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TITLE IX—RESEARCH AND DEVELOPMENT

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SEC. 901. SHORT TITLE.

This title may be cited as the ''Energy Research, Development, Demonstration, and Commercial Application Act of 2005''.

SEC. 902. GOALS.

(a) IN GENERAL.—In order to achieve the purposes of this title, the Secretary shall conduct a balanced set of programs of energy research, development, demonstration, and commercial application with the general goals of—

(1) increasing the efficiency of all energy intensive sectors through conservation and improved technologies;

(2) promoting diversity of energy supply;

(3) decreasing the dependence of the United States on foreign energy supplies;

(4) improving the energy security of the United States; and

(5) decreasing the environmental impact of energy-related activities.

(b) GOALS.—The Secretary shall publish measurable cost and performance-based goals, comparable over time,

with each annual budget submission in at least the following areas:

(1) Energy efficiency for buildings, energy-consuming industries, and vehicles.

(2) Electric energy generation (including distributed generation), transmission, and storage.

(3) Renewable energy technologies, including wind power, photovoltaics, solar thermal systems, geothermal energy, hydrogen-fueled systems, biomass-based systems, biofuels, and hydropower.

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

(5) Nuclear energy, including programs for existing and advanced reactors, and education of future specialists.

(c) PUBLIC COMMENT.—The Secretary shall provide mechanisms for input on the annually published goals from industry, institutions of higher education, and other public sources.

(d) EFFECT OF GOALS.—Nothing in subsection (a) or the annually published goals creates any new authority for any Federal agency, or may be used by any Federal agency, to support the establishment of regulatory standards or regulatory requirements.

SEC. 903. DEFINITIONS.

In this title:

(1) DEPARTMENTAL MISSION.—The term ''departmental mission'' means any of the functions vested in the Secretary by the Department of Energy Organization Act (42 U.S.C. 7101 et seq.) or other law.

(2) HISPANIC-SERVING INSTITUTION.—The term ''Hispanic-serving institution'' has the meaning given the term in section 502(a) of the Higher Education Act of 1965 (20 U.S.C. 1101a(a)).

(3) NONMILITARY ENERGY LABORATORY.—The term ''nonmilitary energy laboratory'' means a National Laboratory other than a National Laboratory listed in subparagraph (G), (H), or (N) of section 2(3).

(4) PART B INSTITUTION.—The term ''part B institution'' has the meaning given the term in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).

(5) SINGLE-PURPOSE RESEARCH FACILITY.—The term ''single-purpose research facility'' means—

(A) any of the primarily single-purpose entities owned by the Department; or

(B) any other organization of the Department designated by the Secretary.

(6) UNIVERSITY.—The term ''university'' has the meaning given the term ''institution of higher education'' in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

Subtitle A—Energy Efficiency

SEC. 911. ENERGY EFFICIENCY.

(a) IN GENERAL.—

(1) OBJECTIVES.—The Secretary shall conduct programs of energy efficiency research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall take into consideration the following objectives:

(A) Increasing the energy efficiency of vehicles, buildings, and industrial processes.

(B) Reducing the demand of the United States for energy, especially energy from foreign sources.

(C) Reducing the cost of energy and making the economy more efficient and competitive.

(D) Improving the energy security of the United States.

(E) Reducing the environmental impact of energy-related activities.

(2) PROGRAMS.—Programs under this subtitle shall include research, development, demonstration, and commercial application of—

(A) advanced, cost-effective technologies to improve the energy efficiency and environmental performance of vehicles, including—

(i) hybrid and electric propulsion systems;

(ii) plug-in hybrid systems;

(iii) advanced combustion engines;

(iv) weight and drag reduction technologies;

(v) whole-vehicle design optimization; and

(vi) advanced drive trains;

(B) cost-effective technologies, for new construction and retrofit, to improve the energy efficiency and environmental performance of buildings, using a whole-buildings approach, including onsite renewable energy generation;

(C) advanced technologies to improve the energy efficiency, environmental performance, and process efficiency of energy-intensive and waste-intensive industries; and

(D) advanced control devices to improve the energy efficiency of electric motors, including those used in industrial processes, heating, ventilation, and cooling.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out energy efficiency and conservation research, development, demonstration, and commercial application activities, including activities authorized under this subtitle—

(1) $783,000,000 for fiscal year 2007;

(2) $865,000,000 for fiscal year 2008; and

(3) $952,000,000 for fiscal year 2009.

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

(1) For activities under section 912, $50,000,000 for each of fiscal years 2007 through 2009.

(2) For activities under section 915, $7,000,000 for each of fiscal years 2007 through 2009.

(3) For activities under subsection (a)(2)(A)—

(A) $200,000,000 for fiscal year 2007;

(B) $270,000,000 for fiscal year 2008; and

(C) $310,000,000 for fiscal year 2009.

(4) For activities under subsection (a)(2)(D), $2,000,000 for each of fiscal years 2007 and 2008.

(d) EXTENDED AUTHORIZATION.—There are authorized to be appropriated to the Secretary to carry out section 912 $50,000,000 for each of fiscal years 2010 through 2013.

(e) LIMITATIONS.—None of the funds authorized to be appropriated under this section may be used for—

(1) the issuance or implementation of energy efficiency regulations;

(2) the weatherization program established under part A of title IV of the Energy Conservation and Production Act (42 U.S.C. 6861 et seq.);

(3) a State energy conservation plan established under part D of title III of the Energy Policy and Conservation Act (42 U.S.C. 6321 et seq.); or

(4) a Federal energy management measure carried out under part 3 of title V of the National Energy Conservation Policy Act (42 U.S.C. 8251 et seq.).

SEC. 912. NEXT GENERATION LIGHTING INITIATIVE.

(a) DEFINITIONS.—In this section:

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

that produces white light using externally applied voltage.

(2) INDUSTRY ALLIANCE.—The term ''Industry Alliance'' means an entity selected by the Secretary under subsection (d).

(3) INITIATIVE.—The term ''Initiative'' means the Next Generation Lighting Initiative carried out under this section.

(4) RESEARCH.—The term ''research'' includes research on the technologies, materials, and manufacturing processes required for white light emitting diodes.

(5) WHITE LIGHT EMITTING DIODE.—The term ''white light emitting diode'' means a semiconducting package, using either organic or inorganic materials, that produces white light using externally applied voltage.

(b) INITIATIVE.—The Secretary shall carry out a Next Generation Lighting Initiative in accordance with this section to support research, development, demonstration, and commercial application activities related to advanced solid-state lighting technologies based on white light emitting diodes.

(c) OBJECTIVES.—The objectives of the Initiative shall be to develop advanced solid-state organic and inor-

ganic lighting technologies based on white light emitting diodes that, compared to incandescent and fluorescent lighting technologies, are longer lasting, are more energy-efficient and cost-competitive, and have less environmental impact.

(d) INDUSTRY ALLIANCE.—Not later than 90 days after the date of enactment of this Act, the Secretary shall competitively select an Industry Alliance to represent participants who are private, for-profit firms, open to large and small businesses, that, as a group, are broadly representative of United States solid state lighting research, development, infrastructure, and manufacturing expertise as a whole.

(e) RESEARCH.—

(1) GRANTS.—The Secretary shall carry out the research activities of the Initiative through competitively awarded grants to—

(A) researchers, including Industry Alliance participants;

(B) small businesses;

(C) National Laboratories; and

(D) institutions of higher education.

(2) INDUSTRY ALLIANCE.—The Secretary shall annually solicit from the Industry Alliance—

(A) comments to identify solid-state lighting technology needs;

(B) an assessment of the progress of the research activities of the Initiative; and

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

(3) AVAILABILITY TO PUBLIC.—The information and roadmaps under paragraph (2) shall be available to the public.

(f) DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION.—

(1) IN GENERAL.—The Secretary shall carry out a development, demonstration, and commercial application program for the Initiative through competitively selected awards.

(2) PREFERENCE.—In making the awards, the Secretary may give preference to participants in the Industry Alliance.

(g) COST SHARING.—In carrying out this section, the Secretary shall require cost sharing in accordance with section 988.

(h) INTELLECTUAL PROPERTY.—The Secretary may require (in accordance with section 202(a)(ii) of title 35, United States Code, section 152 of the Atomic Energy Act of 1954 (42 U.S.C. 2182), and section 9 of the Federal

Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908)) that for any new invention developed under subsection (e)—

(1) that the Industry Alliance participants who are active participants in research, development, and demonstration activities related to the advanced solid-state lighting technologies that are covered by this section shall be granted the first option to negotiate with the invention owner, at least in the field of solid-state lighting, nonexclusive licenses and royalties on terms that are reasonable under the circumstances;

(2)(A) that, for 1 year after a United States patent is issued for the invention, the patent holder shall not negotiate any license or royalty with any entity that is not a participant in the Industry Alliance described in paragraph (1); and

(B) that, during the year described in subparagraph (A), the patent holder shall negotiate nonexclusive licenses and royalties in good faith with any interested participant in the Industry Alliance described in paragraph (1); and

(3) such other terms as the Secretary determines are required to promote accelerated commercialization of inventions made under the Initiative.

(i) NATIONAL ACADEMY REVIEW.—The Secretary shall enter into an arrangement with the National Academy of Sciences to conduct periodic reviews of the Initiative.

SEC. 913. NATIONAL BUILDING PERFORMANCE INITIATIVE.

(a) INTERAGENCY GROUP.—

(1) IN GENERAL.—Not later than 90 days after the date of enactment of this Act, the Director of the Office of Science and Technology Policy shall establish an interagency group to develop, in coordination with the advisory committee established under subsection (e), a National Building Performance Initiative (referred to in this section as the ''Initiative'').

(2) COCHAIRS.—The interagency group shall be co-chaired by appropriate officials of the Department and the Department of Commerce, who shall jointly arrange for the provision of necessary administrative support to the group.

(b) INTEGRATION OF EFFORTS.—The Initiative shall integrate Federal, State, and voluntary private sector efforts to reduce the costs of construction, operation, maintenance, and renovation of commercial, industrial, institutional, and residential buildings.

(c) PLAN.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the interagency group shall submit to Congress a plan for carrying out the appropriate Federal role in the Initiative.

(2) INCLUSIONS.—The plan shall include—

(A) research, development, demonstration, and commercial application of energy technology systems and materials for new construction and retrofit relating to the building envelope and building system components;

(B) research, development, demonstration, and commercial application of energy technology and infrastructure enabling the energy efficient, automated operation of buildings and building equipment; and

(C) the collection, analysis, and dissemination of research results and other pertinent information on enhancing building performance to industry, government entities, and the public.

(d) DEPARTMENT OF ENERGY ROLE.—Within the Federal portion of the Initiative, the Department shall be the lead agency for all aspects of building performance related to use and conservation of energy.

(e) ADVISORY COMMITTEE.—The Director of the Office of Science and Technology Policy shall establish an advisory committee to—

(1) analyze and provide recommendations on potential private sector roles and participation in the Initiative; and

(2) review and provide recommendations on the plan described in subsection (c).

(f) ADMINISTRATION.—Nothing in this section provides any Federal agency with new authority to regulate building performance.

SEC. 914. BUILDING STANDARDS.

(a) DEFINITION OF HIGH PERFORMANCE BUILDING.—In this section, the term ''high performance building'' means a building that integrates and optimizes all major high-performance building attributes, including energy efficiency, durability, life-cycle performance, and occupant productivity.

(b) ASSESSMENT.—Not later than 120 days after the date of enactment of this Act, the Secretary shall enter into an agreement with the National Institute of Building Sciences to—

(1) conduct an assessment (in cooperation with industry, standards development organizations, and other entities, as appropriate) of whether the current

voluntary consensus standards and rating systems for high performance buildings are consistent with the current technological state of the art, including relevant results from the research, development and demonstration activities of the Department;

(2) determine if additional research is required, based on the findings of the assessment; and

(3) recommend steps for the Secretary to accelerate the development of voluntary consensus-based standards for high performance buildings that are based on the findings of the assessment.

(c) GRANT AND TECHNICAL ASSISTANCE PROGRAM.—Consistent with subsection (b) and section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note), the Secretary shall establish a grant and technical assistance program to support the development of voluntary consensus-based standards for high performance buildings.

SEC. 915. SECONDARY ELECTRIC VEHICLE BATTERY USE PROGRAM.

(a) DEFINITIONS.—In this section:

(1) BATTERY.—The term ''battery'' means an energy storage device that previously has been used to provide motive power in a vehicle powered in whole or in part by electricity.

(2) ASSOCIATED EQUIPMENT.—The term ''associated equipment'' means equipment located where the batteries will be used that is necessary to enable the use of the energy stored in the batteries.

(b) PROGRAM.—

(1) IN GENERAL.—The Secretary shall establish and conduct a program of research, development, demonstration, and commercial application of energy technology for the secondary use of batteries, if the Secretary finds that there are sufficient numbers of batteries to support the program.

(2) ADMINISTRATION.—The program shall be—

(A) designed to demonstrate the use of batteries in secondary applications, including utility and commercial power storage and power quality;

(B) structured to evaluate the performance, including useful service life and costs, of such batteries in field operations, and the necessary supporting infrastructure, including reuse and disposal of batteries; and

(C) coordinated with ongoing secondary battery use programs at the National Laboratories and in industry.

(c) SOLICITATION.—

(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary shall solicit proposals to demonstrate the secondary use of batteries and associated equipment and supporting infrastructure in geographic locations throughout the United States.

(2) ADDITIONAL SOLICITATIONS.—The Secretary may make additional solicitations for proposals if the Secretary determines that the solicitations are necessary to carry out this section.

(d) SELECTION OF PROPOSALS.—

(1) IN GENERAL.—Not later than 90 days after the closing date established by the Secretary for receipt of proposals under subsection (c), the Secretary shall select up to 5 proposals that may receive financial assistance under this section once the Department receives appropriated funds to carry out this section.

(2) FACTORS.—In selecting proposals, the Secretary shall consider—

(A) the diversity of battery type;

(B) geographic and climatic diversity; and

(C) life-cycle environmental effects of the approaches.

(3) LIMITATION.—No 1 project selected under this section shall receive more than 25 percent of the funds made available to carry out the program under this section.

(4) NON-FEDERAL INVOLVEMENT.—In selecting proposals, the Secretary shall consider the extent of involvement of State or local government and other persons in each demonstration project to optimize use of Federal resources.

(5) OTHER CRITERIA.—In selecting proposals, the Secretary may consider such other criteria as the Secretary considers appropriate.

(e) CONDITIONS.—In carrying out this section, the Secretary shall require that—

(1) relevant information be provided to—

(A) the Department;

(B) the users of the batteries;

(C) the proposers of a project under this section; and

(D) the battery manufacturers; and

(2) the costs of carrying out projects and activities under this section are shared in accordance with section 988.

SEC. 916. ENERGY EFFICIENCY SCIENCE INITIATIVE.

(a) ESTABLISHMENT.—The Secretary shall establish an Energy Efficiency Science Initiative to be managed by the Assistant Secretary in the Department with responsibility for energy conservation under section 203(a)(9) of the Department of Energy Organization Act (42 U.S.C. 7133(a)(9)), in consultation with the Director of the Office of Science, for grants to be competitively awarded and subject to peer review for research relating to energy efficiency.

(b) REPORT.—The Secretary shall submit to Congress, along with the annual budget request of the President submitted to Congress, a report on the activities of the Energy Efficiency Science Initiative, including a description of the process used to award the funds and an explanation of how the research relates to energy efficiency.

SEC. 917. ADVANCED ENERGY EFFICIENCY TECHNOLOGY TRANSFER CENTERS.

(a) GRANTS.—Not later than 18 months after the date of enactment of this Act, the Secretary shall make grants to nonprofit institutions, State and local governments, or universities (or consortia thereof), to establish a geographically dispersed network of Advanced Energy Efficiency Technology Transfer Centers, to be located in areas the Secretary determines have the greatest need of

the services of such Centers. In establishing the network, the Secretary shall consider the special needs and opportunities for increased energy efficiency for manufactured and site-built housing.

(b) ACTIVITIES.—

(1) IN GENERAL.—Each Center shall operate a program to encourage demonstration and commercial application of advanced energy methods and technologies through education and outreach to building and industrial professionals, and to other individuals and organizations with an interest in efficient energy use.

(2) ADVISORY PANEL.—Each Center shall establish an advisory panel to advise the Center on how best to accomplish the activities under paragraph (1).

