu-
16 ant to section 108 of the National Historic
17 Preservation Act (16 U.S.C. 470h); and

18 (D) the Secure Energy Reinvestment
19 Fund.

20 (d) ALLOCATION.—Amounts obligated from the Fund
21 under this section in each fiscal year shall be allocated
22 as follows:

23 (1) 50 percent shall be for activities under sec-
24 tion 142.

1 (2) 35 percent shall be for activities under sec-
2 tion 143(d)(1).

3 (3) 10 percent shall be for activities under sec-
4 tion 143(d)(2).

5 (4) 5 percent shall be for research under section
6 141(d).

7 (e) FUND.—There is hereby established in the Treas-
8 ury of the United States a separate fund to be known as
9 the “Ultra-Deepwater and Unconventional Natural Gas
10 and Other Petroleum Research Fund”.

11 **Subtitle F—Science**

12 **SEC. 151. SCIENCE.**

13 (a) IN GENERAL.—The following sums are author-
14 ized to be appropriated to the Secretary for research, de-
15 velopment, demonstration, and commercial application ac-
16 tivities of the Office of Science, including activities author-
17 ized under this subtitle, including the amounts authorized
18 under the amendment made by section 158(c)(2)(C), and
19 including basic energy sciences, advanced scientific com-
20 puting research, biological and environmental research, fu-
21 sion energy sciences, high energy physics, nuclear physics,
22 and research analysis and infrastructure support:

23 (1) For fiscal year 2004, \$3,785,000,000.

24 (2) For fiscal year 2005, \$4,153,000,000.

25 (3) For fiscal year 2006, \$4,618,000,000.

1 (4) For fiscal year 2007, \$5,310,000,000.

2 (5) For fiscal year 2008, \$5,800,000,000.

3 (b) ALLOCATIONS.—From amounts authorized under
4 subsection (a), the following sums are authorized:

5 (1) For activities of the Fusion Energy Sciences
6 Program, including activities under sections 152 and
7 153—

8 (A) for fiscal year 2004, \$335,000,000;

9 (B) for fiscal year 2005, \$349,000,000;

10 (C) for fiscal year 2006, \$362,000,000;

11 (D) for fiscal year 2007, \$377,000,000;

12 and

13 (E) for fiscal year 2008, \$393,000,000.

14 (2) For the Spallation Neutron Source—

15 (A) for construction in fiscal year 2004,
16 \$124,600,000;

17 (B) for construction in fiscal year 2005,
18 \$79,800,000;

19 (C) for completion of construction in fiscal
20 year 2006, \$41,100,000; and

21 (D) for other project costs (including re-
22 search and development necessary to complete
23 the project, preoperations costs, and capital
24 equipment related to construction),
25 \$103,279,000 for the period encompassing fis-

1 cal years 2003 through 2006, to remain avail-
2 able until expended through September 30,
3 2006.

4 (3) For Catalysis Research activities under sec-
5 tion 156—

6 (A) for fiscal year 2004, \$33,000,000;

7 (B) for fiscal year 2005, \$35,000,000;

8 (C) for fiscal year 2006, \$36,500,000;

9 (D) for fiscal year 2007, \$38,200,000; and

10 (E) for fiscal year 2008, \$40,100,000.

11 (4) For Nanoscale Science and Engineering Re-
12 search activities under section 157—

13 (A) for fiscal year 2004, \$270,000,000;

14 (B) for fiscal year 2005, \$292,000,000;

15 (C) for fiscal year 2006, \$322,000,000;

16 (D) for fiscal year 2007, \$355,000,000;

17 and

18 (E) for fiscal year 2008, \$390,000,000.

19 (5) For activities under section 157(c), from
20 the amounts authorized under paragraph (4) of this
21 subsection—

22 (A) for fiscal year 2004, \$135,000,000;

23 (B) for fiscal year 2005, \$150,000,000;

24 (C) for fiscal year 2006, \$120,000,000;

1 (D) for fiscal year 2007, \$100,000,000;

2 and

3 (E) for fiscal year 2008, \$125,000,000.

4 (6) For activities in the Genomes to Life Pro-
5 gram under section 159—

6 (A) for fiscal year 2004, \$100,000,000;

7 and

8 (B) for fiscal years 2005 through 2008,
9 such sums as may be necessary.

10 (7) For activities in the Energy-Water Supply
11 Program under section 161, \$30,000,000 for each of
12 fiscal years 2004 through 2008.

13 (c) ITER CONSTRUCTION.—In addition to the funds
14 authorized under subsection (b)(1), such sums as may be
15 necessary for costs associated with ITER construction,
16 consistent with limitations under section 152.

17 **SEC. 152. UNITED STATES PARTICIPATION IN ITER.**

18 (a) IN GENERAL.—The United States may partici-
19 pate in ITER in accordance with the provisions of this
20 section.

21 (b) AGREEMENT.—

22 (1) IN GENERAL.—The Secretary is authorized
23 to negotiate an agreement for United States partici-
24 pation in ITER.

1 (2) CONTENTS.—Any agreement for United
2 States participation in ITER shall, at a minimum—

3 (A) clearly define the United States finan-
4 cial contribution to construction and operating
5 costs;

6 (B) ensure that the share of ITER’s high-
7 technology components manufactured in the
8 United States is at least proportionate to the
9 United States financial contribution to ITER;

10 (C) ensure that the United States will not
11 be financially responsible for cost overruns in
12 components manufactured in other ITER par-
13 ticipating countries;

14 (D) guarantee the United States full ac-
15 cess to all data generated by ITER;

16 (E) enable United States researchers to
17 propose and carry out an equitable share of the
18 experiments at ITER;

19 (F) provide the United States with a role
20 in all collective decisionmaking related to ITER;
21 and

22 (G) describe the process for discontinuing
23 or decommissioning ITER and any United
24 States role in those processes.

1 (c) PLAN.—The Secretary, in consultation with the
2 Fusion Energy Sciences Advisory Committee, shall de-
3 velop a plan for the participation of United States sci-
4 entists in ITER that shall include the United States re-
5 search agenda for ITER, methods to evaluate whether
6 ITER is promoting progress toward making fusion a reli-
7 able and affordable source of power, and a description of
8 how work at ITER will relate to other elements of the
9 United States fusion program. The Secretary shall request
10 a review of the plan by the National Academy of Sciences.

11 (d) LIMITATION.—No funds shall be expended for the
12 construction of ITER until the Secretary has transmitted
13 to Congress—

14 (1) the agreement negotiated pursuant to sub-
15 section (b) and 120 days have elapsed since that
16 transmission;

17 (2) a report describing the management struc-
18 ture of ITER and providing a fixed dollar estimate
19 of the cost of United States participation in the con-
20 struction of ITER, and 120 days have elapsed since
21 that transmission;

22 (3) a report describing how United States par-
23 ticipation in ITER will be funded without reducing
24 funding for other programs in the Office of Science,

1 including other fusion programs, and 60 days have
2 elapsed since that transmission; and

3 (4) the plan required by subsection (c) (but not
4 the National Academy of Sciences review of that
5 plan), and 60 days have elapsed since that trans-
6 mission.

7 (e) ALTERNATIVE TO ITER.—If at any time during
8 the negotiations on ITER, the Secretary determines that
9 construction and operation of ITER is unlikely or infeas-
10 ible, the Secretary shall send to Congress, as part of the
11 budget request for the following year, a plan for imple-
12 menting the domestic burning plasma experiment known
13 as FIRE, including costs and schedules for such a plan.
14 The Secretary shall refine such plan in full consultation
15 with the Fusion Energy Sciences Advisory Committee and
16 shall also transmit such plan to the National Academy of
17 Sciences for review.

18 (f) DEFINITIONS.—In this section and section
19 151(b)(1) and (c):

20 (1) CONSTRUCTION.—The term “construction”
21 means the physical construction of the ITER facil-
22 ity, and the physical construction, purchase, or man-
23 ufacture of equipment or components that are spe-
24 cifically designed for the ITER facility, but does not

1 mean the design of the facility, equipment, or com-
2 ponents.

3 (2) FIRE.—The term “FIRE” means the Fu-
4 sion Ignition Research Experiment, the fusion re-
5 search experiment for which design work has been
6 supported by the Department as a possible alter-
7 native burning plasma experiment in the event that
8 ITER fails to move forward.

9 (3) ITER.—The term “ITER” means the
10 international burning plasma fusion research project
11 in which the President announced United States
12 participation on January 30, 2003.

13 **SEC. 153. PLAN FOR FUSION ENERGY SCIENCES PROGRAM.**

14 (a) DECLARATION OF POLICY.—It shall be the policy
15 of the United States to conduct research, development,
16 demonstration, and commercial application to provide for
17 the scientific, engineering, and commercial infrastructure
18 necessary to ensure that the United States is competitive
19 with other nations in providing fusion energy for its own
20 needs and the needs of other nations, including by dem-
21 onstrating electric power or hydrogen production for the
22 United States energy grid utilizing fusion energy at the
23 earliest date possible.

