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109TH CONGRESS
2D SESSION

H. R. 5634

To authorize research, development, demonstration, and commercial application activities for advanced energy technologies.

IN THE HOUSE OF REPRESENTATIVES

JUNE 16, 2006

Mrs. BIGGERT (for herself, Mr. BOEHLERT, Mr. CALVERT, and Mr. EHLERS) introduced the following bill; which was referred to the Committee on Science

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A BILL

To authorize research, development, demonstration, and commercial application activities for advanced energy technologies.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Advanced Energy Initiative Act of 2006''.

SEC. 2. DEFINITIONS.

For the purposes of this Act—

(1) the term ''biomass'' has the meaning given that term in section 932(a)(1) of the Energy Policy Act of 2005 (42 U.S.C. 16232(a)(1));

(2) the term ''cellulosic feedstock'' has the meaning given the term ''lignocellulosic feedstock'' in section 932(a)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16232(a)(2));

(3) the term ''engineering-scale'' means the minimum size required to predict with confidence all physical processes controlling the performance of a full-scale industrial facility;

(4) the term ''National Laboratory'' has the meaning given the term ''nonmilitary energy laboratory'' in section 903(3) of the Energy Policy Act of 2005 (42 U.S.C. 16182(3));

(5) the term ''plug-in hybrid motor vehicle'' means a motor vehicle that—

(A) can operate on either liquid combustible fuel or electric power provided by a rechargeable battery that can be recharged using offboard sources of electric power;

(B) utilizes regenerative power capture technology to recover energy expended in braking the vehicle for use in recharging the battery; and

(C) can operate solely on electric power for a minimum of 20 miles under city driving conditions; and

(6) the term ''Secretary''means the Secretary of Energy.

SEC. 3. FUTUREGEN.

(a) IN GENERAL.—The Secretary shall carry out a project to demonstrate the feasibility of the commercial application of advanced clean coal energy technology, including carbon capture and geological sequestration, for electricity generation.

(b) REQUIREMENTS.—The Secretary shall design the project to ensure that—

(1) the project is operating by 2012;

(2) the project shall be able—

(A) to achieve at least a 99 percent reduction in sulfur dioxide emissions;

(B) to emit no more than 0.05 pounds of nitrogen oxide emissions per million British thermal units of energy produced by the project;

(C) to achieve at least a 90 percent reduction in mercury emissions;

(D) to emit no more than 0.005 of total particulate emissions in the flue gas per million British thermal units of energy produced by the project; and

(E) to achieve at least a 90 percent reduction in carbon dioxide emissions; and

(3) the project demonstrates the feasibility of electricity generation from coal using advanced clean coal technology with carbon capture and geological sequestration at a cost not greater than 10 percent higher than the average of all commercial integrated coal gasification and combined cycle electric generating plants operating in the United States as of the date of enactment of this Act.

(c) COMMERCIALLY AVAILABLE ADVANCED CLEAN COAL TECHNOLOGY.—To reduce technical risk and focus development efforts on system integration, the Secretary shall, to the extent practicable, ensure that the project utilizes available advanced clean coal technology, such as coal gasifier technology, for those components of the project where such technology would be appropriate.

(d) AUTHORIZATION OF APPROPRIATIONS.—From amounts authorized to be appropriated by section 401(a) of the Energy Policy Act of 2005 (42 U.S.C. 15961(a)), there are authorized to be appropriated to the Secretary to carry out this section—

(1) $54,000,000 for fiscal year 2007;

(2) $100,000,000 for fiscal year 2008;

(3) $113,000,000 for fiscal year 2009;

(4) $81,000,000 for fiscal year 2010;

(5) $62,000,000 for fiscal year 2011; and

(6) $57,000,000 for fiscal year 2012.

SEC. 4. ADVANCED FUEL CYCLE TECHNOLOGIES FOR NUCLEAR POWER.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for advanced nuclear fuel cycle technologies for generating electricity and industrial process heat from nuclear power, including technologies for spent fuel recycling, waste minimization, and reduction of radioactivity of final waste products.