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

(d) SELECTION CRITERIA.—The Secretary shall award grants under this section on the basis of the following criteria, at a minimum:

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

(2) The extent to which the applicant will coordinate the activities of the Center with other entities, such as State and local governments, utilities, and educational and research institutions.

(e) COST-SHARING.—In carrying out this section, the Secretary shall require cost-sharing in accordance with the requirements of section 988 for commercial application activities.

(f) ADVISORY COMMITTEE.—The Secretary shall establish an advisory committee to advise the Secretary on the establishment of Centers under this section. The advisory committee shall be composed of individuals with expertise in the area of advanced energy methods and technologies, including at least 1 representative from—

(1) State or local energy offices;

(2) energy professionals;

(3) trade or professional associations;

(4) architects, engineers, or construction professionals;

(5) manufacturers;

(6) the research community; and

(7) nonprofit energy or environmental organizations.

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

(1) ADVANCED ENERGY METHODS AND TECHNOLOGIES.—The term ''advanced energy methods and technologies'' means all methods and technologies that promote energy efficiency and conservation, including distributed generation technologies, and life-cycle analysis of energy use.

(2) CENTER.—The term ''Center'' means an Advanced Energy Technology Transfer Center established pursuant to this section.

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

(h) AUTHORIZATION OF APPROPRIATIONS.—In addition to amounts otherwise authorized to be appropriated in section 911, there are authorized to be appropriated for the program under this section such sums as may be appropriated.

Subtitle B—Distributed Energy and Electric Energy Systems

SEC. 921. DISTRIBUTED ENERGY AND ELECTRIC ENERGY SYSTEMS.

(a) IN GENERAL.—The Secretary shall carry out programs of research, development, demonstration, and com-

mercial application on distributed energy resources and systems reliability and efficiency, to improve the reliability and efficiency of distributed energy resources and systems, integrating advanced energy technologies with grid connectivity, including activities described in this subtitle. The programs shall address advanced energy technologies and systems and advanced grid reliability technologies.

(b) AUTHORIZATION OF APPROPRIATIONS.—

(1) DISTRIBUTED ENERGY AND ELECTRIC ENERGY SYSTEMS ACTIVITIES.—There are authorized to be appropriated to the Secretary to carry out distributed energy and electric energy systems activities, including activities authorized under this subtitle—

(A) $240,000,000 for fiscal year 2007;

(B) $255,000,000 for fiscal year 2008; and

(C) $273,000,000 for fiscal year 2009.

(2) POWER DELIVERY RESEARCH INITIATIVE.—There are authorized to be appropriated to the Secretary to carry out the Power Delivery Research Initiative under subsection 925(e) such sums as may be necessary for each of fiscal years 2007 through 2009.

(c) MICRO-COGENERATION ENERGY TECHNOLOGY.—From amounts authorized under subsection (b),

$20,000,000 for each of fiscal years 2007 and 2008 shall be available to carry out activities under section 923.

(d) HIGH-VOLTAGE TRANSMISSION LINES.—From amounts authorized under subsection (b), $2,000,000 for fiscal year 2007 shall be available to carry out activities under section 925(g).

SEC. 922. HIGH POWER DENSITY INDUSTRY PROGRAM.

(a) IN GENERAL.—The Secretary shall establish a comprehensive research, development, demonstration, and commercial application of energy technologies to improve the energy efficiency of high power density facilities, including data centers, server farms, and telecommunications facilities.

(b) TECHNOLOGIES.—The program shall consider technologies that provide significant improvement in thermal controls, metering, load management, peak load reduction, or the efficient cooling of electronics.

SEC. 923. MICRO-COGENERATION ENERGY TECHNOLOGY.

(a) IN GENERAL.—The Secretary shall make competitive, merit-based grants to consortia for the development of micro-cogeneration energy technology.

(b) USES.—The consortia shall explore—

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

(2) the use of excess power to operate other appliances within the residence; and

(3) the supply of excess generated power to the power grid.

SEC. 924. DISTRIBUTED ENERGY TECHNOLOGY DEMONSTRATION PROGRAMS.

(a) COORDINATING CONSORTIA PROGRAM.—The Secretary may provide financial assistance to coordinating consortia of interdisciplinary participants for demonstrations designed to accelerate the use of distributed energy technologies (such as fuel cells, microturbines, reciprocating engines, thermally activated technologies, and combined heat and power systems) in highly energy intensive commercial applications.

(b) SMALL-SCALE PORTABLE POWER PROGRAM.—

(1) IN GENERAL.—The Secretary shall—

(A) establish a research, development, and demonstration program to develop working models of small scale portable power devices; and

(B) to the fullest extent practicable, identify and utilize the resources of universities that have shown expertise with respect to advanced portable power devices for either civilian or military use.

(2) ORGANIZATION.—The universities identified and utilized under paragraph (1)(B) are authorized to establish an organization to promote small scale portable power devices.

(3) DEFINITION.—For purposes of this subsection, the term ''small scale portable power device'' means a field-deployable portable mechanical or electromechanical device that can be used for applications such as communications, computation, mobility enhancement, weapons systems, optical devices, cooling, sensors, medical devices, and active biological agent detection systems.

SEC. 925. ELECTRIC TRANSMISSION AND DISTRIBUTION PROGRAMS.

(a) PROGRAM.—The Secretary shall establish a comprehensive research, development, and demonstration program to ensure the reliability, efficiency, and environmental integrity of electrical transmission and distribution systems, which shall include—

(1) advanced energy delivery technologies, energy storage technologies, materials, and systems, giving priority to new transmission technologies, including composite conductor materials and other technologies that enhance reliability, operational flexibility, or power-carrying capability;

(2) advanced grid reliability and efficiency technology development;

(3) technologies contributing to significant load reductions;

(4) advanced metering, load management, and control technologies;

(5) technologies to enhance existing grid components;

(6) the development and use of high-temperature superconductors to—

(A) enhance the reliability, operational flexibility, or power-carrying capability of electric transmission or distribution systems; or

(B) increase the efficiency of electric energy generation, transmission, distribution, or storage systems;

(7) integration of power systems, including systems to deliver high-quality electric power, electric power reliability, and combined heat and power;

(8) supply of electricity to the power grid by small scale, distributed and residential-based power generators;

(9) the development and use of advanced grid design, operation, and planning tools;

(10) any other infrastructure technologies, as appropriate; and

(11) technology transfer and education.

(b) PROGRAM PLAN.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Secretary, in consultation with other appropriate Federal agencies, shall prepare and submit to Congress a 5-year program plan to guide activities under this section.

(2) CONSULTATION.—In preparing the program plan, the Secretary shall consult with—

(A) utilities;

(B) energy service providers;

(C) manufacturers;

(D) institutions of higher education;

(E) other appropriate State and local agencies;

(F) environmental organizations;

(G) professional and technical societies; and

(H) any other persons the Secretary considers appropriate.

(c) IMPLEMENTATION.—The Secretary shall consider implementing the program under this section using a con-

sortium of participants from industry, institutions of higher education, and National Laboratories.

(d) REPORT.—Not later than 2 years after the submission of the plan under subsection (b), the Secretary shall submit to Congress a report—

(1) describing the progress made under this section; and

(2) identifying any additional resources needed to continue the development and commercial application of transmission and distribution of infrastructure technologies.

(e) POWER DELIVERY RESEARCH INITIATIVE.—

(1) IN GENERAL.—The Secretary shall establish a research, development, and demonstration initiative specifically focused on power delivery using components incorporating high temperature superconductivity.

(2) GOALS.—The goals of the Initiative shall be—

(A) to establish world-class facilities to develop high temperature superconductivity power applications in partnership with manufacturers and utilities;

(B) to provide technical leadership for establishing reliability for high temperature

superconductivity power applications, including suitable modeling and analysis;

(C) to facilitate the commercial transition toward direct current power transmission, storage, and use for high power systems using high temperature superconductivity; and

(D) to facilitate the integration of very low impedance high temperature superconducting wires and cables in existing electric networks to improve system performance, power flow control, and reliability.

(3) INCLUSIONS.—The Initiative shall include—

(A) feasibility analysis, planning, research, and design to construct demonstrations of superconducting links in high power, direct current, and controllable alternating current transmission systems;

(B) public-private partnerships to demonstrate deployment of high temperature superconducting cable into testbeds simulating a realistic transmission grid and under varying transmission conditions, including actual grid insertions; and

(C) testbeds developed in cooperation with National Laboratories, industries, and institutions of higher education to—

(i) demonstrate those technologies;

(ii) prepare the technologies for commercial introduction; and

(iii) address cost or performance roadblocks to successful commercial use.

(f) TRANSMISSION AND DISTRIBUTION GRID PLANNING AND OPERATIONS INITIATIVE.—

(1) IN GENERAL.—The Secretary shall establish a research, development, and demonstration initiative specifically focused on tools needed to plan, operate, and expand the transmission and distribution grids in the presence of competitive market mechanisms for energy, load demand, customer response, and ancillary services.

(2) GOALS.—The goals of the Initiative shall be—

(A)(i) to develop and use a geographically distributed center, consisting of institutions of higher education, and National Laboratories, with expertise and facilities to develop the underlying theory and software for power system application; and

(ii) to ensure commercial development in partnership with software vendors and utilities;

(B) to provide technical leadership in engineering and economic analysis for the reliability and efficiency of power systems planning and operations in the presence of competitive markets for electricity;

(C) to model, simulate, and experiment with new market mechanisms and operating practices to understand and optimize those new methods before actual use; and

(D) to provide technical support and technology transfer to electric utilities and other participants in the domestic electric industry and marketplace.

(g) HIGH-VOLTAGE TRANSMISSION LINES.—As part of the program described in subsection (a), the Secretary shall award a grant to a university research program to design and test, in consultation with the Tennessee Valley Authority, state-of-the-art optimization techniques for power flow through existing high voltage transmission lines.

Subtitle C—Renewable Energy

SEC. 931. RENEWABLE ENERGY.

(a) IN GENERAL.—

(1) OBJECTIVES.—The Secretary shall conduct programs of renewable energy research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall take into consideration the following objectives:

(A) Increasing the conversion efficiency of all forms of renewable energy through improved technologies.

(B) Decreasing the cost of renewable energy generation and delivery.

(C) Promoting the diversity of the energy supply.

(D) Decreasing the dependence of the United States on foreign energy supplies.

(E) Improving United States energy security.

(F) Decreasing the environmental impact of energy-related activities.

(G) Increasing the export of renewable generation equipment from the United States.

(2) PROGRAMS.—

(A) SOLAR ENERGY.—The Secretary shall conduct a program of research, development,

demonstration, and commercial application for solar energy, including—

(i) photovoltaics;

(ii) solar hot water and solar space heating;

(iii) concentrating solar power;

(iv) lighting systems that integrate sunlight and electrical lighting in complement to each other in common lighting fixtures for the purpose of improving energy efficiency;

(v) manufacturability of low cost high, quality solar systems; and

(vi) development of products that can be easily integrated into new and existing buildings.

(B) WIND ENERGY.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for wind energy, including—

(i) low speed wind energy;

(ii) offshore wind energy;

(iii) testing and verification (including construction and operation of a research

and testing facility capable of testing wind turbines); and

(iv) distributed wind energy generation.

(C) GEOTHERMAL.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for geothermal energy. The program shall focus on developing improved technologies for reducing the costs of geothermal energy installations, including technologies for—

(i) improving detection of geothermal resources;

(ii) decreasing drilling costs;

(iii) decreasing maintenance costs through improved materials;

(iv) increasing the potential for other revenue sources, such as mineral production; and

(v) increasing the understanding of reservoir life cycle and management.

(D) HYDROPOWER.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for cost competitive technologies that enable the de-

velopment of new and incremental hydropower capacity, adding to the diversity of the energy supply of the United States, including:

(i) Fish-friendly large turbines.

(ii) Advanced technologies to enhance environmental performance and yield greater energy efficiencies.

(E) MISCELLANEOUS PROJECTS.—The Secretary shall conduct research, development, demonstration, and commercial application programs for—

(i) ocean energy, including wave energy;

(ii) the combined use of renewable energy technologies with one another and with other energy technologies, including the combined use of wind power and coal gasification technologies;

(iii) renewable energy technologies for cogeneration of hydrogen and electricity; and

(iv) kinetic hydro turbines.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out renewable energy research, development, demonstra-

tion, and commercial application activities, including activities authorized under this subtitle—

(1) $632,000,000 for fiscal year 2007;

(2) $743,000,000 for fiscal year 2008; and

(3) $852,000,000 for fiscal year 2009.

(c) BIOENERGY.—From the amounts authorized under subsection (b), there are authorized to be appropriated to carry out section 932—

(1) $213,000,000 for fiscal year 2007, of which $100,000,000 shall be for section 932 (d);

(2) $251,000,000 for fiscal year 2008, of which $125,000,000 shall be for section 932 (d); and

(3) $274,000,000 for fiscal year 2009, of which $150,000,000 shall be for section 932 (d) .

(d) SOLAR POWER.—From amounts authorized under subsection (b), there is authorized to be appropriated to carry out activities under subsection (a)(2)(A)—

(1) $140,000,000 for fiscal year 2007, of which $40,000,000 shall be for activities under section 935;

(2) $200,000,000 for fiscal year 2008, of which $50,000,000 shall be for activities under section 935; and

(3) $250,000,000 for fiscal year 2009, of which $50,000,000 shall be for activities under section 935.

(e) ADMINISTRATION.—Of the funds authorized under subsection (c), not less than $5,000,000 for each fiscal year shall be made available for grants to—

(1) part B institutions;

(2) Tribal Colleges or Universities (as defined in section 316(b) of the Higher Education Act of 1965 (20 U.S.C. 1059c(b))); and

(3) Hispanic-serving institutions.

(f) RURAL DEMONSTRATION PROJECTS.—In carrying out this section, the Secretary, in consultation with the Secretary of Agriculture, shall demonstrate the use of renewable energy technologies to assist in delivering electricity to rural and remote locations including —

(1) advanced wind power technology, including combined use with coal gasification;

(2) biomass; and

(3) geothermal energy systems.

(g) ANALYSIS AND EVALUATION.—

(1) IN GENERAL.—The Secretary shall conduct analysis and evaluation in support of the renewable energy programs under this subtitle. These activities

shall be used to guide budget and program decisions, and shall include—

(A) economic and technical analysis of renewable energy potential, including resource assessment;

(B) analysis of past program performance, both in terms of technical advances and in market introduction of renewable energy; and

(C) any other analysis or evaluation that the Secretary considers appropriate.

(2) FUNDING.—The Secretary may designate up to 1 percent of the funds appropriated for carrying out this subtitle for analysis and evaluation activities under this subsection.

SEC. 932. BIOENERGY PROGRAM.

(a) DEFINITIONS:.—In this section:

(1) BIOMASS.—The term ''biomass'' means—

(A) any organic material grown for the purpose of being converted to energy;

(B) any organic byproduct of agriculture (including wastes from food production and processing) that can be converted into energy; or

(C) any waste material that can be converted to energy, is segregated from other waste materials, and is derived from–

(i) any of the following forest-related resources: mill residues, precommercial thinnings, slash, brush, or otherwise nonmerchantable material; or

(ii) wood waste materials, including waste pallets, crates, dunnage, manufacturing and construction wood wastes (other than pressure-treated, chemically-treated, or painted wood wastes), and landscape or right-of-way tree trimmings, but not including municipal solid waste, gas derived from the biodegradation of municipal solid waste, or paper that is commonly recycled.

(2) LIGNOCELLULOSIC FEEDSTOCK.—The term ''lignocellulosic feedstock'' means any portion of a plant or coproduct from conversion, including crops, trees, forest residues, and agricultural residues not specifically grown for food, including from barley grain, grapeseed, rice bran, rice hulls, rice straw, soybean matter, and sugarcane bagasse.

(b) PROGRAM.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for bioenergy, including—

(1) biopower energy systems;

(2) biofuels;

(3) bioproducts;

(4) integrated biorefineries that may produce biopower, biofuels, and bioproducts;

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

(6) economic analysis.

(c) BIOFUELS AND BIOPRODUCTS.—The goals of the biofuels and bioproducts programs shall be to develop, in partnership with industry and institutions of higher education—

(1) advanced biochemical and thermochemical conversion technologies capable of making fuels from lignocellulosic feedstocks that are price-competitive with gasoline or diesel in either internal combustion engines or fuel cell-powered vehicles;

(2) advanced biotechnology processes capable of making biofuels and bioproducts with emphasis on development of biorefinery technologies using enzyme-based processing systems;

(3) advanced biotechnology processes capable of increasing energy production from lignocellulosic feedstocks, with emphasis on reducing the dependence of industry on fossil fuels in manufacturing facilities; and

(4) other advanced processes that will enable the development of cost-effective bioproducts, including biofuels.