24 (b) PLANNING.—

1 (1) IN GENERAL.—Not later than 180 days
2 after the date of enactment of this Act, the Sec-
3 retary shall present to Congress a plan, with pro-
4 posed cost estimates, budgets, and potential inter-
5 national partners, for the implementation of the pol-
6 icy described in subsection (a). The plan shall ensure
7 that—

8 (A) existing fusion research facilities are
9 more fully utilized;

10 (B) fusion science, technology, theory, ad-
11 vanced computation, modeling, and simulation
12 are strengthened;

13 (C) new magnetic and inertial fusion re-
14 search facilities are selected based on scientific
15 innovation, cost effectiveness, and their poten-
16 tial to advance the goal of practical fusion en-
17 ergy at the earliest date possible, and those that
18 are selected are funded at a cost-effective rate;

19 (D) communication of scientific results and
20 methods between the fusion energy science com-
21 munity and the broader scientific and tech-
22 nology communities is improved;

23 (E) inertial confinement fusion facilities
24 are utilized to the extent practicable for the

1 purpose of inertial fusion energy research and
2 development; and

3 (F) attractive alternative inertial and mag-
4 netic fusion energy approaches are more fully
5 explored.

6 (2) COSTS AND SCHEDULES.—Such plan shall
7 also address the status of and, to the degree pos-
8 sible, costs and schedules for—

9 (A) in coordination with the program
10 under section 160, the design and implementa-
11 tion of international or national facilities for the
12 testing of fusion materials; and

13 (B) the design and implementation of
14 international or national facilities for the test-
15 ing and development of key fusion technologies.

16 **SEC. 154. SPALLATION NEUTRON SOURCE.**

17 (a) DEFINITION.—For the purposes of this section,
18 the term “Spallation Neutron Source” means Department
19 Project 99–E–334, Oak Ridge National Laboratory, Oak
20 Ridge, Tennessee.

21 (b) REPORT.—The Secretary shall report on the
22 Spallation Neutron Source as part of the Department’s
23 annual budget submission, including a description of the
24 achievement of milestones, a comparison of actual costs

1 to estimated costs, and any changes in estimated project
2 costs or schedule.

3 (c) LIMITATIONS.—The total amount obligated by the
4 Department, including prior year appropriations, for the
5 Spallation Neutron Source shall not exceed—

6 (1) \$1,192,700,000 for costs of construction;

7 (2) \$219,000,000 for other project costs; and

8 (3) \$1,411,700,000 for total project cost.

9 **SEC. 155. SUPPORT FOR SCIENCE AND ENERGY FACILITIES**

10 **AND INFRASTRUCTURE.**

11 (a) FACILITY AND INFRASTRUCTURE POLICY.—The
12 Secretary shall develop and implement a strategy for fa-
13 cilities and infrastructure supported primarily from the
14 Office of Science, the Office of Energy Efficiency and Re-
15 newable Energy, the Office of Fossil Energy, or the Office
16 of Nuclear Energy, Science, and Technology Programs at
17 all National Laboratories and single-purpose research fa-
18 cilities. Such strategy shall provide cost-effective means
19 for—

20 (1) maintaining existing facilities and infra-
21 structure, as needed;

22 (2) closing unneeded facilities;

23 (3) making facility modifications; and

24 (4) building new facilities.

25 (b) REPORT.—

1 (1) IN GENERAL.—The Secretary shall prepare
 2 and transmit, along with the President’s budget re-
 3 quest to Congress for fiscal year 2006, a report con-
 4 taining the strategy developed under subsection (a).

5 (2) CONTENTS.—For each National Laboratory
 6 and single-purpose research facility, for the facilities
 7 primarily used for science and energy research, such
 8 report shall contain—

9 (A) the current priority list of proposed fa-
 10 cilities and infrastructure projects, including
 11 cost and schedule requirements;

12 (B) a current 10-year plan that dem-
 13 onstrates the reconfiguration of its facilities and
 14 infrastructure to meet its missions and to ad-
 15 dress its long-term operational costs and return
 16 on investment;

17 (C) the total current budget for all facili-
 18 ties and infrastructure funding; and

19 (D) the current status of each facility and
 20 infrastructure project compared to the original
 21 baseline cost, schedule, and scope.

22 **SEC. 156. CATALYSIS RESEARCH AND DEVELOPMENT PRO-**
 23 **GRAM.**

24 (a) ESTABLISHMENT.—The Secretary, through the
 25 Office of Science, shall support a program of research and

1 development in catalysis science consistent with the De-
2 partment's statutory authorities related to research and
3 development. The program shall include efforts to—

4 (1) enable catalyst design using combinations of
5 experimental and mechanistic methodologies coupled
6 with computational modeling of catalytic reactions at
7 the molecular level;

8 (2) develop techniques for high throughput syn-
9 thesis, assay, and characterization at nanometer and
10 subnanometer scales in situ under actual operating
11 conditions;

12 (3) synthesize catalysts with specific site archi-
13 tectures;

14 (4) conduct research on the use of precious
15 metals for catalysis; and

16 (5) translate molecular understanding to the
17 design of catalytic compounds.

18 (b) DUTIES OF THE OFFICE OF SCIENCE.—In car-
19 rying out the program under this section, the Director of
20 the Office of Science shall—

21 (1) support both individual investigators and
22 multidisciplinary teams of investigators to pioneer
23 new approaches in catalytic design;

24 (2) develop, plan, construct, acquire, share, or
25 operate special equipment or facilities for the use of

1 investigators in collaboration with national user fa-
2 cilities such as nanoscience and engineering centers;

3 (3) support technology transfer activities to
4 benefit industry and other users of catalysis science
5 and engineering; and

6 (4) coordinate research and development activi-
7 ties with industry and other Federal agencies.

8 (c) TRIENNIAL ASSESSMENT.—The National Acad-
9 emy of Sciences shall review the catalysis program every
10 3 years to report on gains made in the fundamental
11 science of catalysis and its progress towards developing
12 new fuels for energy production and material fabrication
13 processes.

14 **SEC. 157. NANOSCALE SCIENCE AND ENGINEERING RE-**
15 **SEARCH, DEVELOPMENT, DEMONSTRATION,**
16 **AND COMMERCIAL APPLICATION.**

17 (a) ESTABLISHMENT.—The Secretary, acting
18 through the Office of Science, shall support a program of
19 research, development, demonstration, and commercial ap-
20 plication in nanoscience and nanoengineering. The pro-
21 gram shall include efforts to further the understanding of
22 the chemistry, physics, materials science, and engineering
23 of phenomena on the scale of nanometers and to apply
24 that knowledge to the Department's mission areas.

1 (b) DUTIES OF THE OFFICE OF SCIENCE.—In car-
2 rying out the program under this section, the Office of
3 Science shall—

4 (1) support both individual investigators and
5 teams of investigators, including multidisciplinary
6 teams;

7 (2) carry out activities under subsection (c);

8 (3) support technology transfer activities to
9 benefit industry and other users of nanoscience and
10 nanoengineering;

11 (4) coordinate research and development activi-
12 ties with other Department programs, industry, and
13 other Federal agencies;

14 (5) ensure that societal and ethical concerns
15 will be addressed as the technology is developed by—

16 (A) establishing a research program to
17 identify societal and ethical concerns related to
18 nanotechnology, and ensuring that the results
19 of such research are widely disseminated; and

20 (B) integrating, insofar as possible, re-
21 search on societal and ethical concerns with
22 nanotechnology research and development; and

23 (6) ensure that the potential of nanotechnology
24 to produce or facilitate the production of clean, inex-
25 pensive energy is realized by supporting

1 nanotechnology energy applications research and de-
2 velopment.

3 (c) NANOSCIENCE AND NANOENGINEERING RE-
4 SEARCH CENTERS AND MAJOR INSTRUMENTATION.—

5 (1) IN GENERAL.—The Secretary shall carry
6 out projects to develop, plan, construct, acquire, op-
7 erate, or support special equipment, instrumenta-
8 tion, or facilities for investigators conducting re-
9 search and development in nanoscience and
10 nanoengineering.

11 (2) ACTIVITIES.—Projects under paragraph (1)
12 may include the measurement of properties at the
13 scale of nanometers, manipulation at such scales,
14 and the integration of technologies based on
15 nanoscience or nanoengineering into bulk materials
16 or other technologies.

17 (3) FACILITIES.—Facilities under paragraph
18 (1) may include electron microcharacterization facili-
19 ties, microlithography facilities, scanning probe fa-
20 cilities, and related instrumentation.

21 (4) COLLABORATIONS.—The Secretary shall en-
22 courage collaborations among Department programs,
23 institutions of higher education, laboratories, and in-
24 dustry at facilities under this subsection.

1 **SEC. 158. ADVANCED SCIENTIFIC COMPUTING FOR ENERGY**

2 **MISSIONS.**

3 (a) IN GENERAL.—The Secretary, acting through the
4 Office of Science, shall support a program to advance the
5 Nation’s computing capability across a diverse set of
6 grand challenge, computationally based, science problems
7 related to departmental missions.

8 (b) DUTIES OF THE OFFICE OF SCIENCE.—In car-
9 rying out the program under this section, the Office of
10 Science shall—

11 (1) advance basic science through computation
12 by developing software to solve grand challenge
13 science problems on new generations of computing
14 platforms in collaboration with other Department
15 program offices;

16 (2) enhance the foundations for scientific com-
17 puting by developing the basic mathematical and
18 computing systems software needed to take full ad-
19 vantage of the computing capabilities of computers
20 with peak speeds of 100 teraflops or more, some of
21 which may be unique to the scientific problem of in-
22 terest;

23 (3) enhance national collaboratory and net-
24 working capabilities by developing software to inte-
25 grate geographically separated researchers into ef-

1 fective research teams and to facilitate access to and
2 movement and analysis of large (petabyte) data sets;

3 (4) develop and maintain a robust scientific
4 computing hardware infrastructure to ensure that
5 the computing resources needed to address depart-
6 mental missions are available; and

7 (5) explore new computing approaches and
8 technologies that promise to advance scientific com-
9 puting, including developments in quantum com-
10 puting.