(b) OBJECTIVES.—The Secretary shall design the program under this section to develop technologies that would—

(1) minimize the volume and heat load of high-level nuclear waste destined for storage in a geological repository to the extent that a single repository would be sufficient for storing all nuclear waste generated by United States commercial nuclear power plants during this century;

(2) increase the proliferation resistance of commercial nuclear power reactors and their associated fuel systems and infrastructure; and

(3) increase the amount of useful energy that can be extracted from nuclear fuel.

(c) SYSTEMS ANALYSIS.—

(1) IN GENERAL.—The Secretary shall develop a comprehensive modeling and simulation capability to enable a thorough analysis of possible advanced nuclear fuel cycle systems. The modeling and simulation capability shall be capable of examining—

(A) all of the components of each advanced nuclear fuel cycle system analyzed, including—

(i) spent fuel separations technologies;

(ii) advanced burner reactor technologies;

(iii) fuel fabrication technologies;

(iv) advanced thermal reactor technologies, including advanced thermal reactor designs that would be capable of reducing the toxicity or radioactivity of spent nuclear fuel components; and

(v) waste disposal technologies;

(B) the manner in which possible technology and engineering choices for individual components might affect the overall system, and how various system components would interact with one another; and

(C) quantitative mass flows of nuclear fuel and spent nuclear fuel, including projected inventories and transportation requirements for nuclear fuel and spent nuclear fuel, for any examined system.

(2) ADVANCED NUCLEAR FUEL CYCLE SYSTEM PLAN.—

(A) ANALYSIS.—The Secretary shall conduct a thorough analysis of more than one possible configuration of an advanced nuclear fuel cycle system using the analytical capability developed under paragraph (1). Each possible advanced nuclear fuel cycle system configuration examined shall include both advanced burner reactors and advanced thermal reactors, and the analysis shall consider the degree to which each type of reactor can be utilized to reduce the toxicity or radioactivity of spent nuclear fuel components. The analysis of each possible configuration of an advanced nuclear fuel cycle system examined shall examine the compatibility of fuel cycle system components, including each of the system component technologies described in paragraph (1)(A), and the degree

to which the examined system would meet the objectives described in subsection (b).

(B) PLAN.—Using the results of the analyses developed under subparagraph (A), and not later than June 30, 2007, the Secretary shall develop a detailed plan for research, development, demonstration, and commercial application on advanced nuclear fuel cycle system technologies, including proposed technology options for each of the system component technologies described in paragraph (1)(A) and any proposed engineering-scale demonstrations of such system component technologies. The plan shall include an estimate of the design, engineering, construction and lifetime operating costs of any proposed engineering-scale demonstration. In developing the plan, the Secretary shall consider the integration into an advanced nuclear fuel cycle system of advanced thermal reactors capable of reducing the toxicity or radioactivity of spent nuclear fuel components.

(C) CONSULTATION.—In developing the plan under subparagraph (B), the Secretary shall consult with—

(i) technical experts from United States and foreign companies that design or engineer nuclear power plants or nuclear fuel reprocessing facilities;

(ii) technical experts from United States electric utilities that operate nuclear power plants;

(iii) economists with expertise in nuclear power and electricity markets;

(iv) the Nuclear Energy Research Advisory Committee;

(v) the Chairman of the Nuclear Regulatory Commission; and

(vi) the Administrator of the Environmental Protection Agency.

(3) NATIONAL ACADEMY OF SCIENCES REVIEW.—The Secretary shall enter into an arrangement with the National Academy of Sciences to conduct a review of the plan developed under paragraph (2)(B), including by reviewing the validity of the underlying analyses required in paragraph (2)(A).

(d) REPORT.—Not later than June 30, 2008, the Secretary shall transmit to Congress a report that includes the research, development, demonstration, and commercial application plan developed under subsection (c)(2)(B), the

report from the National Academy of Sciences on the review conducted under subsection (c)(3), and the Secretary's response to the findings and conclusions contained in the National Academy of Sciences report.

(e) PROHIBITION.—The Secretary shall not initiate detailed design or construction of any demonstration facility that is capable of processing 500 kilograms or more per year of nuclear fuel or spent nuclear fuel and that is designed to demonstrate the advanced nuclear fuel system component technologies described in subsection (c)(1)(A)(ii) and (iii) until 90 days after the report under subsection (d) has been transmitted to Congress.