(d) INTEGRATED BIOREFINERY DEMONSTRATION PROJECTS.—

(1) IN GENERAL.—The Secretary shall carry out a program to demonstrate the commercial application of integrated biorefineries. The Secretary shall ensure geographical distribution of biorefinery demonstrations under this subsection. The Secretary shall not provide more than $100,000,000 under this subsection for any single biorefinery demonstration. In making awards under this subsection, the Secretary shall encourage—

(A) the demonstration of a wide variety of lignocellulosic feedstocks;

(B) the commercial application of biomass technologies for a variety of uses, including—

(i) liquid transportation fuels;

(ii) high-value biobased chemicals;

(iii) substitutes for petroleum-based feedstocks and products; and

(iv) energy in the form of electricity or useful heat; and

(C) the demonstration of the collection and treatment of a variety of biomass feedstocks.

(2) PROPOSALS.—Not later than 6 months after the date of enactment of this Act, the Secretary shall solicit proposals for demonstration of advanced biorefineries. The Secretary shall select only proposals that—

(A) demonstrate that the project will be able to operate profitably without direct Federal subsidy after initial construction costs are paid; and

(B) enable the biorefinery to be easily replicated.

(e) UNIVERSITY BIODIESEL PROGRAM.—The Secretary shall establish a demonstration program to determine the feasibility of the operation of diesel electric power generators, using biodiesel fuels with ratings as high as B100, at electric generation facilities owned by institutions of higher education. The program shall examine—

(1) heat rates of diesel fuels with large quantities of cellulosic content;

(2) the reliability of operation of various fuel blends;

(3) performance in cold or freezing weather;

(4) stability of fuel after extended storage; and

(5) other criteria, as determined by the Secretary.

SEC. 933. LOW-COST RENEWABLE HYDROGEN AND INFRASTRUCTURE FOR VEHICLE PROPULSION.

The Secretary shall—

(1) establish a research, development, and demonstration program to determine the feasibility of using hydrogen propulsion in light-weight vehicles and the integration of the associated hydrogen production infrastructure using off-the-shelf components; and

(2) identify universities and institutions that—

(A) have expertise in researching and testing vehicles fueled by hydrogen, methane, and other fuels;

(B) have expertise in integrating off-the-shelf components to minimize cost; and

(C) within 2 years can test a vehicle based on an existing commercially available platform with a curb weight of not less than 2,000 pounds before modifications, that—

(i) operates solely on hydrogen;

(ii) qualifies as a light-duty passenger vehicle; and

(iii) uses hydrogen produced from water using only solar energy.

SEC. 934. CONCENTRATING SOLAR POWER RESEARCH PROGRAM.

(a) IN GENERAL.—The Secretary shall conduct a program of research and development to evaluate the potential for concentrating solar power for hydrogen production, including cogeneration approaches for both hydrogen and electricity.

(b) ADMINISTRATION.—The program shall take advantage of existing facilities to the extent practicable and shall include—

(1) development of optimized technologies that are common to both electricity and hydrogen production;

(2) evaluation of thermochemical cycles for hydrogen production at the temperatures attainable with concentrating solar power;

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

(4) cogeneration of solar thermal electric power and photo-synthetic-based hydrogen production;

(5) system architectures and economics studies; and

(6) coordination with activities under the Next Generation Nuclear Plant Project established under subtitle C of title VI on high temperature materials, thermochemical cycles, and economic issues.

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

(1) assess conflicting guidance on the economic potential of concentrating solar power for electricity production received from the National Research Council in the report entitled ''Renewable Power Pathways: A Review of the U.S. Department of Energy's Renewable Energy Programs'' and dated 2000 and subsequent reviews of that report funded by the Department; and

(2) provide an assessment of the potential impact of technology used to concentrate solar power for electricity before, or concurrent with, submission of the budget for fiscal year 2008.

(d) REPORT.—Not later than 5 years after the date of enactment of this Act, the Secretary shall provide to Congress a report on the economic and technical potential for electricity or hydrogen production, with or without cogeneration, with concentrating solar power, including the

economic and technical feasibility of potential construction of a pilot demonstration facility suitable for commercial production of electricity or hydrogen from concentrating solar power.

SEC. 935. RENEWABLE ENERGY IN PUBLIC BUILDINGS.

(a) DEMONSTRATION AND TECHNOLOGY TRANSFER PROGRAM.—The Secretary shall establish a program for the demonstration of innovative technologies for solar and other renewable energy sources in buildings owned or operated by a State or local government, and for the dissemination of information resulting from such demonstration to interested parties.

(b) LIMIT ON FEDERAL FUNDING.—Notwithstanding section 988, the Secretary shall provide under this section no more than 40 percent of the incremental costs of the solar or other renewable energy source project funded.

(c) REQUIREMENTS.—As part of the application for awards under this section, the Secretary shall require all applicants—-

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

(2) to state how they expect any award to further their transition to the significant use of renewable energy.

Subtitle D—Agricultural Biomass Research and Development Programs

SEC. 941. AMENDMENTS TO THE BIOMASS RESEARCH AND DEVELOPMENT ACT OF 2000.

(a) DEFINITIONS.—Section 303 of the Biomass Research and Development Act of 2000 (Public Law 106–224; 7 U.S.C. 8101 note) is amended—

(1) by striking paragraphs (2), (9), and (10);

(2) by redesignating paragraphs (3), (4), (5), (6), (7), and (8) as paragraphs (4), (5), (7), (8), (9), and (10), respectively;

(3) by inserting after paragraph (1) the following:

''(2) BIOBASED FUEL.—The term 'biobased fuel' means any transportation fuel produced from biomass.

''(3) BIOBASED PRODUCT.—The term 'biobased product' means an industrial product (including chemicals, materials, and polymers) produced from biomass, or a commercial or industrial product (including animal feed and electric power) derived in connection with the conversion of biomass to fuel.'';

(4) by inserting after paragraph (5) (as redesignated by paragraph (2)) the following:

''(6) DEMONSTRATION.—The term 'demonstration' means demonstration of technology in a pilot plant or semi-works scale facility.''; and

(5) by striking paragraph (9) (as redesignated by paragraph (2)) and inserting the following:

''(9) NATIONAL LABORATORY.—The term 'National Laboratory' has the meaning given that term in section 2 of the Energy Policy Act of 2005.''

(b) COOPERATION AND COORDINATION IN BIOMASS RESEARCH AND DEVELOPMENT.—Section 304 of the Biomass Research and Development Act of 2000 (Public Law 106–224; 7 U.S.C. 8101 note) is amended—

(1) in subsections (a) and (d), by striking ''industrial products'' each place it appears and inserting ''fuels and biobased products'';

(2) by striking subsections (b) and (c); and

(3) by redesignating subsection (d) as subsection (b).

(c) BIOMASS RESEARCH AND DEVELOPMENT BOARD.—Section 305 of the Biomass Research and Development Act of 2000 (Public Law 106–224; 7 U.S.C. 8101 note) is amended—

(1) in subsections (a) and (c), by striking ''industrial products'' each place it appears and inserting ''fuels and biobased products'';

(2) in subsection (b)—

(A) in paragraph (1), by striking ''304(d)(1)(B)'' and inserting ''304(b)(1)(B)''; and

(B) in paragraph (2), by striking ''304(d)(1)(A)'' and inserting ''304(b)(1)(A)''; and

(3) in subsection (c)—

(A) in paragraph (1)(B), by striking ''and'' at the end;

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

(C) by adding at the end the following:

''(3) ensure that—

''(A) solicitations are open and competitive with awards made annually; and

''(B) objectives and evaluation criteria of the solicitations are clearly stated and minimally prescriptive, with no areas of special interest; and

''(4) ensure that the panel of scientific and technical peers assembled under section 307(g)(1)(C) to review proposals is composed predominantly of independent experts selected from outside the Departments of Agriculture and Energy.''.

(d) BIOMASS RESEARCH AND DEVELOPMENT TECHNICAL ADVISORY COMMITTEE.—Section 306 of the Biomass Research and Development Act of 2000 (Public Law 106–224; 7 U.S.C. 8101 note) is amended—

(1) in subsection (b)(1)—

(A) in subparagraph (A), by striking ''biobased industrial products'' and inserting ''biofuels'';

(B) by redesignating subparagraphs (B) through (J) as subparagraphs (C) through (K), respectively;

(C) by inserting after subparagraph (A) the following:

''(B) an individual affiliated with the biobased industrial and commercial products industry;'';

(D) in subparagraph (F) (as redesignated by subparagraph (B)) by striking ''an individual has'' and inserting ''2 individuals have'';

(E) in subparagraphs (C), (D), (G), and (I) (as redesignated by subparagraph (B)) by striking ''industrial products'' each place it appears and inserting ''fuels and biobased products''; and

(F) in subparagraph (H) (as redesignated by subparagraph (B)), by inserting ''and environmental'' before ''analysis'';

(2) in subsection (c)(2)—

(A) in subparagraph (A), by striking ''goals'' and inserting ''objectives, purposes, and considerations'';

(B) by redesignating subparagraphs (B) and (C) as subparagraphs (C) and (D), respectively;

(C) by inserting after subparagraph (A) the following:

''(B) solicitations are open and competitive with awards made annually and that objectives and evaluation criteria of the solicitations are clearly stated and minimally prescriptive, with no areas of special interest;''; and

(D) in subparagraph (C) (as redesignated by subparagraph (B)) by inserting ''predominantly from outside the Departments of Agriculture and Energy'' after ''technical peers''.

(e) BIOMASS RESEARCH AND DEVELOPMENT INITIATIVE.—Section 307 of the Biomass Research and Development Act of 2000 (Public Law 106–224; 7 U.S.C. 8101 note) is amended—

(1) in subsection (a), by striking ''research on biobased industrial products'' and inserting ''research on, and development and demonstration of, biobased fuels and biobased products, and the methods, practices and technologies, for their production''; and

(2) by striking subsections (b) through (e) and inserting the following:

''(b) OBJECTIVES.—The objectives of the Initiative are to develop—

''(1) technologies and processes necessary for abundant commercial production of biobased fuels at prices competitive with fossil fuels;

''(2) high-value biobased products—

''(A) to enhance the economic viability of biobased fuels and power; and

''(B) as substitutes for petroleum-based feedstocks and products; and

''(3) a diversity of sustainable domestic sources of biomass for conversion to biobased fuels and biobased products.

''(c) PURPOSES.—The purposes of the Initiative are—

''(1) to increase the energy security of the United States;

''(2) to create jobs and enhance the economic development of the rural economy;

''(3) to enhance the environment and public health; and

''(4) to diversify markets for raw agricultural and forestry products.

''(d) TECHNICAL AREAS.—To advance the objectives and purposes of the Initiative, the Secretary of Agriculture and the Secretary of Energy, in consultation with the Administrator of the Environmental Protection Agency and heads of other appropriate departments and agencies (referred to in this section as the 'Secretaries'), shall direct research and development toward—

''(1) feedstock production through the development of crops and cropping systems relevant to production of raw materials for conversion to biobased fuels and biobased products, including—

''(A) development of advanced and dedicated crops with desired features, including enhanced productivity, broader site range, low requirements for chemical inputs, and enhanced processing;

''(B) advanced crop production methods to achieve the features described in subparagraph (A);

"(C) feedstock harvest, handling, transport, and storage; and

"(D) strategies for integrating feedstock production into existing managed land;

"(2) overcoming recalcitrance of cellulosic biomass through developing technologies for converting cellulosic biomass into intermediates that can subsequently be converted into biobased fuels and biobased products, including—

"(A) pretreatment in combination with enzymatic or microbial hydrolysis; and

"(B) thermochemical approaches, including gasification and pyrolysis;

"(3) product diversification through technologies relevant to production of a range of biobased products (including chemicals, animal feeds, and cogenerated power) that eventually can increase the feasibility of fuel production in a biorefinery, including—

"(A) catalytic processing, including thermochemical fuel production;

"(B) metabolic engineering, enzyme engineering, and fermentation systems for biological production of desired products or cogeneration of power;

"(C) product recovery;

"(D) power production technologies; and

"(E) integration into existing biomass processing facilities, including starch ethanol plants, paper mills, and power plants; and

"(4) analysis that provides strategic guidance for the application of biomass technologies in accordance with realization of improved sustainability and environmental quality, cost effectiveness, security, and rural economic development, usually featuring system-wide approaches.

"(e) ADDITIONAL CONSIDERATIONS.—Within the technical areas described in subsection (d), and in addition to advancing the purposes described in subsection (c) and the objectives described in subsection (b), the Secretaries shall support research and development—

"(1) to create continuously expanding opportunities for participants in existing biofuels production by seeking synergies and continuity with current technologies and practices, such as the use of dried distillers grains as a bridge feedstock;

"(2) to maximize the environmental, economic, and social benefits of production of biobased fuels and biobased products on a large scale through life-

cycle economic and environmental analysis and other means; and

''(3) to assess the potential of Federal land and land management programs as feedstock resources for biobased fuels and biobased products, consistent with the integrity of soil and water resources and with other environmental considerations.

''(f) ELIGIBLE ENTITIES.—To be eligible for a grant, contract, or assistance under this section, an applicant shall be—

''(1) an institution of higher education;

''(2) a National Laboratory;

''(3) a Federal research agency;

''(4) a State research agency;

''(5) a private sector entity;

''(6) a nonprofit organization; or

''(7) a consortium of 2 of more entities described in paragraphs (1) through (6).

''(g) ADMINISTRATION.—

''(1) IN GENERAL.—After consultation with the Board, the points of contact shall—

''(A) publish annually 1 or more joint requests for proposals for grants, contracts, and assistance under this section;

''(B) require that grants, contracts, and assistance under this section be awarded competitively, on the basis of merit, after the establishment of procedures that provide for scientific peer review by an independent panel of scientific and technical peers; and

''(C) give some preference to applications that—

''(i) involve a consortia of experts from multiple institutions;

''(ii) encourage the integration of disciplines and application of the best technical resources; and

''(iii) increase the geographic diversity of demonstration projects.

''(2) DISTRIBUTION OF FUNDING BY TECHNICAL AREA.—Of the funds authorized to be appropriated for activities described in this section, funds shall be distributed for each of fiscal years 2007 through 2010 so as to achieve an approximate distribution of—

''(A) 20 percent of the funds to carry out activities for feedstock production under subsection (d)(1);

"(B) 45 percent of the funds to carry out activities for overcoming recalcitrance of cellulosic biomass under subsection (d)(2);

"(C) 30 percent of the funds to carry out activities for product diversification under subsection (d)(3); and

"(D) 5 percent of the funds to carry out activities for strategic guidance under subsection (d)(4).

"(3) DISTRIBUTION OF FUNDING WITHIN EACH TECHNICAL AREA.—Within each technical area described in paragraphs (1) through (3) of subsection (d), funds shall be distributed for each of fiscal years 2007 through 2010 so as to achieve an approximate distribution of—

"(A) 15 percent of the funds for applied fundamentals;

"(B) 35 percent of the funds for innovation; and

"(C) 50 percent of the funds for demonstration.

"(4) MATCHING FUNDS.—

"(A) IN GENERAL.—A minimum 20 percent funding match shall be required for demonstration projects under this title.

''(B) COMMERCIAL APPLICATIONS.—A minimum of 50 percent funding match shall be required for commercial application projects under this title.

''(5) TECHNOLOGY AND INFORMATION TRANSFER TO AGRICULTURAL USERS.—The Administrator of the Cooperative State Research, Education, and Extension Service and the Chief of the Natural Resources Conservation Service shall ensure that applicable research results and technologies from the Initiative are adapted, made available, and disseminated through those services, as appropriate.''.

(f) ANNUAL REPORTS.—Section 309 of the Biomass Research and Development Act of 2000 (Public Law 106–224; 7 U.S.C. 8101 note) is amended—

(1) in subsection (b)—

(A) in paragraph (1)—

(i) in subparagraph (A), by striking ''purposes described in section 307(b)'' and inserting ''objectives, purposes, and additional considerations described in subsections (b) through (e) of section 307'';

(ii) in subparagraph (B), by striking ''and'' at the end;

(iii) by redesignating subparagraph (C) as subparagraph (D); and

(iv) by inserting after subparagraph (B) the following:

''(C) achieves the distribution of funds described in paragraphs (2) and (3) of section 307(g); and''; and

(B) in paragraph (2), by striking ''industrial products'' and inserting ''fuels and biobased products''; and

(2) by adding at the end the following:

''(e) UPDATES.—The Secretary and the Secretary of Energy shall update the Vision and Roadmap documents prepared for Federal biomass research and development activities.''.