11 (c) HIGH-PERFORMANCE COMPUTING ACT OF 1991
12 AMENDMENTS.—The High-Performance Computing Act
13 of 1991 is amended—

14 (1) in section 4 (15 U.S.C. 5503)—

15 (A) in paragraph (3) by striking “means”
16 and inserting “and networking and information
17 technology mean”, and by striking “(including
18 vector supercomputers and large scale parallel
19 systems)”; and

20 (B) in paragraph (4), by striking “packet
21 switched”; and

22 (2) in section 203 (15 U.S.C. 5523)—

23 (A) in subsection (a), by striking all after
24 “As part of the” and inserting “Networking
25 and Information Technology Research and De-

1 velopment Program, the Secretary of Energy
2 shall conduct basic and applied research in net-
3 working and information technology, with em-
4 phasis on supporting fundamental research in
5 the physical sciences and engineering, and en-
6 ergy applications; providing supercomputer ac-
7 cess and advanced communication capabilities
8 and facilities to scientific researchers; and de-
9 veloping tools for distributed scientific collabo-
10 ration.”;

11 (B) in subsection (b), by striking “Pro-
12 gram” and inserting “Networking and Informa-
13 tion Technology Research and Development
14 Program”; and

15 (C) by amending subsection (e) to read as
16 follows:

17 “(e) AUTHORIZATION OF APPROPRIATIONS.—There
18 are authorized to be appropriated to the Secretary of En-
19 ergy to carry out the Networking and Information Tech-
20 nology Research and Development Program such sums as
21 may be necessary for fiscal years 2004 through 2008.”.

22 (d) COORDINATION.—The Secretary shall ensure that
23 the program under this section is integrated and con-
24 sistent with—

1 (1) the Advanced Simulation and Computing
2 Program, formerly known as the Accelerated Strategic Computing Initiative, of the National Nuclear
3 Security Administration; and

5 (2) other national efforts related to advanced
6 scientific computing for science and engineering.

7 (e) REPORT.—

8 (1) IN GENERAL.—Before undertaking any new
9 initiative to develop any new advanced architecture
10 for high-speed computing, the Secretary, through the
11 Director of the Office of Science, shall transmit a report to Congress describing—

13 (A) the expected duration and cost of the
14 initiative;

15 (B) the technical milestones the initiative
16 is designed to achieve;

17 (C) how institutions of higher education
18 and private firms will participate in the initiative; and

20 (D) why the goals of the initiative could
21 not be achieved through existing programs.

22 (2) LIMITATION.—No funds may be expended
23 on any initiative described in paragraph (1) until 30
24 days after the report required by that paragraph is
25 transmitted to Congress.

1 **SEC. 159. GENOMES TO LIFE PROGRAM.**

2 (a) PROGRAM.—

3 (1) ESTABLISHMENT.—The Secretary shall es-
4 tablish a research, development, and demonstration
5 program in genetics, protein science, and computa-
6 tional biology to support the energy, national secu-
7 rity, and environmental mission of the Department.

8 (2) GRANTS.—The program shall support indi-
9 vidual investigators and multidisciplinary teams of
10 investigators through competitive, merit-reviewed
11 grants.

12 (3) CONSULTATION.—In carrying out the pro-
13 gram, the Secretary shall consult with other Federal
14 agencies that conduct genetic and protein research.

15 (b) GOALS.—The program shall have the goal of de-
16 veloping technologies and methods based on the biological
17 functions of genomes, microbes, and plants that—

18 (1) can facilitate the production of fuels, includ-
19 ing hydrogen;

20 (2) convert carbon dioxide to organic carbon;

21 (3) improve national security and combat ter-
22 rorism;

23 (4) detoxify soils and water at Department fa-
24 cilities contaminated with heavy metals and radio-
25 logical materials; and

1 (5) address other Department missions as iden-
2 tified by the Secretary.

3 (c) PLAN.—

4 (1) DEVELOPMENT OF PLAN.—Not later than 1
5 year after the date of enactment of this Act, the
6 Secretary shall prepare and transmit to Congress a
7 research plan describing how the program author-
8 ized pursuant to this section will be undertaken to
9 accomplish the program goals established in sub-
10 section (b).

11 (2) REVIEW OF PLAN.—The Secretary shall
12 contract with the National Academy of Sciences to
13 review the research plan developed under this sub-
14 section. The Secretary shall transmit the review to
15 Congress not later than 18 months after transmittal
16 of the research plan under paragraph (1), along with
17 the Secretary's response to the recommendations
18 contained in the review.

19 (d) GENOMES TO LIFE USER FACILITIES AND AN-
20 CILLARY EQUIPMENT.—

21 (1) IN GENERAL.—Within the funds authorized
22 to be appropriated pursuant to this Act, the
23 amounts specified under section 151(b)(6) shall,
24 subject to appropriations, be available for projects to
25 develop, plan, construct, acquire, or operate special

1 equipment, instrumentation, or facilities for inves-
2 tigators conducting research, development, dem-
3 onstration, and commercial application in systems
4 biology and proteomics and associated biological dis-
5 ciplines.

6 (2) FACILITIES.—Facilities under paragraph
7 (1) may include facilities, equipment, or instrumen-
8 tation for—

9 (A) the production and characterization of
10 proteins;

11 (B) whole proteome analysis;

12 (C) characterization and imaging of molec-
13 ular machines; and

14 (D) analysis and modeling of cellular sys-
15 tems.

16 (3) COLLABORATIONS.—The Secretary shall en-
17 courage collaborations among universities, labora-
18 tories, and industry at facilities under this sub-
19 section. All facilities under this subsection shall have
20 a specific mission of technology transfer to other in-
21 stitutions.

22 (e) PROHIBITION ON BIOMEDICAL AND HUMAN CELL
23 AND HUMAN SUBJECT RESEARCH.—

1 (1) NO BIOMEDICAL RESEARCH.—In carrying
2 out the program under this section, the Secretary
3 shall not conduct biomedical research.

4 (2) LIMITATIONS.—Nothing in this section shall
5 authorize the Secretary to conduct any research or
6 demonstrations—

7 (A) on human cells or human subjects; or

8 (B) designed to have direct application
9 with respect to human cells or human subjects.

10 **SEC. 160. FISSION AND FUSION ENERGY MATERIALS RE-**
11 **SEARCH PROGRAM.**

12 In the President's fiscal year 2006 budget request,
13 the Secretary shall establish a research and development
14 program on material science issues presented by advanced
15 fission reactors and the Department's fusion energy pro-
16 gram. The program shall develop a catalog of material
17 properties required for these applications, develop theo-
18 retical models for materials possessing the required prop-
19 erties, benchmark models against existing data, and de-
20 velop a roadmap to guide further research and develop-
21 ment in this area.

22 **SEC. 161. ENERGY-WATER SUPPLY PROGRAM.**

23 (a) ESTABLISHMENT.—There is established within
24 the Department the Energy-Water Supply Program, to
25 study energy-related and certain other issues associated

1 with the supply of drinking water and operation of com-
2 munity water systems and to study water supply issues
3 related to energy.

4 (b) DEFINITIONS.—For the purposes of this section:

5 (1) ADMINISTRATOR.—The term “Adminis-
6 trator” means the Administrator of the Environ-
7 mental Protection Agency.

8 (2) AGENCY.—The term “Agency” means the
9 Environmental Protection Agency.

10 (3) FOUNDATION.—The term “Foundation”
11 means the American Water Works Association Re-
12 search Foundation.

13 (4) INDIAN TRIBE.—The term “Indian tribe”
14 has the meaning given the term in section 4 of the
15 Indian Self-Determination and Education Assistance
16 Act (25 U.S.C. 450b).

17 (5) PROGRAM.—The term “Program” means
18 the Energy-Water Supply Program established by
19 this section.

20 (c) PROGRAM AREAS.—The Program shall develop
21 methods, means, procedures, equipment, and improved
22 technologies relating to—

23 (1) the arsenic removal program under sub-
24 section (d);

1 (2) the desalination program under subsection
2 (e); and

3 (3) the water and energy sustainability program
4 under subsection (f).

5 (d) ARSENIC REMOVAL PROGRAM.—

6 (1) IN GENERAL.—As soon as practicable after
7 the date of enactment of this Act, the Secretary, in
8 coordination with the Administrator and in partner-
9 ship with the Foundation, shall utilize the facilities,
10 institutions, and relationships established in the
11 Consolidated Appropriations Resolution, 2003 as de-
12 scribed in Senate Report 107–220 to carry out a re-
13 search program to provide innovative methods and
14 means for removal of arsenic.

15 (2) REQUIRED EVALUATIONS.—The program
16 shall, to the maximum extent practicable, evaluate
17 the means of—

18 (A) reducing energy costs incurred in
19 using arsenic removal technologies;

20 (B) minimizing materials, operating, and
21 maintenance costs; and

22 (C) minimizing any quantities of waste (es-
23 pecially hazardous waste) that result from use
24 of arsenic removal technologies.