(f) AUTHORIZATION OF APPROPRIATIONS.—

(1) ALLOCATIONS.—From amounts authorized to be appropriated under section 951(d)(1) of the Energy Policy Act of 2005 (42 U.S.C. 16271(d)(1)), there are authorized to be appropriated to the Secretary to carry out this section such sums as may be necessary for each of fiscal years 2007 through 2009.

(2) ADDITIONAL AMOUNTS.—There are authorized to be appropriated to the Secretary to carry out this section such sums as may be necessary for each of fiscal years 2010 through 2012.

SEC. 5. ADVANCED BATTERY TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for advanced battery technologies for use in motor vehicles, particularly for plug-in hybrid motor vehicles.

(b) OBJECTIVE.—The Secretary shall design the program under this section to develop technologies that would enable a light-duty, plug-in hybrid motor vehicle to travel up to 40 miles on battery power alone.

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

(1) $31,000,000 for fiscal year 2007;

(2) $34,100,000 for fiscal year 2008;

(3) $37,500,000 for fiscal year 2009; and

(4) $41,250,000 for fiscal year 2010.

SEC. 6. ADVANCED BIOFUEL TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for production of liquid fuels from biomass.

(b) OBJECTIVES.—The Secretary shall design the program under this section to—

(1) develop technologies that would make ethanol produced from cellulosic feedstocks cost competitive with ethanol produced from corn by 2012;

(2) conduct research and development on how to apply advanced genetic engineering and bioengineering techniques to increase the efficiency and lower the cost of industrial-scale production of liquid fuels from cellulosic feedstocks; and

(3) conduct research and development on the production of hydrocarbons other than ethanol from biomass.

(c) AUTHORIZATION OF APPROPRIATIONS.—From amounts authorized to be appropriated under section 931(c) of the Energy Policy Act of 2005 (42 U.S.C. 16231(c)), there are authorized to be appropriated to the Secretary to carry out this section—

(1) $150,000,000 for fiscal year 2007;

(2) $160,000,000 for fiscal year 2008; and

(3) $175,000,000 for fiscal year 2009.

SEC. 7. ADVANCED HYDROGEN STORAGE TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for technologies to enable practical onboard storage of hydrogen for use as a fuel for light-duty motor vehicles.

(b) OBJECTIVE.—The Secretary shall design the program under this section to develop practical hydrogen storage technologies that would enable a hydrogen-fueled light-duty motor vehicle to travel 300 miles before refueling.

(c) AUTHORIZATION OF APPROPRIATIONS.—In addition to amounts otherwise authorized to be appropriated, there are authorized to be appropriated to the Secretary to carry out this section—

(1) $46,000,000 for fiscal year 2007;

(2) $50,000,000 for fiscal year 2008;

(3) $55,000,000 for fiscal year 2009; and

(4) $60,000,000 for fiscal year 2010.

SEC. 8. ADVANCED SOLAR PHOTOVOLTAIC TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for advanced solar photovoltaic technologies.

(b) OBJECTIVES.—The Secretary shall design the program under this section to develop technologies that would—

(1) make electricity generated by solar photovoltaic power cost-competitive by 2015; and

(2) enable the widespread use of solar photovoltaic power.

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

(1) $148,000,000 for fiscal year 2007;

(2) $155,000,000 for fiscal year 2008;

(3) $165,000,000 for fiscal year 2009; and

(4) $180,000,000 for fiscal year 2010.

SEC. 9. ADVANCED WIND ENERGY TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for advanced wind energy technologies.

(b) OBJECTIVES.—The Secretary shall design the program under this section to—

(1) improve the efficiency and lower the cost of wind turbines;

(2) minimize adverse environmental impacts; and

(3) develop new small-scale wind energy technologies for use in low wind speed environments.

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

(1) $44,000,000 for fiscal year 2007;

(2) $48,400,000 for fiscal year 2008;

(3) $53,240,000 for fiscal year 2009; and

(4) $58,564,000 for fiscal year 2010.

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