(g) AUTHORIZATION OF APPROPRIATIONS.—Section 310(b) of the Biomass Research and Development Act of 2000 (Public Law 106–224; 7 U.S.C. 8101 note) is amended by striking ''title $54,000,000 for each of fiscal years 2002 through 2007'' and inserting ''title $200,000,000 for each of fiscal years 2006 through 2015''.

(h) REPEAL OF SUNSET PROVISION.—Section 311 of the Biomass Research and Development Act of 2000 (Public Law 106–224; 7 U.S.C. 8101 note) is repealed.

SEC. 942. PRODUCTION INCENTIVES FOR CELLULOSIC BIOFUELS.

(a) PURPOSE.—The purpose of this section is to—

(1) accelerate deployment and commercialization of biofuels;

(2) deliver the first 1,000,000,000 gallons in annual cellulosic biofuels production by 2015;

(3) ensure biofuels produced after 2015 are cost competitive with gasoline and diesel; and

(4) ensure that small feedstock producers and rural small businesses are full participants in the development of the cellulosic biofuels industry.

(b) DEFINITIONS.—In this section:

(1) CELLULOSIC BIOFUELS.—The term ''cellulosic biofuels'' means any fuel that is produced from cellulosic feedstocks.

(2) ELIGIBLE ENTITY.—The term ''eligible entity'' means a producer of fuel from cellulosic biofuels the production facility of which—

(A) is located in the United States;

(B) meets all applicable Federal and State permitting requirements; and

(C) meets any financial criteria established by the Secretary.

(c) PROGRAM.—

(1) ESTABLISHMENT.—The Secretary, in consultation with the Secretary of Agriculture, the Secretary of Defense, and the Administrator of the Environmental Protection Agency, shall establish an incentive program for the production of cellulosic biofuels.

(2) BASIS OF INCENTIVES.—Under the program, the Secretary shall award production incentives on a per gallon basis of cellulosic biofuels from eligible entities, through—

(A) set payments per gallon of cellulosic biofuels produced in an amount determined by the Secretary, until initiation of the first reverse auction; and

(B) reverse auction thereafter.

(3) FIRST REVERSE AUCTION.—The first reverse auction shall be held on the earlier of—

(A) not later than 1 year after the first year of annual production in the United States of 100,000,000 gallons of cellulosic biofuels, as determined by the Secretary; or

(B) not later than 3 years after the date of enactment of this Act.

(4) REVERSE AUCTION PROCEDURE.—

(A) IN GENERAL.—On initiation of the first reverse auction, and each year thereafter until the earlier of the first year of annual production in the United States of 1,000,000,000 gallons of cellulosic biofuels, as determined by the Secretary, or 10 years after the date of enactment of this Act, the Secretary shall conduct a reverse auction at which—

(i) the Secretary shall solicit bids from eligible entities;

(ii) eligible entities shall submit—

(I) a desired level of production incentive on a per gallon basis; and

(II) an estimated annual production amount in gallons; and

(iii) the Secretary shall issue awards for the production amount submitted, beginning with the eligible entity submitting the bid for the lowest level of production incentive on a per gallon basis and meeting such other criteria as are established by the Secretary, until the amount of funds available for the reverse auction is committed.

(B) AMOUNT OF INCENTIVE RECEIVED.—An eligible entity selected by the Secretary through a reverse auction shall receive the amount of performance incentive requested in the auction for each gallon produced and sold by the entity during the first 6 years of operation.

(C) COMMENCEMENT OF PRODUCTION OF CELLULOSIC BIOFUELS.—As a condition of the receipt of an award under this section, an eligible entity shall enter into an agreement with the Secretary under which the eligible entity agrees to begin production of cellulosic biofuels not later than 3 years after the date of the reverse auction in which the eligible entity participates.

(d) LIMITATIONS.—Awards under this section shall be limited to—

(1) a per gallon amount determined by the Secretary during the first 4 years of the program;

(2) a declining per gallon cap over the remaining lifetime of the program, to be established by the Secretary so that cellulosic biofuels produced after the first year of annual cellulosic biofuels production

in the United States in excess of 1,000,000,000 gallons are cost competitive with gasoline and diesel;

(3) not more than 25 percent of the funds committed within each reverse auction to any 1 project;

(4) not more than $100,000,000 in any 1 year; and

(5) not more than $1,000,000,000 over the lifetime of the program.

(e) PRIORITY.—In selecting a project under the program, the Secretary shall give priority to projects that—

(1) demonstrate outstanding potential for local and regional economic development;

(2) include agricultural producers or cooperatives of agricultural producers as equity partners in the ventures; and

(3) have a strategic agreement in place to fairly reward feedstock suppliers.

(f) AUTHORIZATIONS OF APPROPRIATIONS.—There is authorized to be appropriated to carry out this section $250,000,000.

SEC. 943. PROCUREMENT OF BIOBASED PRODUCTS.

(a) FEDERAL PROCUREMENT.—

(1) DEFINITION OF PROCURING AGENCY.—Section 9001 of the Farm Security and Rural Investment Act of 2002 (7 U.S.C. 8101) is amended—

(A) by redesignating paragraphs (4), (5), and (6) as paragraphs (5), (6), and (7), respectively; and

(B) by inserting after paragraph (3) the following:

''(4) PROCURING AGENCY.—The term 'procuring agency' means—

''(A) any Federal agency that is using Federal funds for procurement; or

''(B) any person contracting with any Federal agency with respect to work performed under the contract.''.

(2) PROCUREMENT.—Section 9002 of the Farm Security and Rural Investment Act of 2002 (7 U.S.C. 8102) is amended—

(A) by striking ''Federal agency'' each place it appears (other than in subsections (f) and (g)) and inserting ''procuring agency'';

(B) in subsection (c)(2)—

(i) by striking ''(2)'' and all that follows through ''Notwithstanding'' and inserting the following:

''(2) FLEXIBILITY.—Notwithstanding'';

(ii) by striking ''an agency'' and inserting ''a procuring agency''; and

(iii) by striking ''the agency'' and inserting ''the procuring agency'';

(C) in subsection (d), by striking ''procured by Federal agencies'' and inserting ''procured by procuring agencies''; and

(D) in subsection (f), by striking ''Federal agencies'' and inserting ''procuring agencies'' .

(b) CAPITOL COMPLEX PROCUREMENT.—Section 9002 of the Farm Security and Rural Investment Act of 2002 (7 U.S.C. 8102) (as amended by subsection (a)(2)) is amended—

(1) by redesignating subsection (j) as subsection (k); and

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

''(j) INCLUSION.—Not later than 90 days after the date of enactment of the Energy Policy Act of 2005, the Architect of the Capitol, the Sergeant at Arms of the Senate, and the Chief Administrative Officer of the House of Representatives shall establish procedures that apply the requirements of this section to procurement for the Capitol Complex.''.

(c) EDUCATION.—

(1) IN GENERAL.—The Architect of the Capitol shall establish in the Capitol Complex a program of

public education regarding use by the Architect of the Capitol of biobased products.

(2) PURPOSES.—The purposes of the program shall be—

(A) to establish the Capitol Complex as a showcase for the existence and benefits of biobased products; and

(B) to provide access to further information on biobased products to occupants and visitors.

(d) PROCEDURE.—Requirements issued under the amendments made by subsection (b) shall be made in accordance with directives issued by the Committee on Rules and Administration of the Senate and the Committee on House Administration of the House of Representatives.

SEC. 944. SMALL BUSINESS BIOPRODUCT MARKETING AND CERTIFICATION GRANTS.

(a) IN GENERAL.—Using amounts made available under subsection (g), the Secretary of Agriculture (referred to in this section as the ''Secretary'') shall make available on a competitive basis grants to eligible entities described in subsection (b) for the biobased product marketing and certification purposes described in subsection (c).

(b) ELIGIBLE ENTITIES.—

(1) IN GENERAL.—An entity eligible for a grant under this section is any manufacturer of biobased products that—

(A) proposes to use the grant for the biobased product marketing and certification purposes described in subsection (c); and

(B) has not previously received a grant under this section.

(2) PREFERENCE.—In making grants under this section, the Secretary shall provide a preference to an eligible entity that has fewer than 50 employees.

(c) BIOBASED PRODUCT MARKETING AND CERTIFICATION GRANT PURPOSES.—A grant made under this section shall be used—

(1) to provide working capital for marketing of biobased products; and

(2) to provide for the certification of biobased products to—

(A) qualify for the label described in section 9002(h)(1) of the Farm Security and Rural Investment Act of 2002 (7 U.S.C. 8102(h)(1)); or

(B) meet other biobased standards determined appropriate by the Secretary.

(d) MATCHING FUNDS.—

(1) IN GENERAL.—Grant recipients shall provide matching non-Federal funds equal to the amount of the grant received.

(2) EXPENDITURE.—Matching funds shall be expended in advance of grant funding, so that for every dollar of grant that is advanced, an equal amount of matching funds shall have been funded prior to submitting the request for reimbursement.

(e) AMOUNT.—A grant made under this section shall not exceed $100,000.

(f) ADMINISTRATION.—The Secretary shall establish such administrative requirements for grants under this section, including requirements for applications for the grants, as the Secretary considers appropriate.

(g) AUTHORIZATIONS OF APPROPRIATIONS.—There are authorized to be appropriated to make grants under this section—

(1) $1,000,000 for fiscal year 2006; and

(2) such sums as are necessary for each of fiscal years 2007 through 2015.

SEC. 945. REGIONAL BIOECONOMY DEVELOPMENT GRANTS.

(a) IN GENERAL.—Using amounts made available under subsection (g), the Secretary of Agriculture (referred to in this section as the ''Secretary'') shall make

available on a competitive basis grants to eligible entities described in subsection (b) for the purposes described in subsection (c).

(b) ELIGIBLE ENTITIES.—An entity eligible for a grant under this section is any regional bioeconomy development association, agricultural or energy trade association, or Land Grant institution that—

(1) proposes to use the grant for the purposes described in subsection (c); and

(2) has not previously received a grant under this section.

(c) REGIONAL BIOECONOMY DEVELOPMENT ASSOCIATION GRANT PURPOSES.—A grant made under this section shall be used to support and promote the growth and development of the bioeconomy within the region served by the eligible entity, through coordination, education, outreach, and other endeavors by the eligible entity.

(d) MATCHING FUNDS.—

(1) IN GENERAL.—Grant recipients shall provide matching non-Federal funds equal to the amount of the grant received.

(2) EXPENDITURE.—Matching funds shall be expended in advance of grant funding, so that for every dollar of grant that is advanced, an equal

amount of matching funds shall have been funded prior to submitting the request for reimbursement.

(e) ADMINISTRATION.—The Secretary shall establish such administrative requirements for grants under this section, including requirements for applications for the grants, as the Secretary considers appropriate.

(f) AMOUNT.—A grant made under this section shall not exceed $500,000.

(g) AUTHORIZATIONS OF APPROPRIATIONS.—There are authorized to be appropriated to make grants under this section—

(1) $1,000,000 for fiscal year 2006; and

(2) such sums as are necessary for each of fiscal years 2007 through 2015.

SEC. 946. PREPROCESSING AND HARVESTING DEMONSTRATION GRANTS.

(a) IN GENERAL.—The Secretary of Agriculture (referred to in this section as the ''Secretary'') shall make grants available on a competitive basis to enterprises owned by agricultural producers, for the purposes of demonstrating cost-effective, cellulosic biomass innovations in—

(1) preprocessing of feedstocks, including cleaning, separating and sorting, mixing or blending, and chemical or biochemical treatments, to add value

and lower the cost of feedstock processing at a biorefinery; or

(2) 1-pass or other efficient, multiple crop harvesting techniques.

(b) LIMITATIONS ON GRANTS.—

(1) NUMBER OF GRANTS.—Not more than 5 demonstration projects per fiscal year shall be funded under this section.

(2) NON-FEDERAL COST SHARE.—The non-Federal cost share of a project under this section shall be not less than 20 percent, as determined by the Secretary.

(c) CONDITION OF GRANT.—To be eligible for a grant for a project under this section, a recipient of a grant or a participating entity shall agree to use the material harvested under the project—

(1) to produce ethanol; or

(2) for another energy purpose, such as the generation of heat or electricity.

(d) AUTHORIZATION FOR APPROPRIATIONS.—There is authorized to be appropriated to carry out this section $5,000,000 for each of fiscal years 2006 through 2010.

SEC. 947. EDUCATION AND OUTREACH.

(a) IN GENERAL.—The Secretary of Agriculture shall establish, within the Department of Agriculture or

through an independent contracting entity, a program of education and outreach on biobased fuels and biobased products consisting of—

(1) training and technical assistance programs for feedstock producers to promote producer ownership, investment, and participation in the operation of processing facilities; and

(2) public education and outreach to familiarize consumers with the biobased fuels and biobased products.

(b) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to carry out this section $1,000,000 for each of fiscal years 2006 through 2010.

SEC. 948. REPORTS.

(a) BIOBASED PRODUCT POTENTIAL.—Not later than 1 year after the date of enactment of this Act, the Secretary of Agriculture (referred to in this section as the ''Secretary'') shall submit to the Committee on Agriculture of the House of Representatives and the Committee on Agriculture, Nutrition, and Forestry of the Senate a report that—

(1) describes the economic potential for the United States of the widespread production and use of commercial and industrial biobased products through calendar year 2025; and

(2) as the maximum extent practicable, identifies the economic potential by product area.

(b) ANALYSIS OF ECONOMIC INDICATORS.—Not later than 2 years after the date of enactment of this Act, the Secretary shall submit to Congress an analysis of economic indicators of the biobased economy.

Subtitle E—Nuclear Energy

SEC. 951. NUCLEAR ENERGY.

(a) IN GENERAL.—The Secretary shall conduct programs of civilian nuclear energy research, development, demonstration, and commercial application, including activities described in this subtitle. Programs under this subtitle shall take into consideration the following objectives:

(1) Enhancing nuclear power's viability as part of the United States energy portfolio.

(2) Providing the technical means to reduce the likelihood of nuclear proliferation.

(3) Maintaining a cadre of nuclear scientists and engineers.

(4) Maintaining National Laboratory and university nuclear programs, including their infrastructure.

(5) Supporting both individual researchers and multidisciplinary teams of researchers to pioneer

new approaches in nuclear energy, science, and technology.

(6) Developing, planning, constructing, acquiring, and operating special equipment and facilities for the use of researchers.

(7) Supporting technology transfer and other appropriate activities to assist the nuclear energy industry, and other users of nuclear science and engineering, including activities addressing reliability, availability, productivity, component aging, safety, and security of nuclear power plants.

(8) Reducing the environmental impact of nuclear energy-related activities.

(b) AUTHORIZATION OF APPROPRIATIONS FOR CORE PROGRAMS.—There are authorized to be appropriated to the Secretary to carry out nuclear energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle, other than those described in subsection (c)—

(1) $330,000,000 for fiscal year 2007;

(2) $355,000,000 for fiscal year 2008; and

(3) $495,000,000 for fiscal year 2009.

(c) NUCLEAR INFRASTRUCTURE AND FACILITIES.—There are authorized to be appropriated to the Secretary to carry out activities under section 955—

(1) $135,000,000 for fiscal year 2007;

(2) $140,000,000 for fiscal year 2008; and

(3) $145,000,000 for fiscal year 2009.

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

(1) For activities under section 953—

(A) $150,000,000 for fiscal year 2007;

(B) $155,000,000 for fiscal year 2008; and

(C) $275,000,000 for fiscal year 2009.

(2) For activities under section 954—

(A) $43,600,000 for fiscal year 2007;

(B) $50,100,000 for fiscal year 2008; and

(C) $56,000,000 for fiscal year 2009.

(3) For activities under section 957, $6,000,000 for each of fiscal years 2007 through 2009.

(e) LIMITATION.—None of the funds authorized under this section may be used to decommission the Fast Flux Test Facility.

SEC. 952. NUCLEAR ENERGY RESEARCH PROGRAMS.

(a) NUCLEAR ENERGY RESEARCH INITIATIVE.—The Secretary shall carry out a Nuclear Energy Research Initiative for research and development related to nuclear energy.