1 (3) PEER REVIEW.—Where applicable and rea-
2 sonably available, projects undertaken under this
3 subsection shall be peer-reviewed.

4 (4) COMMUNITY WATER SYSTEMS.—In carrying
5 out the program under this subsection, the Sec-
6 retary, in coordination with the Administrator,
7 shall—

8 (A) select projects involving a geographi-
9 cally and hydrologically diverse group of com-
10 munity water systems (as defined in section
11 1003 of the Public Health Service Act (42
12 U.S.C. 300)) and water chemistries, that have
13 experienced technical or economic difficulties in
14 providing drinking water with levels of arsenic
15 at 10 parts-per-billion or lower, which projects
16 shall be designed to develop innovative methods
17 and means to deliver drinking water that con-
18 tains less than 10 parts per billion of arsenic;
19 and

20 (B) provide not less than 40 percent of all
21 funds spent pursuant to this subsection to ad-
22 dress the needs of, and in collaboration with,
23 rural communities or Indian tribes.

24 (5) COST EFFECTIVENESS.—The Foundation
25 shall create methods for determining cost effective-

1 ness of arsenic removal technologies used in the pro-
2 gram.

3 (6) EDUCATION, TRAINING, AND TECH-
4 NOLOGY.—The Foundation shall include education,
5 training, and technology transfer as part of the pro-
6 gram.

7 (7) COORDINATION.—The Secretary shall con-
8 sult with the Administrator to ensure that all activi-
9 ties conducted under the program are coordinated
10 with the Agency and do not duplicate other pro-
11 grams in the Agency and other Federal agencies,
12 State programs, and academia.

13 (8) REPORTS.—Not later than 1 year after the
14 date of commencement of the program under this
15 subsection, and once every year thereafter, the Sec-
16 retary shall submit to the Committee on Energy and
17 Commerce of the House of Representatives and the
18 Committee on Environment and Public Works and
19 the Committee on Energy and Natural Resources of
20 the Senate a report on the results of the program
21 under this subsection.

22 (e) DESALINATION PROGRAM.—

23 (1) IN GENERAL.—The Secretary, in coopera-
24 tion with the Commissioner of Reclamation of the
25 Department of the Interior, shall carry out a pro-

1 gram to conduct research and develop methods and
2 means for desalination in accordance with the desali-
3 nation technology progress plan developed under
4 title II of the Energy and Water Development Ap-
5 propriations Act, 2002 (115 Stat. 498), and de-
6 scribed in Senate Report 107–39 under the heading
7 “WATER AND RELATED RESOURCES” in the “BU-
8 REAU OF RECLAMATION” section.

9 (2) REQUIREMENTS.—The desalination pro-
10 gram shall—

11 (A) use the resources of the Department
12 and the Department of the Interior that were
13 involved in the development of the 2003 Na-
14 tional Desalination and Water Purification
15 Technology Roadmap for next-generation de-
16 salination technology;

17 (B) focus on technologies that are appro-
18 priate for use in desalinating brackish ground-
19 water, drinking water, wastewater and other sa-
20 line water supplies, or disposal of residual brine
21 or salt; and

22 (C) consider the use of renewable energy
23 sources.

24 (3) CONSTRUCTION PROJECTS.—Funds made
25 available to carry out this subsection may be used

1 for construction projects, including completion of the
2 National Desalination Research Center for brackish
3 groundwater and ongoing operational costs of this
4 facility.

5 (4) STEERING COMMITTEE.—The Secretary and
6 the Commissioner of Reclamation of the Department
7 of the Interior shall jointly establish a steering com-
8 mittee for activities conducted under this subsection.
9 The steering committee shall be jointly chaired by 1
10 representative from the program and 1 representa-
11 tive from the Bureau of Reclamation.

12 (f) WATER AND ENERGY SUSTAINABILITY PRO-
13 GRAM.—

14 (1) IN GENERAL.—The Secretary shall develop
15 a program to identify methods, means, procedures,
16 equipment, and improved technologies necessary to
17 ensure that sufficient quantities of water are avail-
18 able to meet energy needs and sufficient energy is
19 available to meet water needs.

20 (2) ASSESSMENTS.—In order to acquire infor-
21 mation and avoid duplication, the Secretary shall
22 work in collaboration with the Secretary of the Inte-
23 rior, the Army Corps of Engineers, the Adminis-
24 trator, the Secretary of Commerce, the Secretary of

1 Defense, relevant State agencies, nongovernmental
2 organizations, and academia, to assess—

3 (A) future water resources needed to sup-
4 port energy development and production within
5 the United States including water used for hy-
6 dropower, and production of, or electricity gen-
7 eration by, hydrogen, biomass, fossil fuels, and
8 nuclear fuel;

9 (B) future energy resources needed to sup-
10 port water purification and wastewater treat-
11 ment, including desalination and water convey-
12 ance;

13 (C) use of impaired and nontraditional
14 water supplies for energy production other than
15 oil and gas extraction;

16 (D) technology and programs for improv-
17 ing water use efficiency; and

18 (E) technologies to reduce water use in en-
19 ergy development and production.

20 (3) ROADMAP; TOOLS.—The Secretary shall—

21 (A) develop a program plan and technology
22 development roadmap for the Water and En-
23 ergy Sustainability Program to identify sci-
24 entific and technical requirements and activities
25 that are required to support planning for en-

1 ergy sustainability under current and potential
2 future conditions of water availability, use of
3 impaired water for energy production and other
4 uses, and reduction of water use in energy de-
5 velopment and production;

6 (B) develop tools for national and local en-
7 ergy and water sustainability planning, includ-
8 ing numerical models, decision analysis tools,
9 economic analysis tools, databases, and plan-
10 ning methodologies and strategies;

11 (C) implement at least 3 planning projects
12 involving energy development or production that
13 use the tools described in subparagraph (B)
14 and assess the viability of those tools at the
15 scale of river basins with at least 1 demonstra-
16 tion involving an international border; and

17 (D) transfer those tools to other Federal
18 agencies, State agencies, nonprofit organiza-
19 tions, industry, and academia.

20 (4) REPORT.—Not later than 1 year after the
21 date of enactment of this Act, the Secretary shall
22 submit to Congress a report on the Water and En-
23 ergy Sustainability Program that—

1 (A) includes the results of the assessment
2 under paragraph (2) and the program plan and
3 technology development roadmap; and

4 (B) identifies policy, legal, and institu-
5 tional issues related to water and energy sus-
6 tainability.

7 **SEC. 162. NITROGEN FIXATION.**

8 The Secretary, acting through the Office of Science,
9 shall support a program of research, development, dem-
10 onstration, and commercial application on biological nitro-
11 gen fixation, including plant genomics research relevant
12 to the development of commercial crop varieties with en-
13 hanced nitrogen fixation efficiency and ability.

14 **Subtitle G—Energy and**
15 **Environment**

16 **SEC. 164. UNITED STATES-MEXICO ENERGY TECHNOLOGY**
17 **COOPERATION.**

18 (a) PROGRAM.—The Secretary shall establish a re-
19 search, development, demonstration, and commercial ap-
20 plication program to be carried out in collaboration with
21 entities in Mexico and the United States to promote en-
22 ergy efficient, environmentally sound economic develop-
23 ment along the United States-Mexico border that mini-
24 mizes public health risks from industrial activities in the
25 border region.

1 (b) PROGRAM MANAGEMENT.—The program under
2 subsection (a) shall be managed by the Department of En-
3 ergy Carlsbad Environmental Management Field Office.

4 (c) TECHNOLOGY TRANSFER.—In carrying out
5 projects and activities under this section, the Secretary
6 shall assess the applicability of technology developed under
7 the Environmental Management Science Program of the
8 Department.

9 (d) INTELLECTUAL PROPERTY.—In carrying out this
10 section, the Secretary shall comply with the requirements
11 of any agreement entered into between the United States
12 and Mexico regarding intellectual property protection.

13 (e) AUTHORIZATION OF APPROPRIATIONS.—The fol-
14 lowing sums are authorized to be appropriated to the Sec-
15 retary to carry out activities under this section:

16 (1) For each of fiscal years 2004 and 2005,
17 \$5,000,000.

18 (2) For each of fiscal years 2006, 2007, and
19 2008, \$6,000,000.

20 **SEC. 165. WESTERN HEMISPHERE ENERGY COOPERATION.**

21 (a) PROGRAM.—The Secretary shall carry out a pro-
22 gram to promote cooperation on energy issues with West-
23 ern Hemisphere countries.

1 (b) ACTIVITIES.—Under the program, the Secretary
2 shall fund activities to work with Western Hemisphere
3 countries to—

4 (1) assist the countries in formulating and
5 adopting changes in economic policies and other poli-
6 cies to—

7 (A) increase the production of energy sup-
8 plies; and

9 (B) improve energy efficiency; and

10 (2) assist in the development and transfer of
11 energy supply and efficiency technologies that would
12 have a beneficial impact on world energy markets.

13 (c) UNIVERSITY PARTICIPATION.—To the extent
14 practicable, the Secretary shall carry out the program
15 under this section with the participation of universities so
16 as to take advantage of the acceptance of universities by
17 Western Hemisphere countries as sources of unbiased
18 technical and policy expertise when assisting the Secretary
19 in—

20 (1) evaluating new technologies;

21 (2) resolving technical issues;

22 (3) working with those countries in the develop-
23 ment of new policies; and

24 (4) training policymakers, particularly in the
25 case of universities that involve the participation of

1 minority students, such as Hispanic-serving institu-
2 tions and Historically Black Colleges and Univer-
3 sities.