(b) NUCLEAR ENERGY SYSTEMS SUPPORT PROGRAM.—The Secretary shall carry out a Nuclear Energy Systems Support Program to support research and development activities addressing reliability, availability, productivity, component aging, safety, and security of existing nuclear power plants.

(c) NUCLEAR POWER 2010 PROGRAM.—

(1) IN GENERAL.—The Secretary shall carry out a Nuclear Power 2010 Program, consistent with recommendations of the Nuclear Energy Research Advisory Committee of the Department in the report entitled ''A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010'' and dated October 2001.

(2) ADMINISTRATION.—The Program shall include—

(A) use of the expertise and capabilities of industry, institutions of higher education, and National Laboratories in evaluation of advanced nuclear fuel cycles and fuels testing;

(B) consideration of a variety of reactor designs suitable for both developed and developing nations;

(C) participation of international collaborators in research, development, and design efforts, as appropriate; and

(D) encouragement for participation by institutions of higher education and industry.

(d) GENERATION IV NUCLEAR ENERGY SYSTEMS INITIATIVE.—

(1) IN GENERAL.—The Secretary shall carry out a Generation IV Nuclear Energy Systems Initiative to develop an overall technology plan for and to support research and development necessary to make an informed technical decision about the most promising candidates for eventual commercial application.

(2) ADMINISTRATION.—In conducting the Initiative, the Secretary shall examine advanced proliferation-resistant and passively safe reactor designs, including designs that—

(A) are economically competitive with other electric power generation plants;

(B) have higher efficiency, lower cost, and improved safety compared to reactors in operation on the date of enactment of this Act;

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

(D) use improved instrumentation.

(e) REACTOR PRODUCTION OF HYDROGEN.—The Secretary shall carry out research to examine designs for high-temperature reactors capable of producing large-scale quantities of hydrogen.

SEC. 953. ADVANCED FUEL CYCLE INITIATIVE.

(a) IN GENERAL.—The Secretary, acting through the Director of the Office of Nuclear Energy, Science and Technology, shall conduct an advanced fuel recycling technology research, development, and demonstration application program (referred to in this section as the ''program'') to evaluate proliferation-resistant fuel recycling and transmutation technologies that minimize environmental and public health and safety impacts as an alternative to aqueous reprocessing technologies deployed as of the date of enactment of this Act in support of evaluation of alternative national strategies for spent nuclear fuel and the Generation IV advanced reactor concepts.

(b) ANNUAL REVIEW.—The program shall be subject to annual review by the Nuclear Energy Research Advisory Committee of the Department or other independent entity, as appropriate.

(c) INTERNATIONAL COOPERATION.—In carrying out the program, the Secretary is encouraged to seek opportu-

nities to enhance the progress of the program through international cooperation.

(d) REPORTS.—The Secretary shall submit, as part of the annual budget submission of the Department, a report on the activities of the program.

SEC. 954. UNIVERSITY NUCLEAR SCIENCE AND ENGINEERING SUPPORT.

(a) IN GENERAL.—The Secretary shall conduct a program to invest in human resources and infrastructure in the nuclear sciences and related fields, including health physics, nuclear engineering, and radiochemistry, consistent with missions of the Department related to civilian nuclear research, development, demonstration, and commercial application.

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

(1) conduct a graduate and undergraduate fellowship program to attract new and talented students, which may include fellowships for students to spend time at National Laboratories in the areas of nuclear science, engineering, and health physics with a member of the National Laboratory staff acting as a mentor;

(2) conduct a junior faculty research initiation grant program to assist universities in recruiting

and retaining new faculty in the nuclear sciences and engineering by awarding grants to junior faculty for research on issues related to nuclear energy engineering and science;

(3) support fundamental nuclear sciences, engineering, and health physics research through a nuclear engineering education and research program;

(4) encourage collaborative nuclear research among industry, National Laboratories, and universities; and

(5) support communication and outreach related to nuclear science, engineering, and health physics.

(c) UNIVERSITY-NATIONAL LABORATORY INTERACTIONS.—The Secretary shall conduct—

(1) a fellowship program for professors at universities to spend sabbaticals at National Laboratories in the areas of nuclear science and technology; and

(2) a visiting scientist program in which National Laboratory staff can spend time in academic nuclear science and engineering departments.

(d) STRENGTHENING UNIVERSITY RESEARCH AND TRAINING REACTORS AND ASSOCIATED INFRASTRUC-

TURE.—In carrying out the program under this section, the Secretary may support—

(1) converting research reactors from high-enrichment fuels to low-enrichment fuels and upgrading operational instrumentation;

(2) consortia of universities to broaden access to university research reactors;

(3) student training programs, in collaboration with the United States nuclear industry, in relicensing and upgrading reactors, including through the provision of technical assistance; and

(4) reactor improvements as part of a taking into consideration effort that emphasizes research, training, and education, including through the Innovations in Nuclear Infrastructure and Education Program or any similar program.

(e) OPERATIONS AND MAINTENANCE.—Funding for a project provided under this section may be used for a portion of the operating and maintenance costs of a research reactor at a university used in the project.

(f) DEFINITION.—In this section, the term `junior faculty' means a faculty member who was awarded a doctorate less than 10 years before receipt of an award from the grant program described in subsection (b)(2).

SEC. 955. DEPARTMENT OF ENERGY CIVILIAN NUCLEAR INFRASTRUCTURE AND FACILITIES.

(a) IN GENERAL.—The Secretary shall operate and maintain infrastructure and facilities to support the nuclear energy research, development, demonstration, and commercial application programs, including radiological facilities management, isotope production, and facilities management.

(b) DUTIES.—In carrying this section, the Secretary shall—

(1) develop an inventory of nuclear science and engineering facilities, equipment, expertise, and other assets at all of the National Laboratories;

(2) develop a prioritized list of nuclear science and engineering plant and equipment improvements needed at each of the National Laboratories;

(3) consider the available facilities and expertise at all National Laboratories and emphasize investments which complement rather than duplicate capabilities; and

(4) develop a timeline and a proposed budget for the completion of deferred maintenance on plant and equipment, with the goal of ensuring that Department programs under this subtitle will be generally recognized to be among the best in the world.

(c) PLAN.—The Secretary shall develop a comprehensive plan for the facilities at the Idaho National Laboratory, especially taking into account the resources available at other National Laboratories. In developing the plan, the Secretary shall—

(1) evaluate the facilities planning processes utilized by other physical science and engineering research and development institutions, both in the United States and abroad, that are generally recognized as being among the best in the world, and consider how those processes might be adapted toward developing such facilities plan;

(2) avoid duplicating, moving, or transferring nuclear science and engineering facilities, equipment, expertise, and other assets that currently exist at other National Laboratories;

(3) consider the establishment of a national transuranic analytic chemistry laboratory as a user facility at the Idaho National Laboratory;

(4) include a plan to develop, if feasible, the Advanced Test Reactor and Test Reactor Area into a user facility that is more readily accessible to academic and industrial researchers;

(5) consider the establishment of a fast neutron source as a user facility;

(6) consider the establishment of new hot cells and the configuration of hot cells most likely to advance research, development, demonstration, and commercial application in nuclear science and engineering, especially in the context of the condition and availability of these facilities elsewhere in the National Laboratories; and

(7) include a timeline and a proposed budget for the completion of deferred maintenance on plant and equipment.

(d) TRANSMITTAL TO CONGRESS.—Not later than 1 year after the date of enactment of this Act, the Secretary shall transmit the plan under subsection (c) to Congress.

SEC. 956. SECURITY OF NUCLEAR FACILITIES.

The Secretary, acting through the Director of the Office of Nuclear Energy, Science and Technology, shall conduct a research and development program on cost-effective technologies for increasing—

(1) the safety of nuclear facilities from natural phenomena; and

(2) the security of nuclear facilities from deliberate attacks.

SEC. 957. ALTERNATIVES TO INDUSTRIAL RADIOACTIVE SOURCES.

(a) SURVEY.—

(1) IN GENERAL.—Not later than August 1, 2006, the Secretary shall submit to Congress the results of a survey of industrial applications of large radioactive sources.

(2) ADMINISTRATION.—The survey shall—

(A) consider well-logging sources as 1 class of industrial sources;

(B) include information on current domestic and international Department, Department of Defense, State Department, and commercial programs to manage and dispose of radioactive sources; and

(C) analyze available disposal options for currently deployed or future sources and, if deficiencies are noted for either deployed or future sources, recommend legislative options that Congress may consider to remedy identified deficiencies.

(b) PLAN.—

(1) IN GENERAL.—In conjunction with the survey conducted under subsection (a), the Secretary shall establish a research and development program to develop alternatives to sources described in subsection (a) that reduce safety, environmental, or pro-

liferation risks to either workers using the sources or the public.

(2) ACCELERATORS.—Miniaturized particle accelerators for well-logging or other industrial applications and portable accelerators for production of short-lived radioactive materials at an industrial site shall be considered as part of the research and development efforts.

(3) REPORT.—Not later than August 1, 2006, the Secretary shall submit to Congress a report describing the details of the program plan.

Subtitle F—Fossil Energy

SEC. 961. FOSSIL ENERGY.

(a) IN GENERAL.—The Secretary shall carry out research, development, demonstration, and commercial application programs in fossil energy, including activities under this subtitle, with the goal of improving the efficiency, effectiveness, and environmental performance of fossil energy production, upgrading, conversion, and consumption. Such programs take into consideration the following objectives:

(1) Increasing the energy conversion efficiency of all forms of fossil energy through improved technologies.

(2) Decreasing the cost of all fossil energy production, generation, and delivery.

(3) Promoting diversity of energy supply.

(4) Decreasing the dependence of the United States on foreign energy supplies.

(5) Improving United States energy security.

(6) Decreasing the environmental impact of energy-related activities.

(7) Increasing the export of fossil energy-related equipment, technology, and services from the United States.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out fossil energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle—

(1) $611,000,000 for fiscal year 2007;

(2) $626,000,000 for fiscal year 2008; and

(3) $641,000,000 for fiscal year 2009.

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

(1) For activities under section 962—

(A) $367,000,000 for fiscal year 2007;

(B) $376,000,000 for fiscal year 2008; and

(C) $394,000,000 for fiscal year 2009.

(2) For activities under section 964—

(A) $20,000,000 for fiscal year 2007;

(B) $25,000,000 for fiscal year 2008; and

(C) $30,000,000 for fiscal year 2009.

(3) For activities under section 966—

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

(B) $450,000 for each of fiscal years 2008 and 2009.

(4) For the Office of Arctic Energy under section 3197 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (42 U.S.C. 7144d) $25,000,000 for each of fiscal years 2007 through 2009.

(d) EXTENDED AUTHORIZATION.—There are authorized to be appropriated to the Secretary for the Office of Arctic Energy established under section 3197 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (42 U.S.C. 7144d) $25,000,000 for each of fiscal years 2010 through 2012.

(e) LIMITATIONS.—

(1) USES.—None of the funds authorized under this section may be used for Fossil Energy Environmental Restoration or Import/Export Authorization.

(2) INSTITUTIONS OF HIGHER EDUCATION.—Of the funds authorized under subsection (c)(2), not

less than 20 percent of the funds appropriated for each fiscal year shall be dedicated to research and development carried out at institutions of higher education.

SEC. 962. COAL AND RELATED TECHNOLOGIES PROGRAM.

(a) IN GENERAL.—In addition to the programs authorized under title IV, the Secretary shall conduct a program of technology research, development, demonstration, and commercial application for coal and power systems, including programs to facilitate production and generation of coal-based power through—

(1) innovations for existing plants (including mercury removal);

(2) gasification systems;

(3) advanced combustion systems;

(4) turbines for synthesis gas derived from coal;

(5) carbon capture and sequestration research and development;

(6) coal-derived chemicals and transportation fuels;

(7) liquid fuels derived from low rank coal water slurry;

(8) solid fuels and feedstocks;

(9) advanced coal-related research;

(10) advanced separation technologies; and

(11) fuel cells for the operation of synthesis gas derived from coal.

(b) COST AND PERFORMANCE GOALS.—

(1) IN GENERAL.—In carrying out programs authorized by this section, during each of calendar years 2008, 2010, 2012, and 2016, and during each fiscal year beginning after September 30, 2021, the Secretary shall identify cost and performance goals for coal-based technologies that would permit the continued cost-competitive use of coal for the production of electricity, chemical feedstocks, and transportation fuels.

(2) ADMINISTRATION.—In establishing the cost and performance goals, the Secretary shall—

(A) consider activities and studies undertaken as of the date of enactment of this Act by industry in cooperation with the Department in support of the identification of the goals;

(B) consult with interested entities, including—

(i) coal producers;

(ii) industries using coal;

(iii) organizations that promote coal and advanced coal technologies;

(iv) environmental organizations;

(v) organizations representing workers; and

(vi) organizations representing consumers;

(C) not later than 120 days after the date of enactment of this Act, publish in the Federal Register proposed draft cost and performance goals for public comments; and

(D) not later than 180 days after the date of enactment of this Act and every 4 years thereafter, submit to Congress a report describing the final cost and performance goals for the technologies that includes—

(i) a list of technical milestones; and

(ii) an explanation of how programs authorized in this section will not duplicate the activities authorized under the Clean Coal Power Initiative authorized under title IV.

(c) POWDER RIVER BASIN AND FORT UNION LIGNITE COAL MERCURY REMOVAL.—

(1) IN GENERAL.—In addition to the programs authorized by subsection (a), the Secretary shall establish a program to test and develop technologies to control and remove mercury emissions from subbitu-

minous coal mined in the Powder River Basin, and Fort Union lignite coals, that are used for the generation of electricity.

(2) EFFICACY OF MERCURY REMOVAL TECHNOLOGY.—In carrying out the program under paragraph (1), the Secretary shall examine the efficacy of mercury removal technologies on coals described in that paragraph that are blended with other types of coal.

(d) FUEL CELLS.—

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

(2) DEMONSTRATIONS.—The demonstrations referred to in paragraph (1) shall include solid oxide fuel cell technology for commercial, residential, and transportation applications, and distributed generation systems, using improved manufacturing production and processes.

SEC. 963. CARBON CAPTURE RESEARCH AND DEVELOPMENT PROGRAM.

(a) IN GENERAL.—The Secretary shall carry out a 10-year carbon capture research and development pro-

gram to develop carbon dioxide capture technologies on combustion-based systems for use—

(1) in new coal utilization facilities; and

(2) on the fleet of coal-based units in existence on the date of enactment of this Act.

(b) OBJECTIVES.—The objectives of the program under subsection (a) shall be—

(1) to develop carbon dioxide capture technologies, including adsorption and absorption techniques and chemical processes, to remove the carbon dioxide from gas streams containing carbon dioxide potentially amenable to sequestration;

(2) to develop technologies that would directly produce concentrated streams of carbon dioxide potentially amenable to sequestration;

(3) to increase the efficiency of the overall system to reduce the quantity of carbon dioxide emissions released from the system per megawatt generated; and

(4) in accordance with the carbon dioxide capture program, to promote a robust carbon sequestration program and continue the work of the Department, in conjunction with the private sector, through regional carbon sequestration partnerships.

(c) AUTHORIZATION OF APPROPRIATIONS.—From amounts authorized under section 961(b), the following sums are authorized for activities described in subsection (a)(2):

(1) $25,000,000 for fiscal year 2006;

(2) $30,000,000 for fiscal year 2007; and

(3) $35,000,000 for fiscal year 2008

SEC. 964. RESEARCH AND DEVELOPMENT FOR COAL MINING TECHNOLOGIES.

(a) ESTABLISHMENT.—The Secretary shall carry out a program for research and development on coal mining technologies.

(b) COOPERATION.—In carrying out the program, the Secretary shall cooperate with appropriate Federal agencies, coal producers, trade associations, equipment manufacturers, institutions of higher education with mining engineering departments, and other relevant entities.

(c) PROGRAM.—The research and development activities carried out under this section shall—

(1) be guided by the mining research and development priorities identified by the Mining Industry of the Future Program and in the recommendations from relevant reports of the National Academy of Sciences on mining technologies;

(2) include activities exploring minimization of contaminants in mined coal that contribute to environmental concerns including development and demonstration of electromagnetic wave imaging ahead of mining operations;

(3) develop and demonstrate coal bed electromagnetic wave imaging, spectroscopic reservoir analysis technology, and techniques for horizontal drilling in order to—

(A) identify areas of high coal gas content;

(B) increase methane recovery efficiency;

(C) prevent spoilage of domestic coal reserves; and

(D) minimize water disposal associated with methane extraction; and

(4) expand mining research capabilities at institutions of higher education.

SEC. 965. OIL AND GAS RESEARCH PROGRAMS.

(a) IN GENERAL.—The Secretary shall conduct a program of research, development, demonstration, and commercial application of oil and gas, including—

(1) exploration and production;

(2) gas hydrates;

(3) reservoir life and extension;

(4) transportation and distribution infrastructure;

(5) ultraclean fuels;

(6) heavy oil, oil shale, and tar sands; and

(7) related environmental research.

(b) OBJECTIVES.—The objectives of this program shall include advancing the science and technology available to domestic petroleum producers, particularly independent operators, to minimize the economic dislocation caused by the decline of domestic supplies of oil and natural gas resources.

(c) NATURAL GAS AND OIL DEPOSITS REPORT.—Not later than 2 years after the date of enactment of this Act and every 2 years thereafter, the Secretary of the Interior, in consultation with other appropriate Federal agencies, shall submit to Congress a report on the latest estimates of natural gas and oil reserves, reserves growth, and undiscovered resources in Federal and State waters off the coast of Louisiana, Texas, Alabama, and Mississippi.

(d) INTEGRATED CLEAN POWER AND ENERGY RESEARCH.—

(1) ESTABLISHMENT OF CENTER.—The Secretary shall establish a national center or consortium of excellence in clean energy and power generation, using the resources of the Clean Power and Energy

Research Consortium in existence on the date of enactment of this Act, to address the critical dependence of the United States on energy and the need to reduce emissions.

(2) FOCUS AREAS.—The center or consortium shall conduct a program of research, development, demonstration, and commercial application on integrating the following 6 focus areas:

(A) Efficiency and reliability of gas turbines for power generation.

(B) Reduction in emissions from power generation.

(C) Promotion of energy conservation issues.

(D) Effectively using alternative fuels and renewable energy.

(E) Development of advanced materials technology for oil and gas exploration and use in harsh environments.

(F) Education on energy and power generation issues.

SEC. 966. LOW-VOLUME OIL AND GAS RESERVOIR RESEARCH PROGRAM.

(a) DEFINITIONS OF GIS.—In this section, the term ''GIS'' means geographic information systems technology

that facilitates the organization and management of data with a geographic component.

(b) PROGRAM.—The Secretary shall establish a program of research, development, demonstration, and commercial application to maximize the productive capacity of marginal wells and reservoirs.

(c) DATA COLLECTION.—Under the program, the Secretary shall collect data on—

(1) the status and location of marginal wells and oil and gas reservoirs;

(2) the production capacity of marginal wells and oil and gas reservoirs;

(3) the location of low-pressure gathering facilities and pipelines; and

(4) the quantity of natural gas vented or flared in association with crude oil production.

(d) ANALYSIS.—Under the program, the Secretary shall—

(1) estimate the remaining producible reserves based on variable pipeline pressures; and

(2) recommend measures that will enable the continued production of those resources.

(e) STUDY.—

(1) IN GENERAL.—The Secretary may award a grant to an organization of States that contain sig-

nificant numbers of marginal oil and natural gas wells to conduct an annual study of low-volume natural gas reservoirs.

(2) ORGANIZATION WITH NO GIS CAPABILITIES.—If an organization receiving a grant under paragraph (1) does not have GIS capabilities, the organization shall contract with an institution of higher education with GIS capabilities.

(3) STATE GEOLOGISTS.—The organization receiving a grant under paragraph (1) shall collaborate with the State geologist of each State being studied.

(f) PUBLIC INFORMATION.—The Secretary may use the data collected and analyzed under this section to produce maps and literature to disseminate to States to promote conservation of natural gas reserves.

SEC. 967. COMPLEX WELL TECHNOLOGY TESTING FACILITY.

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

SEC. 968. METHANE HYDRATE RESEARCH.

(a) IN GENERAL.—The Methane Hydrate Research and Development Act of 2000 (30 U.S.C. 1902 note; Public Law 106–193) is amended to read as follows:

"SECTION 1. SHORT TITLE.

"This Act may be cited as the 'Methane Hydrate Research and Development Act of 2000'.

"SEC. 2. FINDINGS.

"Congress finds that—

"(1) in order to promote energy independence and meet the increasing demand for energy, the United States will require a diversified portfolio of substantially increased quantities of electricity, natural gas, and transportation fuels;

"(2) according to the report submitted to Congress by the National Research Council entitled 'Charting the Future of Methane Hydrate Research in the United States', the total United States resources of gas hydrates have been estimated to be on the order of 200,000 trillion cubic feet;

"(3) according to the report of the National Commission on Energy Policy entitled 'Ending the Energy Stalemate—A Bipartisan Strategy to Meet America's Energy Challenge', and dated December 2004, the United States may be endowed with over 1/4 of the methane hydrate deposits in the world;

''(4) according to the Energy Information Administration, a shortfall in natural gas supply from conventional and unconventional sources is expected to occur in or about 2020; and

''(5) the National Academy of Sciences states that methane hydrate may have the potential to alleviate the projected shortfall in the natural gas supply.

''SEC. 3. DEFINITIONS.

''In this Act:

''(1) CONTRACT.—The term 'contract' means a procurement contract within the meaning of section 6303 of title 31, United States Code.

''(2) COOPERATIVE AGREEMENT.—The term 'cooperative agreement' means a cooperative agreement within the meaning of section 6305 of title 31, United States Code.

''(3) DIRECTOR.—The term 'Director' means the Director of the National Science Foundation.

''(4) GRANT.—The term 'grant' means a grant awarded under a grant agreement (within the meaning of section 6304 of title 31, United States Code).

''(5) INDUSTRIAL ENTERPRISE.—The term 'industrial enterprise' means a private, nongovernmental enterprise that has an expertise or capability

that relates to methane hydrate research and development.

''(6) INSTITUTION OF HIGHER EDUCATION.—The term 'institution of higher education' means an institution of higher education (as defined in section 102 of the Higher Education Act of 1965 (20 U.S.C. 1002)).

''(7) SECRETARY.—The term 'Secretary' means the Secretary of Energy, acting through the Assistant Secretary for Fossil Energy.

''(8) SECRETARY OF COMMERCE.—The term 'Secretary of Commerce' means the Secretary of Commerce, acting through the Administrator of the National Oceanic and Atmospheric Administration.

''(9) SECRETARY OF DEFENSE.—The term 'Secretary of Defense' means the Secretary of Defense, acting through the Secretary of the Navy.

''(10) SECRETARY OF THE INTERIOR.—The term 'Secretary of the Interior' means the Secretary of the Interior, acting through the Director of the United States Geological Survey, the Director of the Bureau of Land Management, and the Director of the Minerals Management Service.

"SEC. 4. METHANE HYDRATE RESEARCH AND DEVELOPMENT PROGRAM.

"(a) IN GENERAL.—

"(1) COMMENCEMENT OF PROGRAM.—Not later than 90 days after the date of enactment of the Energy Research, Development, Demonstration, and Commercial Application Act of 2005, the Secretary, in consultation with the Secretary of Commerce, the Secretary of Defense, the Secretary of the Interior, and the Director, shall commence a program of methane hydrate research and development in accordance with this section.

"(2) DESIGNATIONS.—The Secretary, the Secretary of Commerce, the Secretary of Defense, the Secretary of the Interior, and the Director shall designate individuals to carry out this section.

"(3) COORDINATION.—The individual designated by the Secretary shall coordinate all activities within the Department of Energy relating to methane hydrate research and development.

"(4) MEETINGS.—The individuals designated under paragraph (2) shall meet not later than 180 days after the date of enactment of the Energy Research, Development, Demonstration, and Commercial Application Act of 2005 and not less frequently than every 180 days thereafter to—

"(A) review the progress of the program under paragraph (1); and

"(B) coordinate interagency research and partnership efforts in carrying out the program.

"(b) GRANTS, CONTRACTS, COOPERATIVE AGREEMENTS, INTERAGENCY FUNDS TRANSFER AGREEMENTS, AND FIELD WORK PROPOSALS.—

"(1) ASSISTANCE AND COORDINATION.—In carrying out the program of methane hydrate research and development authorized by this section, the Secretary may award grants to, or enter into contracts or cooperative agreements with, institutions of higher education, oceanographic institutions, and industrial enterprises to—

"(A) conduct basic and applied research to identify, explore, assess, and develop methane hydrate as a commercially viable source of energy;

"(B) identify methane hydrate resources through remote sensing;

"(C) acquire and reprocess seismic data suitable for characterizing methane hydrate accumulations;

"(D) assist in developing technologies required for efficient and environmentally sound development of methane hydrate resources;

"(E) promote education and training in methane hydrate resource research and resource development through fellowships or other means for graduate education and training;

"(F) conduct basic and applied research to assess and mitigate the environmental impact of hydrate degassing (including both natural degassing and degassing associated with commercial development);

"(G) develop technologies to reduce the risks of drilling through methane hydrates; and

"(H) conduct exploratory drilling, well testing, and production testing operations on permafrost and non-permafrost gas hydrates in support of the activities authorized by this paragraph, including drilling of 1 or more full-scale production test wells.

"(2) COMPETITIVE PEER REVIEW.—Funds made available under paragraph (1) shall be made available based on a competitive process using external scientific peer review of proposed research.

"(c) METHANE HYDRATES ADVISORY PANEL.—

''(1) IN GENERAL.—The Secretary shall establish an advisory panel (including the hiring of appropriate staff) consisting of representatives of industrial enterprises, institutions of higher education, oceanographic institutions, State agencies, and environmental organizations with knowledge and expertise in the natural gas hydrates field, to—

''(A) assist in developing recommendations and broad programmatic priorities for the methane hydrate research and development program carried out under subsection (a)(1);

''(B) provide scientific oversight for the methane hydrates program, including assessing progress toward program goals, evaluating program balance, and providing recommendations to enhance the quality of the program over time; and

''(C) not later than 2 years after the date of enactment of the Energy Research, Development, Demonstration, and Commercial Application Act of 2005, and at such later dates as the panel considers advisable, submit to Congress—

''(i) an assessment of the methane hydrate research program; and

"(ii) an assessment of the 5-year research plan of the Department of Energy.

"(2) CONFLICTS OF INTEREST.—In appointing each member of the advisory panel established under paragraph (1), the Secretary shall ensure, to the maximum extent practicable, that the appointment of the member does not pose a conflict of interest with respect to the duties of the member under this Act.

"(3) MEETINGS.—The advisory panel shall—

"(A) hold the initial meeting of the advisory panel not later than 180 days after the date of establishment of the advisory panel; and

"(B) meet biennially thereafter.

"(4) COORDINATION.—The advisory panel shall coordinate activities of the advisory panel with program managers of the Department of Energy at appropriate National Laboratories.

"(d) CONSTRUCTION COSTS.—None of the funds made available to carry out this section may be used for the construction of a new building or the acquisition, expansion, remodeling, or alteration of an existing building (including site grading and improvement and architect fees).

''(e) RESPONSIBILITIES OF THE SECRETARY.—In carrying out subsection (b)(1), the Secretary shall—

''(1) facilitate and develop partnerships among government, industrial enterprises, and institutions of higher education to research, identify, assess, and explore methane hydrate resources;

''(2) undertake programs to develop basic information necessary for promoting long-term interest in methane hydrate resources as an energy source;

''(3) ensure that the data and information developed through the program are accessible and widely disseminated as needed and appropriate;

''(4) promote cooperation among agencies that are developing technologies that may hold promise for methane hydrate resource development;

''(5) report annually to Congress on the results of actions taken to carry out this Act; and

''(6) ensure, to the maximum extent practicable, greater participation by the Department of Energy in international cooperative efforts.

''SEC. 5. NATIONAL RESEARCH COUNCIL STUDY.

''(a) AGREEMENT FOR STUDY.—The Secretary shall offer to enter into an agreement with the National Research Council under which the National Research Council shall—

''(1) conduct a study of the progress made under the methane hydrate research and development program implemented under this Act; and

''(2) make recommendations for future methane hydrate research and development needs.

''(b) REPORT.—Not later than September 30, 2009, the Secretary shall submit to Congress a report containing the findings and recommendations of the National Research Council under this section.

''SEC. 6. REPORTS AND STUDIES FOR CONGRESS.

''The Secretary shall provide to the Committee on Science of the House of Representatives and the Committee on Energy and Natural Resources of the Senate copies of any report or study that the Department of Energy prepares at the direction of any committee of Congress relating to the methane hydrate research and development program implemented under this Act.

''SEC. 7. AUTHORIZATION OF APPROPRIATIONS.

''There are authorized to be appropriated to the Secretary to carry out this Act, to remain available until expended—

''(1) $15,000,000 for fiscal year 2006;

''(2) $20,000,000 for fiscal year 2007;

''(3) $30,000,000 for fiscal year 2008;

''(4) $40,000,000 for fiscal year 2009; and

''(5) $50,000,000 for fiscal year 2010.''.

(b) RECLASSIFICATION.—The Law Revision Counsel shall reclassify the Methane Hydrate Research and Development Act of 2000 (30 U.S.C. 1902 note; Public Law 106–193) to a new chapter at the end of title 30, United States Code.

Subtitle G—Science

SEC. 971. SCIENCE.

(a) IN GENERAL.—The Secretary shall conduct, through the Office of Science, programs of research, development, demonstration, and commercial application in high energy physics, nuclear physics, biological and environmental research, basic energy sciences, advanced scientific computing research, and fusion energy sciences, including activities described in this subtitle. The programs shall include support for facilities and infrastructure, education, outreach, information, analysis, and coordination activities.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out research, development, demonstration, and commercial application activities of the Office of Science, including activities authorized under this subtitle (including the amounts authorized under the amendment made by section 976(b) and including basic energy sciences, advanced

scientific and computing research, biological and environmental research, fusion energy sciences, high energy physics, nuclear physics, research analysis, and infrastructure support)—

(1) $4,153,000,000 for fiscal year 2007;

(2) $4,586,000,000 for fiscal year 2008; and

(3) $5,200,000,000 for fiscal year 2009.

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

(1) For activities under the Fusion Energy Sciences program (including activities under section 972)—

(A) $355,500,000 for fiscal year 2007;

(B) $369,500,000 for fiscal year 2008; and

(C) $384,800,000 for fiscal year 2009.

(2) For activities under the catalysis research program under section 973—

(A) $36,500,000 for fiscal year 2007;

(B) $38,200,000 for fiscal year 2008; and

(C) such sums as may be necessary for fiscal year 2009.

(3) For activities under the Systems Biology Program under section 977 such sums as may be necessary for each of fiscal years 2007 through 2009.

(4) For activities under the Energy and Water Supplies program under section 979, $30,000,000 for each of fiscal years 2007 through 2009.

(5) For the energy research fellowships programs under section 984, $40,000,000 for each of fiscal years 2007 through 2009.

(6) For the advanced scientific computing activities under section 976, $270,000,000 for fiscal year 2007, $350,000,000 for fiscal year 2008, and $375,000,000 for fiscal year 2009.

(7) For the science and engineering education pilot program under section 983, $4,000,000 for each of fiscal years 2007 and 2008, and $8,000,000 for fiscal year 2009.

(d) INTEGRATED BIOENERGY RESEARCH AND DEVELOPMENT.—In addition to amounts otherwise authorized by this section, there are authorized to be appropriated to the Secretary for integrated bioenergy research and development programs, projects, and activities, $49,000,000 for each of the fiscal years 2005 through 2009. Activities funded under this subsection shall be coordinated with ongoing related programs of other Federal agencies, including the Plant Genome Program of the National Science Foundation. Of the funds authorized under this subsection, at least $5,000,000 for each fiscal year

shall be for training and education targeted to minority and socially disadvantaged farmers and ranchers.

SEC. 972. FUSION ENERGY SCIENCES PROGRAM.

(a) DECLARATION OF POLICY.—It shall be the policy of the United States to conduct research, development, demonstration, and commercial applications to provide for the scientific, engineering, and commercial infrastructure necessary to ensure that the United States is competitive with other countries in providing fusion energy for its own needs and the needs of other countries, including by demonstrating electric power or hydrogen production for the United States energy grid using fusion energy at the earliest date.