4 (d) AUTHORIZATION OF APPROPRIATIONS.—There
5 are authorized to be appropriated to carry out this sec-
6 tion—

- 7 (1) \$8,000,000 for fiscal year 2004;
- 8 (2) \$10,000,000 for fiscal year 2005;
- 9 (3) \$13,000,000 for fiscal year 2006;
- 10 (4) \$16,000,000 for fiscal year 2007; and
- 11 (5) \$19,000,000 for fiscal year 2008.

12 **SEC. 166. WASTE REDUCTION AND USE OF ALTERNATIVES.**

13 (a) GRANT AUTHORITY.—The Secretary may make
14 a single grant to a qualified institution to examine and
15 develop the feasibility of burning post-consumer carpet in
16 cement kilns as an alternative energy source. The pur-
17 poses of the grant shall include determining—

- 18 (1) how post-consumer carpet can be burned
19 without disrupting kiln operations;
- 20 (2) the extent to which overall kiln emissions
21 may be reduced;
- 22 (3) the emissions of air pollutants and other
23 relevant environmental impacts; and
- 24 (4) how this process provides benefits to both
25 cement kiln operations and carpet suppliers.

1 (b) QUALIFIED INSTITUTION.—For the purposes of
2 subsection (a), a qualified institution is a research-inten-
3 sive institution of higher education with demonstrated ex-
4 pertise in the fields of fiber recycling and logistical mod-
5 eling of carpet waste collection and preparation.

6 (c) AUTHORIZATION OF APPROPRIATIONS.—There
7 are authorized to be appropriated to the Secretary for car-
8 rying out this section \$500,000.

9 **SEC. 167. REPORT ON FUEL CELL TEST CENTER.**

10 (a) REPORT.—Not later than 1 year after the date
11 of enactment of this Act, the Secretary shall transmit to
12 Congress a report on the results of a study of the estab-
13 lishment of a test center for next-generation fuel cells at
14 an institution of higher education that has available a con-
15 tinuous source of hydrogen and access to the electric
16 transmission grid. Such report shall include a conceptual
17 design for such test center and a projection of the costs
18 of establishing the test center.

19 (b) AUTHORIZATION OF APPROPRIATIONS.—There
20 are authorized to be appropriated to the Secretary for car-
21 rying out this section \$500,000.

22 **SEC. 168. ARCTIC ENGINEERING RESEARCH CENTER.**

23 (a) IN GENERAL.—The Secretary of Energy (referred
24 to in this section as the “Secretary”) in consultation with
25 the Secretary of Transportation and the United States

1 Arctic Research Commission shall provide annual grants
2 to a university located adjacent to the Arctic Energy Of-
3 fice of the Department of Energy, to establish and operate
4 a university research center to be headquartered in Fair-
5 banks and to be known as the “Arctic Engineering Re-
6 search Center” (referred to in this section as the “Cen-
7 ter”).

8 (b) PURPOSE.—The purpose of the Center shall be
9 to conduct research on, and develop improved methods of,
10 construction and use of materials to improve the overall
11 performance of roads, bridges, residential, commercial,
12 and industrial structures, and other infrastructure in the
13 Arctic region, with an emphasis on developing—

14 (1) new construction techniques for roads,
15 bridges, rail, and related transportation infrastruc-
16 ture and residential, commercial, and industrial in-
17 frastructure that are capable of withstanding the
18 Arctic environment and using limited energy re-
19 sources as efficiently as possible;

20 (2) technologies and procedures for increasing
21 road, bridge, rail, and related transportation infra-
22 structure and residential, commercial, and industrial
23 infrastructure safety, reliability, and integrity in the
24 Arctic region;

1 (3) new materials and improving the perform-
2 ance and energy efficiency of existing materials for
3 the construction of roads, bridges, rail, and related
4 transportation infrastructure and residential, com-
5 mercial, and industrial infrastructure in the Arctic
6 region; and

7 (4) recommendations for new local, regional,
8 and State permitting and building codes to ensure
9 transportation and building safety and efficient en-
10 ergy use when constructing, using, and occupying
11 such infrastructure in the Arctic region.

12 (c) OBJECTIVES.—The Center shall carry out—

13 (1) basic and applied research in the subjects
14 described in subsection (b), the products of which
15 shall be judged by peers or other experts in the field
16 to advance the body of knowledge in road, bridge,
17 rail, and infrastructure engineering in the Arctic re-
18 gion; and

19 (2) an ongoing program of technology transfer
20 that makes research results available to potential
21 users in a form that can be implemented.

22 (d) AMOUNT OF GRANT.—For each of fiscal years
23 2004 through 2009, the Secretary shall provide a grant
24 in the amount of \$3,000,000 to the institution specified
25 in subsection (a) to carry out this section.

1 (e) AUTHORIZATION OF APPROPRIATIONS.—There
2 are authorized to be appropriated to carry out this section
3 \$3,000,000 for each of fiscal years 2004 through 2009.

4 **Subtitle H—Management**

5 **SEC. 171. AVAILABILITY OF FUNDS.**

6 Funds authorized to be appropriated to the Depart-
7 ment under this title shall remain available until expended.

8 **SEC. 172. COST SHARING.**

9 (a) RESEARCH AND DEVELOPMENT.—Except as oth-
10 erwise provided in this title, for research and development
11 programs carried out under this title the Secretary shall
12 require a commitment from non-Federal sources of at
13 least 20 percent of the cost of the project. The Secretary
14 may reduce or eliminate the non-Federal requirement
15 under this subsection if the Secretary determines that the
16 research and development is of a basic or fundamental na-
17 ture or involves technical analyses or educational activi-
18 ties.

19 (b) DEMONSTRATION AND COMMERCIAL APPLICA-
20 TION.—Except as otherwise provided in this title, the Sec-
21 retary shall require at least 50 percent of the costs directly
22 and specifically related to any demonstration or commer-
23 cial application project under this title to be provided from
24 non-Federal sources. The Secretary may reduce the non-
25 Federal requirement under this subsection if the Secretary

1 determines that the reduction is necessary and appropriate
2 considering the technological risks involved in the project
3 and is necessary to meet the objectives of this title.

4 (c) CALCULATION OF AMOUNT.—In calculating the
5 amount of the non-Federal commitment under subsection
6 (a) or (b), the Secretary may include personnel, services,
7 equipment, and other resources.

8 (d) SIZE OF NON-FEDERAL SHARE.—The Secretary
9 may consider the size of the non-Federal share in selecting
10 projects.

11 **SEC. 173. MERIT REVIEW OF PROPOSALS.**

12 Awards of funds authorized under this title shall be
13 made only after an impartial review of the scientific and
14 technical merit of the proposals for such awards has been
15 carried out by or for the Department.

16 **SEC. 174. EXTERNAL TECHNICAL REVIEW OF DEPART-**
17 **MENTAL PROGRAMS.**

18 (a) NATIONAL ENERGY RESEARCH AND DEVELOP-
19 MENT ADVISORY BOARDS.—

20 (1) IN GENERAL.—The Secretary shall establish
21 1 or more advisory boards to review Department re-
22 search, development, demonstration, and commercial
23 application programs in energy efficiency, renewable
24 energy, nuclear energy, and fossil energy.

1 (2) EXISTING ADVISORY BOARDS.—The Sec-
2 retary may designate an existing advisory board
3 within the Department to fulfill the responsibilities
4 of an advisory board under this subsection, and may
5 enter into appropriate arrangements with the Na-
6 tional Academy of Sciences to establish such an ad-
7 visory board.

8 (b) OFFICE OF SCIENCE ADVISORY COMMITTEES.—

9 (1) UTILIZATION OF EXISTING COMMITTEES.—
10 The Secretary shall continue to use the scientific
11 program advisory committees chartered under the
12 Federal Advisory Committee Act (5 U.S.C. App.) by
13 the Office of Science to oversee research and devel-
14 opment programs under that Office.

15 (2) SCIENCE ADVISORY COMMITTEE.—

16 (A) ESTABLISHMENT.—There shall be in
17 the Office of Science a Science Advisory Com-
18 mittee that includes the chairs of each of the
19 advisory committees described in paragraph (1).

20 (B) RESPONSIBILITIES.—The Science Ad-
21 visory Committee shall—

22 (i) serve as the science advisor to the
23 Director of the Office of Science;

24 (ii) advise the Director with respect to
25 the well-being and management of the Na-

1 tional Laboratories and single-purpose re-
2 search facilities;

3 (iii) advise the Director with respect
4 to education and workforce training activi-
5 ties required for effective short-term and
6 long-term basic and applied research ac-
7 tivities of the Office of Science; and

8 (iv) advise the Director with respect
9 to the well being of the university research
10 programs supported by the Office of
11 Science.

12 (c) MEMBERSHIP.—Each advisory board under this
13 section shall consist of persons with appropriate expertise
14 representing a diverse range of interests.

15 (d) MEETINGS AND PURPOSES.—Each advisory
16 board under this section shall meet at least semiannually
17 to review and advise on the progress made by the respec-
18 tive research, development, demonstration, and commer-
19 cial application program or programs. The advisory board
20 shall also review the measurable cost and performance-
21 based goals for such programs as established under sec-
22 tion 101(b), and the progress on meeting such goals.