(b) PLANNING.—

(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary shall submit to Congress a plan (with proposed cost estimates, budgets, and lists of potential international partners) for the implementation of the policy described in subsection (a) in a manner that ensures that—

(A) existing fusion research facilities are more fully used;

(B) fusion science, technology, theory, advanced computation, modeling, and simulation are strengthened;

(C) new magnetic and inertial fusion research and development facilities are selected based on scientific innovation and cost effectiveness, and the potential of the facilities to advance the goal of practical fusion energy at the earliest date practicable;

(D) facilities that are selected are funded at a cost-effective rate;

(E) communication of scientific results and methods between the fusion energy science community and the broader scientific and technology communities is improved;

(F) inertial confinement fusion facilities are used to the extent practicable for the purpose of inertial fusion energy research and development;

(G) attractive alternative inertial and magnetic fusion energy approaches are more fully explored; and

(H) to the extent practicable, the recommendations of the Fusion Energy Sciences Advisory Committee in the report on workforce

planning, dated March 2004, are carried out, including periodic reassessment of program needs.

(2) COSTS AND SCHEDULES.—The plan shall also address the status of and, to the extent practicable, costs and schedules for—

(A) the design and implementation of international or national facilities for the testing of fusion materials; and

(B) the design and implementation of international or national facilities for the testing and development of key fusion technologies.

(c) UNITED STATES PARTICIPATION IN ITER.—

(1) DEFINITIONS.—In this subsection:

(A) CONSTRUCTION.—

(i) IN GENERAL.—The term ''construction'' means—

(I) the physical construction of the ITER facility; and

(II) the physical construction, purchase, or manufacture of equipment or components that are specifically designed for the ITER facility.

(ii) EXCLUSIONS.—The term ''construction'' does not include the design of the facility, equipment, or components.

(B) ITER.—The term ''ITER'' means the international burning plasma fusion research project in which the President announced United States participation on January 30, 2003, or any similar international project.

(2) PARTICIPATION.—The United States may participate in the ITER only in accordance with this subsection.

(3) AGREEMENT.—

(A) IN GENERAL.—The Secretary may negotiate an agreement for United States participation in the ITER.

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

(i) clearly define the United States financial contribution to construction and operating costs, as well as any other costs associated with a project;

(ii) ensure that the share of high-technology components of the ITER manufactured in the United States is at least pro-

portionate to the United States financial contribution to the ITER;

(iii) ensure that the United States will not be financially responsible for cost overruns in components manufactured in other ITER participating countries;

(iv) guarantee the United States full access to all data generated by the ITER;

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

(vi) provide the United States with a role in all collective decisionmaking related to the ITER; and

(vii) describe the process for discontinuing or decommissioning the ITER and any United States role in that process.

(4) PLAN.—

(A) DEVELOPMENT.—The Secretary, in consultation with the Fusion Energy Sciences Advisory Committee, shall develop a plan for the participation of United States scientists in the ITER that shall include—

(i) the United States research agenda for the ITER;

(ii) methods to evaluate whether the ITER is promoting progress toward making fusion a reliable and affordable source of power; and

(iii) a description of how work at the ITER will relate to other elements of the United States fusion program.

(B) REVIEW.—The Secretary shall request a review of the plan by the National Academy of Sciences.

(5) LIMITATION.—No Federal funds shall be expended for the construction of the ITER until the Secretary has submitted to Congress—

(A) the agreement negotiated in accordance with paragraph (3) and 120 days have elapsed since that submission;

(B) a report describing the management structure of the ITER and providing a fixed dollar estimate of the cost of United States participation in the construction of the ITER, and 120 days have elapsed since that submission;

(C) a report describing how United States participation in the ITER will be funded without reducing funding for other programs in the Office of Science (including other fusion pro-

grams), and 60 days have elapsed since that submission; and

(D) the plan required by paragraph (4) (but not the National Academy of Sciences review of that plan), and 60 days have elapsed since that submission.

(6) ALTERNATIVE TO ITER.—

(A) IN GENERAL.—If at any time during the negotiations on the ITER, the Secretary determines that construction and operation of the ITER is unlikely or infeasible, the Secretary shall submit to Congress, along with the budget request of the President submitted to Congress for the following fiscal year, a plan for implementing a domestic burning plasma experiment such as the Fusion Ignition Research Experiment, including costs and schedules for the plan.

(B) ADMINISTRATION.—The Secretary shall—

(i) refine the plan in full consultation with the Fusion Energy Sciences Advisory Committee; and

(ii) transmit the plan to the National Academy of Sciences for review.

SEC. 973. CATALYSIS RESEARCH PROGRAM.

(a) ESTABLISHMENT.—The Secretary, acting through the Office of Science, shall support a program of research and development in catalysis science consistent with the statutory authorities of the Department related to research and development.

(b) COMPONENTS.—The program shall include efforts to—

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

(2) develop techniques for high throughput synthesis, assay, and characterization at nanometer and subnanometer scales in-situ under actual operating conditions;

(3) synthesize catalysts with specific site architectures;

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

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

(c) DUTIES OF THE OFFICE OF SCIENCE.—In carrying out the program, the Director of the Office of Science shall—

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

(2) develop, plan, construct, acquire, share, or operate special equipment or facilities for the use of investigators in collaboration with national user facilities, such as nanoscience and engineering centers;

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

(4) coordinate research and development activities with industry and other Federal agencies.

(d) ASSESSMENT.—Not later than 3 years after the date of enactment of this Act, the Secretary shall enter into an arrangement with the National Academy of Sciences to—

(1) review the catalysis program to measure—

(A) gains made in the fundamental science of catalysis; and

(B) progress towards developing new fuels for energy production and material fabrication processes; and

(2) submit to Congress a report describing the results of the review.

SEC. 974. HYDROGEN.

(a) IN GENERAL.—The Secretary shall conduct a program of fundamental research and development in support of programs authorized under title VIII.

(b) METHODS.—The program shall include support for methods of generating hydrogen without the use of natural gas.

SEC. 975. SOLID STATE LIGHTING.

The Secretary shall conduct a program of fundamental research on advance solid state lighting in support of the Next Generation Lighting Initiative carried out under section 912.

SEC. 976. ADVANCED SCIENTIFIC COMPUTING FOR ENERGY MISSIONS.

(a) PROGRAM.—

(1) IN GENERAL.—The Secretary shall conduct an advanced scientific computing research and development program that includes activities related to applied mathematics and activities authorized by the Department of Energy High-End Computing Revitalization Act of 2004 (15 U.S.C. 5541 et seq.).

(2) GOAL.—The Secretary shall carry out the program with the goal of supporting departmental missions, and providing the high-performance computational, networking, advanced visualization tech-

nologies, and workforce resources, that are required for world leadership in science.

(b) HIGH-PERFORMANCE COMPUTING.—Section 203 of the High-Performance Computing Act of 1991 (15 U.S.C. 5523) is amended to read as follows:

"SEC. 203. DEPARTMENT OF ENERGY ACTIVITIES.

"(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Secretary of Energy shall—

"(1) conduct and support basic and applied research in high-performance computing and networking to support fundamental research in science and engineering disciplines related to energy applications; and

"(2) provide computing and networking infrastructure support, including—

"(A) the provision of high-performance computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems; and

"(B) support for advanced software and applications development for science and engineering disciplines related to energy applications.

''(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary of Energy such sums as are necessary to carry out this section.''.

SEC. 977. SYSTEMS BIOLOGY PROGRAM.

(a) PROGRAM.—

(1) ESTABLISHMENT.—The Secretary shall establish a research, development, and demonstration program in microbial and plant systems biology, protein science, and computational biology to support the energy, national security, and environmental missions of the Department.

(2) GRANTS.—The program shall support individual researchers and multidisciplinary teams of researchers through competitive, merit-reviewed grants.

(3) CONSULTATION.—In carrying out the program, the Secretary shall consult with other Federal agencies that conduct genetic and protein research.

(b) GOALS.—The program shall have the goal of developing technologies and methods based on the biological functions of genomes, microbes, and plants that—

(1) can facilitate the production of fuels, including hydrogen;

(2) convert carbon dioxide to organic carbon;

(3) detoxify soils and water, including at facilities of the Department, contaminated with heavy metals and radiological materials; and

(4) address other Department missions as identified by the Secretary.

(c) PLAN.—

(1) DEVELOPMENT OF PLAN.—Not later than 1 year after the date of enactment of this Act, the Secretary shall prepare and transmit to Congress a research plan describing how the program authorized pursuant to this section will be undertaken to accomplish the program goals established in subsection (b).

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

(d) USER FACILITIES AND ANCILLARY EQUIPMENT.—Within the funds authorized to be appropriated pursuant to this subtitle, amounts shall be available for projects to develop, plan, construct, acquire, or operate

special equipment, instrumentation, or facilities, including user facilities at National Laboratories, for researchers conducting research, development, demonstration, and commercial application in systems biology and proteomics and associated biological disciplines.

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

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

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

(A) on human cells or human subjects; or

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

SEC. 978. FISSION AND FUSION ENERGY MATERIALS RESEARCH PROGRAM.

(a) IN GENERAL.—Along with the budget request of the President submitted to Congress for fiscal year 2007, the Secretary shall establish a research and development program on material science issues presented by advanced fission reactors and the fusion energy program of the Department.

(b) ADMINISTRATION.—In carrying out the program, the Secretary shall develop—

(1) a catalog of material properties required for applications described in subsection (a);

(2) theoretical models for materials possessing the required properties;

(3) benchmark models against existing data; and

(4) a roadmap to guide further research and development in the area covered by the program.

SEC. 979. ENERGY AND WATER SUPPLIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application to—

(1) address energy-related issues associated with provision of adequate water supplies, optimal management, and efficient use of water;

(2) address water-related issues associated with the provision of adequate supplies, optimal management, and efficient use of energy; and

(3) assess the effectiveness of existing programs within the Department and other Federal agencies to address these energy and water related issues.

(b) PROGRAM ELEMENTS.—The program under this section shall include—

(1) arsenic treatment;

(2) desalination; and

(3) planning, analysis, and modeling of energy and water supply and demand.

(c) COLLABORATION.—In carrying out this section, the Secretary shall consult with the Administrator of the Environmental Protection Agency, the Secretary of the Interior, the Chief Engineer of the Army Corps of Engineers, the Secretary of Commerce, the Secretary of Defense, and other Federal agencies as appropriate.

(d) FACILITIES.—The Secretary may utilize all existing facilities within the Department and may design and construct additional facilities as needed to carry out the purposes of this program.

(e) ADVISORY COMMITTEE.—The Secretary shall establish or utilize an advisory committee to provide independent advice and review of the program.

(f) REPORTS.—Not later than 2 years after the date of enactment of this Act, the Secretary shall submit to Congress a report on the assessment described in subsection (b) and recommendations for future actions.

SEC. 980. SPALLATION NEUTRON SOURCE.

(a) DEFINITIONS.—In this section:

(1) SING.—The term ''SING'' means the Spallation Neutron Source Instruments Next Generation major item of equipment.

(2) SNS POWER UPGRADE.—The term ''SNS power upgrade'' means the Spallation Neutron Source power upgrade described in the 20-year facilities plan of the Office of Science of the Department.

(3) SNS SECOND TARGET STATION.—The term ''SNS second target station'' the Spallation Neutron Source second target station described in the 20-year facilities plan of the Office of Science of the Department.

(4) SPALLATION NEUTRON SOURCE FACILITY.—The terms ''Spallation Neutron Source Facility'' and ''Facility'' mean the completed Spallation Neutron Source scientific user facility located at Oak Ridge National Laboratory, Oak Ridge, Tennessee.

(5) SPALLATION NEUTRON SOURCE PROJECT.—The terms ''Spallation Neutron Source Project'' and ''Project'' means Department Project 99–E–334, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

(b) SPALLATION NEUTRON SOURCE PROJECT.—

(1) IN GENERAL.—The Secretary shall submit to Congress, as part of the annual budget request of the President submitted to Congress, a report on progress on the Spallation Neutron Source Project.

(2) CONTENTS.—The report shall include for the Project—

(A) a description of the achievement of milestones;

(B) a comparison of actual costs to estimated costs; and

(C) any changes in estimated Project costs or schedule.

(c) SPALLATION NEUTRON SOURCE FACILITY PLAN.—

(1) IN GENERAL.—The Secretary shall develop an operational plan for the Spallation Neutron Source Facility that ensures that the Facility is employed to the full capability of the Facility in support of the study of advanced materials, nanoscience, and other missions of the Office of Science of the Department.

(2) PLAN.—The operational plan shall—

(A) include a plan for the operation of an effective scientific user program that—

(i) is based on peer review of proposals submitted for use of the Facility;

(ii) includes scientific and technical support to ensure that external users, including researchers based at institutions of higher education, are able to make full use of a variety of high quality scientific instruments; and

(iii) phases in systems upgrades to ensure that the Facility remains at the forefront of international scientific endeavors in the field of the Facility throughout the operating life of the Facility;

(B) include an ongoing program to develop new instruments that builds on the high performance neutron source and that allows neutron scattering techniques to be applied to a growing range of scientific problems and disciplines; and

(C) address the status of and, to the maximum extent practicable, costs and schedules for—

(i) full user mode operations of the Facility;

(ii) instrumentation built at the Facility during the operating phase through full use of the experimental hall, including the SING;

(iii) the SNS power upgrade; and

(iv) the SNS second target station.

(d) AUTHORIZATION OF APPROPRIATIONS.—

(1) SPALLATION NEUTRON SOURCE PROJECT.—There is authorized to be appropriated to carry out the Spallation Neutron Source Project for the lifetime of the Project $1,411,700,000 for total project costs, of which—

(A) $1,192,700,000 shall be used for the costs of construction; and

(B) $219,000,000 shall be used for other Project costs.

(2) SPALLATION NEUTRON SOURCE FACILITY.—

(A) IN GENERAL.—Except as provided in subparagraph (B), there is authorized to be appropriated for the Spallation Neutron Source Facility for—

(i) the SING, $75,000,000 for each of fiscal year 2007 through 2009; and

(ii) the SNS power upgrade, $160,000,000, to remain available until expended.

(B) INSUFFICIENT STOCKPILES OF HEAVY WATER.—If stockpiles of heavy water of the Department are insufficient to meet the needs of the Facility, there is authorized to be appropriated for the Facility $12,000,000 for fiscal year 2007.

SEC. 981. RARE ISOTOPE ACCELERATOR.

(a) ESTABLISHMENT.—The Secretary shall construct and operate a Rare Isotope Accelerator. The Secretary shall commence construction no later than September 30, 2008.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary such sums as may be necessary to carry out this section. The Secretary shall not spend more than $1,100,000,000 in Federal funds for all activities associated with the Rare Isotope Accelerator, prior to operation of the Accelerator.

SEC. 982. OFFICE OF SCIENTIFIC AND TECHNICAL INFORMATION.

The Secretary, through the Office of Scientific and Technical Information, shall maintain within the Department publicly available collections of scientific and tech-

nical information resulting from research, development, demonstration, and commercial applications activities supported by the Department.

SEC. 983. SCIENCE AND ENGINEERING EDUCATION PILOT PROGRAM.

(a) ESTABLISHMENT OF PILOT PROGRAM.—The Secretary shall award a grant to a Southeastern United States consortium of major research universities that currently advances science and education by partnering with National Laboratories, to establish a regional pilot program of its SEEK-16 program for enhancing scientific, technological, engineering, and mathematical literacy, creativity, and decision-making. The consortium shall include leading research universities, 1 or more universities that train substantial numbers of elementary and secondary school teachers, and (where appropriate) National Laboratories.

(b) PROGRAM ELEMENTS.—The regional pilot program shall include—

(1) expanding strategic, formal partnerships among universities with strength in research, universities that train substantial numbers of elementary and secondary school teachers, and the private sector;

(2) combining Department expertise with 1 or more National Aeronautics and Space Administration Educator Resource Centers;

(3) developing programs to permit current and future teachers to participate in ongoing research projects at National Laboratories and research universities and to adapt lessons learned to the classroom;

(4) designing and implementing course work;

(5) designing and implementing a strategy for measuring and assessing progress under the program; and

(6) developing models for transferring knowledge gained under the pilot program to other institutions and areas of the United States.

(c) CATEGORIZATION.—A grant under this section shall be considered an authorized activity under section 3165 of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381b).

(d) REPORT.—No later than 2 years after the award of the grant, the Secretary shall transmit to Congress a report outlining lessons learned and, if determined appropriate by the Secretary, containing a plan for expanding the program throughout the United States.

SEC. 984. ENERGY RESEARCH FELLOWSHIPS.

(a) POSTDOCTORAL FELLOWSHIP PROGRAM.—The Secretary shall establish a program under which the Secretary provides fellowships to encourage outstanding young scientists and engineers to pursue postdoctoral research appointments in energy research and development at institutions of higher education of their choice.