23 (e) PERIODIC REVIEWS AND ASSESSMENTS.—The
24 Secretary shall enter into appropriate arrangements with
25 the National Academy of Sciences to conduct periodic re-

1 views and assessments of the programs authorized by this
2 title, the measurable cost and performance-based goals for
3 such programs as established under section 101(b), if any,
4 and the progress on meeting such goals. Such reviews and
5 assessments shall be conducted every 5 years, or more
6 often as the Secretary considers necessary, and the Sec-
7 retary shall transmit to Congress reports containing the
8 results of all such reviews and assessments.

9 **SEC. 175. IMPROVED COORDINATION OF TECHNOLOGY**
10 **TRANSFER ACTIVITIES.**

11 (a) **TECHNOLOGY TRANSFER COORDINATOR.**—The
12 Secretary shall designate a Technology Transfer Coordi-
13 nator to perform oversight of and policy development for
14 technology transfer activities at the Department. The
15 Technology Transfer Coordinator shall—

16 (1) coordinate the activities of the Technology
17 Transfer Working Group;

18 (2) oversee the expenditure of funds allocated
19 to the Technology Transfer Working Group; and

20 (3) coordinate with each technology partnership
21 ombudsman appointed under section 11 of the Tech-
22 nology Transfer Commercialization Act of 2000 (42
23 U.S.C. 7261c).

24 (b) **TECHNOLOGY TRANSFER WORKING GROUP.**—
25 The Secretary shall establish a Technology Transfer

1 Working Group, which shall consist of representatives of
2 the National Laboratories and single-purpose research fa-
3 cilities, to—

4 (1) coordinate technology transfer activities oc-
5 ccurring at National Laboratories and single-purpose
6 research facilities;

7 (2) exchange information about technology
8 transfer practices, including alternative approaches
9 to resolution of disputes involving intellectual prop-
10 erty rights and other technology transfer matters;
11 and

12 (3) develop and disseminate to the public and
13 prospective technology partners information about
14 opportunities and procedures for technology transfer
15 with the Department, including those related to al-
16 ternative approaches to resolution of disputes involv-
17 ing intellectual property rights and other technology
18 transfer matters.

19 (c) TECHNOLOGY TRANSFER RESPONSIBILITY.—
20 Nothing in this section shall affect the technology transfer
21 responsibilities of Federal employees under the Stevenson-
22 Wydler Technology Innovation Act of 1980 (15 U.S.C.
23 3701 et seq.).

1 **SEC. 176. FEDERAL LABORATORY EDUCATIONAL PART-**
2 **NERS.**

3 (a) DISTRIBUTION OF ROYALTIES RECEIVED BY
4 FEDERAL AGENCIES.—Section 14(a)(1)(B)(v) of the Ste-
5 venson-Wydler Technology Innovation Act of 1980 (15
6 U.S.C. 3710c(a)(1)(B)(v)), is amended to read as follows:

7 “(v) for scientific research and develop-
8 ment and for educational assistance and other
9 purposes consistent with the missions and ob-
10 jectives of the agency and the laboratory.”.

11 (b) COOPERATIVE RESEARCH AND DEVELOPMENT
12 AGREEMENTS.—Section 12(b)(5)(C) of the Stevenson-
13 Wydler Technology Innovation Act of 1980 (15 U.S.C.
14 3710a(b)(5)(C)) is amended to read as follows:

15 “(C) for scientific research and development
16 and for educational assistance consistent with the
17 missions and objectives of the agency and the lab-
18 oratory.”.

19 **SEC. 177. INTERAGENCY COOPERATION.**

20 The Secretary shall enter into discussions with the
21 Administrator of the National Aeronautics and Space Ad-
22 ministration with the goal of reaching an interagency
23 working agreement between the 2 agencies that would
24 make the National Aeronautics and Space Administra-
25 tion’s expertise in energy, gained from its existing and
26 planned programs, more readily available to the relevant

1 research, development, demonstration, and commercial ap-
2 plications programs of the Department. Technologies to
3 be discussed should include the National Aeronautics and
4 Space Administration's modeling, research, development,
5 testing, and evaluation of new energy technologies, includ-
6 ing solar, wind, fuel cells, and hydrogen storage and dis-
7 tribution.

8 **SEC. 178. TECHNOLOGY INFRASTRUCTURE PROGRAM.**

9 (a) ESTABLISHMENT.—The Secretary shall establish
10 a Technology Infrastructure Program in accordance with
11 this section.

12 (b) PURPOSE.—The purpose of the Technology Infra-
13 structure Program shall be to improve the ability of Na-
14 tional Laboratories and single-purpose research facilities
15 to support departmental missions by—

16 (1) stimulating the development of technology
17 clusters that can support departmental missions at
18 the National Laboratories or single-purpose research
19 facilities;

20 (2) improving the ability of National Labora-
21 tories and single-purpose research facilities to lever-
22 age and benefit from commercial research, tech-
23 nology, products, processes, and services; and

24 (3) encouraging the exchange of scientific and
25 technological expertise between National Labora-

1 tories or single-purpose research facilities and enti-
2 ties that can support departmental missions at the
3 National Laboratories or single-purpose research fa-
4 cilities, such as institutions of higher education;
5 technology-related business concerns; nonprofit insti-
6 tutions; and agencies of State, tribal, or local gov-
7 ernments.

8 (c) PROJECTS.—The Secretary shall authorize the
9 Director of each National Laboratory or single-purpose re-
10 search facility to implement the Technology Infrastructure
11 Program at such National Laboratory or facility through
12 projects that meet the requirements of subsections (d) and
13 (e).

14 (d) PROGRAM REQUIREMENTS.—Each project funded
15 under this section shall meet the following requirements:

16 (1) Each project shall include at least 1 of each
17 of the following entities: a business; an institution of
18 higher education; a nonprofit institution; and an
19 agency of a State, local, or tribal government.

20 (2) Not less than 50 percent of the costs of
21 each project funded under this section shall be pro-
22 vided from non-Federal sources. The calculation of
23 costs paid by the non-Federal sources to a project
24 shall include cash, personnel, services, equipment,
25 and other resources expended on the project after

1 start of the project. Independent research and devel-
2 opment expenses of Government contractors that
3 qualify for reimbursement under section 31.205–
4 18(e) of the Federal Acquisition Regulation issued
5 pursuant to section 25(c)(1) of the Office of Federal
6 Procurement Policy Act (41 U.S.C. 421(c)(1)) may
7 be credited toward costs paid by non-Federal sources
8 to a project, if the expenses meet the other require-
9 ments of this section.

10 (3) All projects under this section shall be com-
11 petitively selected using procedures determined by
12 the Secretary.

13 (4) Any participant that receives funds under
14 this section may use generally accepted accounting
15 principles for maintaining accounts, books, and
16 records relating to the project.

17 (5) No Federal funds shall be made available
18 under this section for construction or any project for
19 more than 5 years.

20 (e) SELECTION CRITERIA.—

21 (1) IN GENERAL.—The Secretary shall allocate
22 funds under this section only if the Director of the
23 National Laboratory or single-purpose research facil-
24 ity managing the project determines that the project
25 is likely to improve the ability of the National Lab-

1 oratory or single-purpose research facility to achieve
2 technical success in meeting departmental missions.

3 (2) CRITERIA.—The Secretary shall consider
4 the following criteria in selecting a project to receive
5 Federal funds:

6 (A) The potential of the project to promote
7 the development of a commercially sustainable
8 technology cluster following the period of De-
9 partment investment, which will derive most of
10 the demand for its products or services from
11 the private sector, and which will support de-
12 partmental missions at the participating Na-
13 tional Laboratory or single-purpose research fa-
14 cility.

15 (B) The potential of the project to promote
16 the use of commercial research, technology,
17 products, processes, and services by the partici-
18 pating National Laboratory or single-purpose
19 research facility to achieve its mission or the
20 commercial development of technological inno-
21 vations made at the participating National Lab-
22 oratory or single-purpose research facility.

23 (C) The extent to which the project in-
24 volves a wide variety and number of institutions
25 of higher education, nonprofit institutions, and

1 technology-related business concerns that can
2 support the missions of the participating Na-
3 tional Laboratory or single-purpose research fa-
4 cility and that will make substantive contribu-
5 tions to achieving the goals of the project.

6 (D) The extent to which the project fo-
7 cuses on promoting the development of tech-
8 nology-related business concerns that are small
9 businesses or involves such small businesses
10 substantively in the project.

11 (E) Such other criteria as the Secretary
12 determines to be appropriate.

13 (f) ALLOCATION.—In allocating funds for projects
14 approved under this section, the Secretary shall provide—

15 (1) the Federal share of the project costs; and

16 (2) additional funds to the National Laboratory
17 or single-purpose research facility managing the
18 project to permit the National Laboratory or single-
19 purpose research facility to carry out activities relat-
20 ing to the project, and to coordinate such activities
21 with the project.

22 (g) REPORT TO CONGRESS.—Not later than July 1,
23 2006, the Secretary shall report to Congress on whether
24 the Technology Infrastructure Program should be contin-
25 ued and, if so, how the program should be managed.