(b) SENIOR RESEARCH FELLOWSHIPS.—

(1) IN GENERAL.—The Secretary shall establish a program under which the Secretary provides fellowships to allow outstanding senior researchers and their research groups in energy research and development to explore research and development topics of their choosing for a period of not less than 3 years, to be determined by the Secretary.

(2) CONSIDERATION.—In providing a fellowship under the program described in paragraph (1), the Secretary shall consider—

(A) the past scientific or technical accomplishment of a senior researcher; and

(B) the potential for continued accomplishment by the researcher during the period of the fellowship.

Subtitle H—International Cooperation

SEC. 985. WESTERN HEMISPHERE ENERGY COOPERATION.

(a) PROGRAM.—The Secretary shall carry out a program to promote cooperation on energy issues with countries of the Western Hemisphere.

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

(1) increase the production of energy supplies;

(2) improve energy efficiency; and

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

(c) PARTICIPATION BY INSTITUTIONS OF HIGHER EDUCATION.—To the extent practicable, the Secretary shall carry out the program under this section with the participation of institutions of higher education so as to take advantage of the acceptance of institutions of higher education by countries of the Western Hemisphere as sources of unbiased technical and policy expertise when assisting the Secretary in—

(1) evaluating new technologies;

(2) resolving technical issues;

(3) working with those countries in the development of new policies; and

(4) training policymakers, particularly in the case of institutions of higher education that involve the participation of minority students, such as—

(A) Hispanic-serving institutions; and

(B) part B institutions.

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

(1) $10,000,000 for fiscal year 2007;

(2) $13,000,000 for fiscal year 2008; and

(3) $16,000,000 for fiscal year 2009.

SEC. 986. COOPERATION BETWEEN UNITED STATES AND ISRAEL.

(a) FINDINGS.—Congress finds that—

(1) on February 1, 1996, the United States and Israel signed the agreement entitled ''Agreement between the Department of Energy of the United States of America and the Ministry of Energy and Infrastructure of Israel Concerning Energy Cooperation'', (referred to in this section as the ''Agreement'') to establish a framework for collaboration between the United States and Israel in energy research and development activities;

(2) the Agreement entered into force in February 2000;

(3) in February 2005, the Agreement was automatically renewed for 1 additional 5-year period pursuant to Article X of the Agreement; and

(4) under the Agreement, the United States and Israel may cooperate in energy research and development in a variety of alternative and advanced energy sectors.

(b) REPORT TO CONGRESS.—Not later than 90 days after the date of enactment of this Act, the Secretary shall submit to the Committee on Energy and Natural Resources and the Committee on Foreign Relations of the Senate and the Committee on Energy and Commerce and the Committee on International Relations of the House of Representatives a report that describes—

(1) the ways in which the United States and Israel have cooperated on energy research and development activities under the Agreement;

(2) projects initiated pursuant to the Agreement; and

(3) plans for future cooperation and joint projects under the Agreement.

(c) SENSE OF CONGRESS.—It is the sense of Congress that energy cooperation between the Governments

of the United States and Israel is mutually beneficial in the development of energy technology.

Subtitle I—Research Administration and Operations

SEC. 987. AVAILABILITY OF FUNDS.

Funds authorized to be appropriated to the Department under this Act or an amendment made by this Act shall remain available until expended.

SEC. 988. COST SHARING.

(a) APPLICABILITY.—Notwithstanding any other provision of law, in carrying out a research, development, demonstration, or commercial application program, or activity that is initiated after the date of enactment of this section, the Secretary shall require cost-sharing in accordance with this section.

(b) RESEARCH AND DEVELOPMENT.—

(1) IN GENERAL.—Except as provided in paragraphs (2) and (3) and subsection (f), the Secretary shall require not less than 20 percent of the cost of a research or development activity described in subsection (a) to be provided by a non-Federal source.

(2) EXCLUSION.—Paragraph (1) shall not apply to a research or development activity described in subsection (a) that is of a basic or fundamental na-

ture, as determined by the appropriate officer of the Department.

(3) REDUCTION.—The Secretary may reduce or eliminate the requirement of paragraph (1) for a research and development activity of an applied nature if the Secretary determines that the reduction is necessary and appropriate.

(c) DEMONSTRATION AND COMMERCIAL APPLICATION.—

(1) IN GENERAL.—Except as provided in paragraph (2) and subsection (f), the Secretary shall require that not less than 50 percent of the cost of a demonstration or commercial application activity described in subsection (a) to be provided by a non-Federal source.

(2) REDUCTION OF NON-FEDERAL SHARE.—The Secretary may reduce the non-Federal share required under paragraph (1) if the Secretary determines the reduction to be necessary and appropriate, taking into consideration any technological risk relating to the activity.

(d) CALCULATION OF AMOUNT.—In calculating the amount of a non-Federal contribution under this section, the Secretary—

(1) may include allowable costs in accordance with the applicable cost principles, including—

(A) cash;

(B) personnel costs;

(C) the value of a service, other resource, or third party in-kind contribution determined in accordance with the applicable circular of the Office of Management and Budget;

(D) indirect costs or facilities and administrative costs; or

(E) any funds received under the power program of the Tennessee Valley Authority (except to the extent that such funds are made available under an annual appropriation Acts); and

(2) shall not include—

(A) revenues or royalties from the prospective operation of an activity beyond the time considered in the award;

(B) proceeds from the prospective sale of an asset of an activity; or

(C) other appropriated Federal funds.

(e) REPAYMENT OF FEDERAL SHARE.—The Secretary shall not require repayment of the Federal share

of a cost-shared activity under this section as a condition of making an award.

(f) EXCLUSIONS.—This section shall not apply to—

(1) a cooperative research and development agreement under the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.);

(2) a fee charged for the use of a Department facility; or

(3) an award under—

(A) the small business innovation research program under section 9 of the Small Business Act (15 U.S.C. 638); or

(B) the small business technology transfer program under that section.

SEC. 989. MERIT REVIEW OF PROPOSALS.

(a) AWARDS.—Awards of funds authorized under this Act or an amendment made by this Act shall be made only after an impartial review of the scientific and technical merit of the proposals for the awards has been carried out by or for the Department.

(b) COMPETITION.—Competitive awards under this Act shall involve competitions open to all qualified entities within 1 or more of the following categories:

(1) Institutions of higher education.

(2) National Laboratories.

(3) Nonprofit and for-profit private entities.

(4) State and local governments.

(5) Consortia of entities described in paragraphs (1) through (4).

(c) SENSE OF CONGRESS.—It is the sense of Congress that research, development, demonstration, and commercial application activities carried out by the Department should be awarded using competitive procedures, to the maximum extent practicable.

SEC. 990. EXTERNAL TECHNICAL REVIEW OF DEPARTMENTAL PROGRAMS.

(a) NATIONAL ENERGY RESEARCH AND DEVELOPMENT ADVISORY BOARDS.—

(1) ESTABLISHMENT.—The Secretary shall establish 1 or more advisory boards to review research, development, demonstration, and commercial application programs of the Department in energy efficiency, renewable energy, nuclear energy, and fossil energy.

(2) ALTERNATIVES.—The Secretary may—

(A) designate an existing advisory board within the Department to fulfill the responsibilities of an advisory board under this section; and

(B) enter into appropriate arrangements with the National Academy of Sciences to establish such an advisory board.

(b) USE OF EXISTING COMMITTEES.—The Secretary shall continue to use the scientific program advisory committees chartered under the Federal Advisory Committee Act (5 U.S.C. App.) by the Office of Science to oversee research and development programs under that Office.

(c) MEMBERSHIP.—Each advisory board under this section shall consist of persons with appropriate expertise representing a diverse range of interests.

(d) MEETINGS AND GOALS.—

(1) MEETINGS.—Each advisory board under this section shall meet at least semiannually to review and advise on the progress made by the respective 1 or more research, development, demonstration, and commercial application programs.

(2) GOALS.—The advisory board shall review the measurable cost and performance-based goals for the programs as established under section 902, and the progress on meeting the goals.

(e) PERIODIC REVIEWS AND ASSESSMENTS.—

(1) IN GENERAL.—The Secretary shall enter into appropriate arrangements with the National

Academy of Sciences to conduct periodic reviews and assessments of—

(A) the research, development, demonstration, and commercial application programs authorized by this Act and amendments made by this Act;

(B) the measurable cost and performance-based goals for the programs as established under section 902, if any; and

(C) the progress on meeting the goals.

(2) TIMING.—The reviews and assessments shall be conducted every 5 years or more often as the Secretary considers necessary.

(3) REPORTS.—The Secretary shall submit to Congress reports describing the results of all the reviews and assessments.

SEC. 991. NATIONAL LABORATORY DESIGNATION.

After the date of enactment of this Act, the Secretary shall not designate a facility that is not listed in section 2(3) as a National Laboratory.

SEC. 992. REPORT ON EQUAL EMPLOYMENT OPPORTUNITY PRACTICES.

Not later than 12 months after the date of enactment of this Act, and biennially thereafter, the Secretary shall transmit to Congress a report on the equal employment

opportunity practices at National Laboratories. Such report shall include—

(1) a thorough review of each National Laboratory contractor's equal employment opportunity policies, including promotion to management and professional positions and pay raises;

(2) a statistical report on complaints and their disposition in the National Laboratories;

(3) a description of how equal employment opportunity practices at the National Laboratories are treated in the contract and in calculating award fees for each contractor;

(4) a summary of disciplinary actions and their disposition by either the Department or the relevant contractors for each National Laboratory;

(5) a summary of outreach efforts to attract women and minorities to the National Laboratories;

(6) a summary of efforts to retain women and minorities in the National Laboratories; and

(7) a summary of collaboration efforts with the Office of Federal Contract Compliance Programs to improve equal employment opportunity practices at the National Laboratories.

SEC. 993. STRATEGY AND PLAN FOR SCIENCE AND ENERGY FACILITIES AND INFRASTRUCTURE.

(a) FACILITY AND INFRASTRUCTURE POLICY.—

(1) IN GENERAL.—The Secretary shall develop and implement a strategy for facilities and infrastructure supported primarily from the Office of Science, the Office of Energy Efficiency and Renewable Energy, the Office of Fossil Energy, or the Office of Nuclear Energy, Science and Technology Programs at all National Laboratories and single-purpose research facilities.

(2) STRATEGY.—The strategy shall provide cost-effective means for—

(A) maintaining existing facilities and infrastructure;

(B) closing unneeded facilities;

(C) making facility modifications; and

(D) building new facilities.

(b) REPORT.—

(1) IN GENERAL.—The Secretary shall prepare and submit, along with the budget request of the President submitted to Congress for fiscal year 2008, a report describing the strategy developed under subsection (a).

(2) CONTENTS.—For each National Laboratory and single-purpose research facility that is primarily

used for science and energy research, the report shall contain—

(A) the current priority list of proposed facilities and infrastructure projects, including cost and schedule requirements;

(B) a current 10-year plan that demonstrates the reconfiguration of its facilities and infrastructure to meet its missions and to address its long-term operational costs and return on investment;

(C) the total current budget for all facilities and infrastructure funding; and

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

SEC. 994. STRATEGIC RESEARCH PORTFOLIO ANALYSIS AND COORDINATION PLAN.

(a) IN GENERAL.—The Secretary shall periodically review all of the science and technology activities of the Department in a strategic framework that takes into account both the frontiers of science to which the Department can contribute and the national needs relevant to the Department's statutory missions.

(b) COORDINATION ANALYSIS AND PLAN.—As part of the review under subsection (a), the Secretary shall de-

velop a coordination plan to improve coordination and collaboration in research, development, demonstration, and commercial application activities across Department organizational boundaries.

(c) PLAN CONTENTS.—The plan shall describe—

(1) cross-cutting scientific and technical issues and research questions that span more than 1 program or major office of the Department;

(2) how the applied technology programs of the Department are coordinating their activities, and addressing those questions;

(3) ways in which the technical interchange within the Department, particularly between the Office of Science and the applied technology programs, can be enhanced, including ways in which the research agendas of the Office of Science and the applied programs can interact and assist each other;

(4) a description of how the Secretary will ensure that the Department's overall research agenda include, in addition to fundamental, curiosity-driven research, fundamental research related to topics of concern to the applied programs, and applications in Departmental technology programs of research results generated by fundamental, curiosity-driven research.

(d) PLAN TRANSMITTAL.—Not later than 12 months after the date of enactment of this Act, and every 4 years thereafter, the Secretary shall transmit to Congress the results of the review under subsection (a) and the coordination plan under subsection (b).

SEC. 995. COMPETITIVE AWARD OF MANAGEMENT CONTRACTS.

None of the funds authorized to be appropriated to the Secretary by this title may be used to award a management and operating contract for a National Laboratory (excluding those named in subparagraphs (G), (H), (N), and (O) of section 2 (3)), unless such contract is competitively awarded, or the Secretary grants, on a case-by-case basis, a waiver. The Secretary may not delegate the authority to grant such a waiver and shall submit to Congress a report notifying it of the waiver, and setting forth the reasons for the waiver, at least 60 days prior to the date of the award of such contract.

SEC. 996. WESTERN MICHIGAN DEMONSTRATION PROJECT.

The Administrator of the Environmental Protection Agency, in consultation with the State of Michigan and affected local officials, shall conduct a demonstration project to address the effect of transported ozone and ozone precursors in Southwestern Michigan. The demonstration program shall address projected nonattainment

areas in Southwestern Michigan that include counties with design values for ozone of less than .095 based on years 2000 to 2002 or the most current 3-year period of air quality data. The Administrator shall assess any difficulties such areas may experience in meeting the 8-hour national ambient air quality standard for ozone due to the effect of transported ozone or ozone precursors into the areas. The Administrator shall work with State and local officials to determine the extent of ozone and ozone precursor transport, to assess alternatives to achieve compliance with the 8-hour standard apart from local controls, and to determine the timeframe in which such compliance could take place. The Administrator shall complete this demonstration project no later than 2 years after the date of enactment of this section and shall not impose any requirement or sanction under the Clean Air Act (42 U.S.C. 7401 et seq.) that might otherwise apply during the pendency of the demonstration project.

SEC. 997. ARCTIC ENGINEERING RESEARCH CENTER.

(a) IN GENERAL.—The Secretary of Transportation, in consultation with the Secretary and the United States Arctic Research Commission, shall provide annual grants to a university located adjacent to the Arctic Energy Office of the Department of Energy, to establish and operate a university research center to be headquartered in Fair-

banks and to be known as the ''Arctic Engineering Research Center'' (referred to in this section as the ''Center'').

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

(1) new construction techniques for roads, bridges, rail, and related transportation infrastructure and residential, commercial, and industrial infrastructure that are capable of withstanding the Arctic environment and using limited energy resources as efficiently as practicable;

(2) technologies and procedures for increasing road, bridge, rail, and related transportation infrastructure and residential, commercial, and industrial infrastructure safety, reliability, and integrity in the Arctic region;

(3) new materials and improving the performance and energy efficiency of existing materials for the construction of roads, bridges, rail, and related transportation infrastructure and residential, com-

mercial, and industrial infrastructure in the Arctic region; and

(4) recommendations for new local, regional, and State permitting and building codes to ensure transportation and building safety and efficient energy use when constructing, using, and occupying such infrastructure in the Arctic region.

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

(1) basic and applied research in the subjects described in subsection (b), the products of which shall be judged by peers or other experts in the field to advance the body of knowledge in road, bridge, rail, and infrastructure engineering in the Arctic region; and

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

(d) AMOUNT OF GRANT.—For each of fiscal years 2006 through 2011, the Secretary shall provide a grant in the amount of $3,000,000 to the institution specified in subsection (a) to carry out this section.

(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section $3,000,000 for each of fiscal years 2006 through 2011.

SEC. 998. BARROW GEOPHYSICAL RESEARCH FACILITY.

(a) ESTABLISHMENT.—The Secretary of Commerce, in consultation with the Secretaries of Energy and the Interior, the Director of the National Science Foundation, and the Administrator of the Environmental Protection Agency, shall establish a joint research facility in Barrow, Alaska, to be known as the ''Barrow Geophysical Research Facility'', to support scientific research activities in the Arctic.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretaries of Commerce, Energy, and the Interior, the Director of the National Science Foundation, and the Administrator of the Environmental Protection Agency for the planning, design, construction, and support of the Barrow Geophysical Research Facility, $61,000,000.

[Subtitle J—Ultra Deepwater and Unconventional Oil and Gas Research and Development]