1 (h) DEFINITIONS.—In this section:

2 (1) TECHNOLOGY CLUSTER.—The term “tech-
3 nology cluster” means a concentration of technology-
4 related business concerns, institutions of higher edu-
5 cation, or nonprofit institutions that reinforce each
6 other’s performance in the areas of technology devel-
7 opment through formal or informal relationships.

8 (2) TECHNOLOGY-RELATED BUSINESS CON-
9 CERN.—The term “technology-related business con-
10 cern” means a for-profit corporation, company, asso-
11 ciation, firm, partnership, or small business concern
12 that conducts scientific or engineering research; de-
13 velops new technologies; manufactures products
14 based on new technologies; or performs technological
15 services.

16 (i) AUTHORIZATION OF APPROPRIATIONS.—There
17 are authorized to be appropriated to the Secretary for ac-
18 tivities under this section \$10,000,000 for each of fiscal
19 years 2004, 2005, and 2006.

20 **SEC. 179. REPROGRAMMING.**

21 (a) DISTRIBUTION REPORT.—Not later than 60 days
22 after the date of the enactment of an Act appropriating
23 amounts authorized under this title, the Secretary shall
24 transmit to the appropriate authorizing committees of
25 Congress a report explaining how such amounts will be

1 distributed among the authorizations contained in this
2 title.

3 (b) PROHIBITION.—

4 (1) IN GENERAL.—No amount identified under
5 subsection (a) shall be reprogrammed if such re-
6 programming would result in an obligation which
7 changes an individual distribution required to be re-
8 ported under subsection (a) by more than 5 percent
9 unless the Secretary has transmitted to the appro-
10 priate authorizing committees of Congress a report
11 described in subsection (c) and a period of 30 days
12 has elapsed after such committees receive the report.

13 (2) COMPUTATION.—In the computation of the
14 30-day period described in paragraph (1), there shall
15 be excluded any day on which either House of Con-
16 gress is not in session because of an adjournment of
17 more than 3 days to a day certain.

18 (c) REPROGRAMMING REPORT.—A report referred to
19 in subsection (b)(1) shall contain a full and complete
20 statement of the action proposed to be taken and the facts
21 and circumstances relied on in support of the proposed
22 action.

23 **SEC. 180. CONSTRUCTION WITH OTHER LAWS.**

24 Except as otherwise provided in this title, the Sec-
25 retary shall carry out the research, development, dem-

1 onstration, and commercial application programs,
2 projects, and activities authorized by this title in accord-
3 ance with the applicable provisions of the Atomic Energy
4 Act of 1954 (42 U.S.C. 2011 et seq.), the Federal Non-
5 nuclear Research and Development Act of 1974 (42
6 U.S.C. 5901 et seq.), the Energy Policy Act of 1992 (42
7 U.S.C. 13201 et seq.), the Stevenson-Wydler Technology
8 Innovation Act of 1980 (15 U.S.C. 3701 et seq.), chapter
9 18 of title 35, United States Code (commonly referred to
10 as the Bayh-Dole Act), and any other Act under which
11 the Secretary is authorized to carry out such activities.

12 **SEC. 181. REPORT ON RESEARCH AND DEVELOPMENT PRO-**
13 **GRAM EVALUATION METHODOLOGIES.**

14 Not later than 180 days after the date of enactment
15 of this Act, the Secretary shall enter into appropriate ar-
16 rangements with the National Academy of Sciences to in-
17 vestigate and report on the scientific and technical merits
18 of any evaluation methodology currently in use or pro-
19 posed for use in relation to the scientific and technical pro-
20 grams of the Department by the Secretary or other Fed-
21 eral official. Not later than 6 months after receiving the
22 report of the National Academy, the Secretary shall sub-
23 mit such report to Congress, along with any other views
24 or plans of the Secretary with respect to the future use
25 of such evaluation methodology.

1 **SEC. 182. DEPARTMENT OF ENERGY SCIENCE AND TECH-**
2 **NOLOGY SCHOLARSHIP PROGRAM.**

3 (a) ESTABLISHMENT OF PROGRAM.—

4 (1) IN GENERAL.—The Secretary is authorized
5 to establish a Department of Energy Science and
6 Technology Scholarship Program to award scholar-
7 ships to individuals that is designed to recruit and
8 prepare students for careers in the Department.

9 (2) COMPETITIVE PROCESS.—Individuals shall
10 be selected to receive scholarships under this section
11 through a competitive process primarily on the basis
12 of academic merit, with consideration given to finan-
13 cial need and the goal of promoting the participation
14 of individuals identified in section 33 or 34 of the
15 Science and Engineering Equal Opportunities Act
16 (42 U.S.C. 1885a or 1885b).

17 (3) SERVICE AGREEMENTS.—To carry out the
18 Program the Secretary shall enter into contractual
19 agreements with individuals selected under para-
20 graph (2) under which the individuals agree to serve
21 as full-time employees of the Department, for the
22 period described in subsection (f)(1), in positions
23 needed by the Department and for which the individ-
24 uals are qualified, in exchange for receiving a schol-
25 arship.

1 (b) SCHOLARSHIP ELIGIBILITY.—In order to be eligi-
2 ble to participate in the Program, an individual must—

3 (1) be enrolled or accepted for enrollment as a
4 full-time student at an institution of higher edu-
5 cation in an academic program or field of study de-
6 scribed in the list made available under subsection
7 (d);

8 (2) be a United States citizen; and

9 (3) at the time of the initial scholarship award,
10 not be a Federal employee as defined in section
11 2105 of title 5 of the United States Code.

12 (c) APPLICATION REQUIRED.—An individual seeking
13 a scholarship under this section shall submit an applica-
14 tion to the Secretary at such time, in such manner, and
15 containing such information, agreements, or assurances as
16 the Secretary may require.

17 (d) ELIGIBLE ACADEMIC PROGRAMS.—The Secretary
18 shall make publicly available a list of academic programs
19 and fields of study for which scholarships under the Pro-
20 gram may be utilized, and shall update the list as nec-
21 essary.

22 (e) SCHOLARSHIP REQUIREMENT.—

23 (1) IN GENERAL.—The Secretary may provide a
24 scholarship under the Program for an academic year
25 if the individual applying for the scholarship has

1 submitted to the Secretary, as part of the applica-
2 tion required under subsection (c), a proposed aca-
3 demic program leading to a degree in a program or
4 field of study on the list made available under sub-
5 section (d).

6 (2) DURATION OF ELIGIBILITY.—An individual
7 may not receive a scholarship under this section for
8 more than 4 academic years, unless the Secretary
9 grants a waiver.

10 (3) SCHOLARSHIP AMOUNT.—The dollar
11 amount of a scholarship under this section for an
12 academic year shall be determined under regulations
13 issued by the Secretary, but shall in no case exceed
14 the cost of attendance.

15 (4) AUTHORIZED USES.—A scholarship pro-
16 vided under this section may be expended for tuition,
17 fees, and other authorized expenses as established by
18 the Secretary by regulation.

19 (5) CONTRACTS REGARDING DIRECT PAYMENTS
20 TO INSTITUTIONS.—The Secretary may enter into a
21 contractual agreement with an institution of higher
22 education under which the amounts provided for a
23 scholarship under this section for tuition, fees, and
24 other authorized expenses are paid directly to the in-

1 stitution with respect to which the scholarship is
2 provided.

3 (f) PERIOD OF OBLIGATED SERVICE.—

4 (1) DURATION OF SERVICE.—The period of
5 service for which an individual shall be obligated to
6 serve as an employee of the Department is, except
7 as provided in subsection (h)(2), 24 months for each
8 academic year for which a scholarship under this
9 section is provided.

10 (2) SCHEDULE FOR SERVICE.—

11 (A) IN GENERAL.—Except as provided in
12 subparagraph (B), obligated service under para-
13 graph (1) shall begin not later than 60 days
14 after the individual obtains the educational de-
15 gree for which the scholarship was provided.

16 (B) DEFERRAL.—The Secretary may defer
17 the obligation of an individual to provide a pe-
18 riod of service under paragraph (1) if the Sec-
19 retary determines that such a deferral is appro-
20 priate. The Secretary shall prescribe the terms
21 and conditions under which a service obligation
22 may be deferred through regulation.

23 (g) PENALTIES FOR BREACH OF SCHOLARSHIP
24 AGREEMENT.—

1 (1) FAILURE TO COMPLETE ACADEMIC TRAIN-
2 ING.—Scholarship recipients who fail to maintain a
3 high level of academic standing, as defined by the
4 Secretary by regulation, who are dismissed from
5 their educational institutions for disciplinary rea-
6 sons, or who voluntarily terminate academic training
7 before graduation from the educational program for
8 which the scholarship was awarded, shall be in
9 breach of their contractual agreement and, in lieu of
10 any service obligation arising under such agreement,
11 shall be liable to the United States for repayment
12 not later than 1 year after the date of default of all
13 scholarship funds paid to them and to the institution
14 of higher education on their behalf under the agree-
15 ment, except as provided in subsection (h)(2). The
16 repayment period may be extended by the Secretary
17 when determined to be necessary, as established by
18 regulation.

19 (2) FAILURE TO BEGIN OR COMPLETE THE
20 SERVICE OBLIGATION OR MEET THE TERMS AND
21 CONDITIONS OF DEFERMENT.—A scholarship recipi-
22 ent who, for any reason, fails to begin or complete
23 a service obligation under this section after comple-
24 tion of academic training, or fails to comply with the
25 terms and conditions of deferment established by the

1 Secretary pursuant to subsection (f)(2)(B), shall be
2 in breach of the contractual agreement. When a re-
3 cipient breaches an agreement for the reasons stated
4 in the preceding sentence, the recipient shall be lia-
5 ble to the United States for an amount equal to—

6 (A) the total amount of scholarships re-
7 ceived by such individual under this section;
8 plus

9 (B) the interest on the amounts of such
10 awards which would be payable if at the time
11 the awards were received they were loans bear-
12 ing interest at the maximum legal prevailing
13 rate, as determined by the Treasurer of the
14 United States,
15 multiplied by 3.

16 (h) WAIVER OR SUSPENSION OF OBLIGATION.—

17 (1) DEATH OF INDIVIDUAL.—Any obligation of
18 an individual incurred under the Program (or a con-
19 tractual agreement thereunder) for service or pay-
20 ment shall be canceled upon the death of the indi-
21 vidual.

22 (2) IMPOSSIBILITY OR EXTREME HARDSHIP.—
23 The Secretary shall by regulation provide for the
24 partial or total waiver or suspension of any obliga-
25 tion of service or payment incurred by an individual

1 under the Program (or a contractual agreement
 2 thereunder) whenever compliance by the individual is
 3 impossible or would involve extreme hardship to the
 4 individual, or if enforcement of such obligation with
 5 respect to the individual would be contrary to the
 6 best interests of the Government.

7 (i) DEFINITIONS.—In this section the following defi-
 8 nitions apply:

9 (1) COST OF ATTENDANCE.—The term “cost of
 10 attendance” has the meaning given that term in sec-
 11 tion 472 of the Higher Education Act of 1965 (20
 12 U.S.C. 1087**LL**).

13 (2) PROGRAM.—The term “Program” means
 14 the Department of Energy Science and Technology
 15 Scholarship Program established under this section.

16 (j) AUTHORIZATION OF APPROPRIATIONS.—There
 17 are authorized to be appropriated to the Secretary for ac-
 18 tivities under this section—

19 (1) for fiscal year 2004, \$800,000;

20 (2) for fiscal year 2005, \$1,600,000;

21 (3) for fiscal year 2006, \$2,000,000;

22 (4) for fiscal year 2007, \$2,000,000; and

23 (5) for fiscal year 2008, \$2,000,000.

1 **SEC. 183. REPORT ON EQUAL EMPLOYMENT OPPORTUNITY**
2 **PRACTICES.**

3 Not later than 12 months after the date of enactment
4 of this Act, and biennially thereafter, the Secretary shall
5 transmit to Congress a report on the equal employment
6 opportunity practices at National Laboratories. Such re-
7 port shall include—

8 (1) a thorough review of each laboratory con-
9 tractor's equal employment opportunity policies, in-
10 cluding promotion to management and professional
11 positions and pay raises;

12 (2) a statistical report on complaints and their
13 disposition in the laboratories;

14 (3) a description of how equal employment op-
15 portunity practices at the laboratories are treated in
16 the contract and in calculating award fees for each
17 contractor;

18 (4) a summary of disciplinary actions and their
19 disposition by either the Department or the relevant
20 contractors for each laboratory;

21 (5) a summary of outreach efforts to attract
22 women and minorities to the laboratories;

23 (6) a summary of efforts to retain women and
24 minorities in the laboratories; and

25 (7) a summary of collaboration efforts with the
26 Office of Federal Contract Compliance Programs to

1 improve equal employment opportunity practices at
2 the laboratories.

3 **SEC. 184. SMALL BUSINESS ADVOCACY AND ASSISTANCE.**

4 (a) SMALL BUSINESS ADVOCATE.—The Secretary
5 shall require the Director of each National Laboratory,
6 and may require the Director of a single-purpose research
7 facility, to designate a small business advocate to—

8 (1) increase the participation of small business
9 concerns, including socially and economically dis-
10 advantaged small business concerns, in procurement,
11 collaborative research, technology licensing, and
12 technology transfer activities conducted by the Na-
13 tional Laboratory or single-purpose research facility;

14 (2) report to the Director of the National Lab-
15 oratory or single-purpose research facility on the ac-
16 tual participation of small business concerns, includ-
17 ing socially and economically disadvantaged small
18 business concerns, in procurement, collaborative re-
19 search, technology licensing, and technology transfer
20 activities along with recommendations, if appro-
21 priate, on how to improve participation;

22 (3) make available to small businesses training,
23 mentoring, and information on how to participate in
24 procurement and collaborative research activities;

1 (4) increase the awareness inside the National
2 Laboratory or single-purpose research facility of the
3 capabilities and opportunities presented by small
4 business concerns; and

5 (5) establish guidelines for the program under
6 subsection (b) and report on the effectiveness of
7 such program to the Director of the National Lab-
8 oratory or single-purpose research facility.

9 (b) ESTABLISHMENT OF SMALL BUSINESS ASSIST-
10 ANCE PROGRAM.—The Secretary shall require the Direc-
11 tor of each National Laboratory, and may require the Di-
12 rector of a single-purpose research facility, to establish a
13 program to provide small business concerns—

14 (1) assistance directed at making them more ef-
15 fective and efficient subcontractors or suppliers to
16 the National Laboratory or single-purpose research
17 facility; or

18 (2) general technical assistance, the cost of
19 which shall not exceed \$10,000 per instance of as-
20 sistance, to improve the small business concerns'
21 products or services.

22 (c) USE OF FUNDS.—None of the funds expended
23 under subsection (b) may be used for direct grants to the
24 small business concerns.

25 (d) DEFINITIONS.—In this section:

1 (1) SMALL BUSINESS CONCERN.—The term
2 “small business concern” has the meaning given
3 such term in section 3 of the Small Business Act
4 (15 U.S.C. 632).

5 (2) SOCIALLY AND ECONOMICALLY DISADVAN-
6 TAGED SMALL BUSINESS CONCERNS.—The term “so-
7 cially and economically disadvantaged small business
8 concerns” has the meaning given such term in sec-
9 tion 8(a)(4) of the Small Business Act (15 U.S.C.
10 637(a)(4)).

11 (e) AUTHORIZATION OF APPROPRIATIONS.—There
12 are authorized to be appropriated to the Secretary for ac-
13 tivities under this section \$5,000,000 for each of fiscal
14 years 2004 through 2008.

15 **SEC. 185. REPORT ON MOBILITY OF SCIENTIFIC AND TECH-**
16 **NICAL PERSONNEL.**

17 Not later than 2 years after the date of enactment
18 of this Act, the Secretary shall transmit a report to Con-
19 gress identifying any policies or procedures of a contractor
20 operating a National Laboratory or single-purpose re-
21 search facility that create disincentives to the temporary
22 transfer of scientific and technical personnel among the
23 contractor-operated National Laboratories or contractor-
24 operated single-purpose research facilities and provide

1 suggestions for improving interlaboratory exchange of sci-
2 entific and technical personnel.

3 **SEC. 186. NATIONAL ACADEMY OF SCIENCES REPORT.**

4 Not later than 90 days after the date of enactment
5 of this Act, the Secretary shall enter into an arrangement
6 with the National Academy of Sciences for the Academy
7 to—

8 (1) conduct a study on—

9 (A) the obstacles to accelerating the com-
10 mercial application of energy technology; and

11 (B) the adequacy of Department policies
12 and procedures for, and oversight of, technology
13 transfer-related disputes between contractors of
14 the Department and the private sector; and

15 (2) transmit a report to Congress on rec-
16 ommendations developed as a result of the study.

17 **SEC. 187. OUTREACH.**

18 The Secretary shall ensure that each program au-
19 thorized by this title includes an outreach component to
20 provide information, as appropriate, to manufacturers,
21 consumers, engineers, architects, builders, energy service
22 companies, institutions of higher education, small busi-
23 nesses, facility planners and managers, State and local
24 governments, and other entities.

1 **SEC. 188. COMPETITIVE AWARD OF MANAGEMENT CON-**
2 **TRACTS.**

3 None of the funds authorized to be appropriated to
4 the Secretary by this title may be used to award a manage-
5 ment and operating contract for a nonmilitary energy lab-
6 oratory of the Department unless such contract is com-
7 petitively awarded or the Secretary grants, on a case-by-
8 case basis, a waiver to allow for such a deviation. The Sec-
9 retary may not delegate the authority to grant such a
10 waiver and shall submit to Congress a report notifying
11 Congress of the waiver and setting forth the reasons for
12 the waiver at least 60 days prior to the date of the award
13 of such a contract.

14 **SEC. 189. EDUCATIONAL PROGRAMS IN SCIENCE AND**
15 **MATHEMATICS.**

16 (a) ACTIVITIES.—Section 3165(a) of the Department
17 of Energy Science Education Enhancement Act (42
18 U.S.C. 7381b(a)) is amended by adding at the end the
19 following:

20 “(14) Support competitive events for students,
21 under supervision of teachers, designed to encourage
22 student interest and knowledge in science and math-
23 ematics.”.

24 (b) AUTHORIZATION OF APPROPRIATIONS.—Section
25 3169 of the Department of Energy Science Education En-
26 hancement Act (42 U.S.C. 7381e), as so redesignated by

1 section 1102(b), is amended by inserting before the period
2 “; and \$40,000,000 for each of fiscal years 2004 through
3 2008”.

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