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109TH CONGRESS
1ST SESSION

H. R. 1482

To provide for the research and development of advanced nuclear reactor, solar energy, and wind energy technologies for the production of hydrogen, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

APRIL 5, 2005

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

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A BILL

To provide for the research and development of advanced nuclear reactor, solar energy, and wind energy technologies for the production of hydrogen, and for other purposes.

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 referred to as the ''Hydrogen Liberty Act''.

SEC. 2. HYDROGEN PRODUCTION PROGRAMS.

(a) ADVANCED REACTOR HYDROGEN COGENERATION PROJECT.—

(1) PROJECT ESTABLISHMENT.— The Secretary is directed to establish an Advanced Reactor Hydrogen Cogeneration Project.

(2) PROJECT DEFINITION.— The project shall consist of the research, development, design, construction, and operation of a hydrogen production cogeneration research facility that, relative to the current commercial reactors, enhances safety features, reduces waste production, enhances thermal efficiencies, increases proliferation resistance, and has the potential for improved economics and physical security in reactor siting. This facility shall be constructed so as to enable research and development on advanced reactors of the type selected and on alternative approaches for reactor-based production of hydrogen.

(3) PROJECT MANAGEMENT.—

(A) MANAGEMENT.—The project shall be managed within the Department by the Office of Nuclear Energy, Science, and Technology.

(B) LEAD LABORATORY.—The lead laboratory for the project, providing the site for the reactor construction, shall be the Idaho Na-

tional Laboratory (in this subsection referred to as ''INL'').

(C) STEERING COMMITTEE.—The Secretary shall establish a national steering committee with membership from the national laboratories, universities, and industry to provide advice to the Secretary and the Director of the Office of Nuclear Energy, Science, and Technology on technical and program management aspects of the project.

(D) COLLABORATION.—Project activities shall be conducted at INL, other national laboratories, universities, domestic industry, and international partners.

(4) PROJECT REQUIREMENTS.—

(A) RESEARCH AND DEVELOPMENT.—

(i) IN GENERAL.—The project shall include planning, research and development, design, and construction of an advanced, next-generation, nuclear energy system suitable for enabling further research and development on advanced reactor technologies and alternative approaches for reactor-based generation of hydrogen.

(ii) REACTOR TEST CAPABILITIES AT INL.—The project shall utilize, where appropriate, extensive reactor test capabilities resident at INL.

(iii) ALTERNATIVES.—The project shall be designed to explore technical, environmental, and economic feasibility of alternative approaches for reactor-based hydrogen production.

(iv) INDUSTRIAL LEAD.—The industrial lead for the project shall be a company incorporated in the United States.

(B) INTERNATIONAL COLLABORATION.—

(i) IN GENERAL.—The Secretary shall seek international cooperation, participation, and financial contribution in this project.

(ii) ASSISTANCE FROM INTERNATIONAL PARTNERS.—The Secretary may contract for assistance from specialists or facilities from member countries of the Generation IV International Forum, the Russian Federation, or other international partners where such specialists or facilities

provide access to cost-effective and relevant skills or test capabilities.

(iii) GENERATION IV INTERNATIONAL FORUM.—International activities shall be coordinated with the Generation IV International Forum.

(iv) GENERATION IV NUCLEAR ENERGY SYSTEMS PROGRAM.—The Secretary may combine this project with the Generation IV Nuclear Energy Systems Program.

(C) DEMONSTRATION.—The overall project, which may involve demonstration of selected project objectives in a partner nation, must demonstrate both electricity and hydrogen production and may provide flexibility, where technically and economically feasible in the design and construction, to enable tests of alternative reactor core and cooling configurations.

(D) PARTNERSHIPS.—The Secretary shall establish cost-shared partnerships with domestic industry or international participants for the research, development, design, construction, and operation of the research facility, and preference in determining the final project structure shall be given to an overall project which re-

tains United States leadership while maximizing cost sharing opportunities and minimizing Federal funding responsibilities.

(E) TARGET DATE.—The Secretary shall select technologies and develop the project to provide initial testing of either hydrogen production or electricity generation by 2011, or provide a report to Congress explaining why this date is not feasible.

(F) WAIVER OF CONSTRUCTION TIMELINES.—The Secretary is authorized to conduct the Advanced Reactor Hydrogen Cogeneration Project without the constraints of DOE Order 413.3, relating to program and project management for the acquisition of capital assets, as necessary to meet the specified operational date.

(G) COMPETITION.—The Secretary may fund up to 2 teams for up to 1 year to develop detailed proposals for competitive evaluation and selection of a single proposal and concept for further progress. The Secretary shall define the format of the competitive evaluation of proposals.

(H) USE OF FACILITIES.—Research facilities in industry, national laboratories, or universities either within the United States or with cooperating international partners may be used to develop the enabling technologies for the research facility. Utilization of domestic university-based facilities shall be encouraged to provide educational opportunities for student development.

(I) ROLE OF NUCLEAR REGULATORY COMMISSION.—

(i) IN GENERAL.—The Nuclear Regulatory Commission shall have licensing and regulatory authority for any reactor authorized under this subsection, pursuant to section 202 of the Energy Reorganization Act of 1974 (42 U.S.C. 5842).

(ii) RISK-BASED CRITERIA.—The Secretary shall seek active participation of the Nuclear Regulatory Commission throughout the project to develop risk-based criteria for any future commercial development of a similar reactor architecture.

(J) REPORT.—The Secretary shall develop and transmit to Congress a comprehensive

project plan not later than 3 months after the date of enactment of this Act. The project plan shall be updated annually with each annual budget submission.

(b) ADVANCED NUCLEAR REACTOR TECHNOLOGIES.—The Secretary shall—

(1) prepare a detailed roadmap for carrying out the provisions in this Act related to advanced nuclear reactor technologies and for implementing the recommendations related to advanced nuclear reactor technologies that are included in the report transmitted under subsection (f); and

(2) provide for the establishment of 5 projects in geographic areas that are regionally and climatically diverse to demonstrate the commercial production of hydrogen at existing nuclear power plants, including one demonstration project at a national laboratory or institution of higher education using an advanced gas-cooled reactor.

(c) COLLOCATION WITH HYDROGEN PRODUCTION FACILITY.—Section 103 of the Atomic Energy Act of 1954 (42 U.S.C. 2011) is amended by adding at the end the following new subsection:

''g. The Commission shall give priority to the licensing of a utilization facility that is collocated with a hydro-

gen production facility. The Commission shall issue a final decision approving or disapproving the issuance of a license to construct and operate a utilization facility not later than the expiration of 2 years after the date of the submission of such application, if the application references a Commission-certified design and an early site permit, unless the Commission determines that the applicant has proposed material and substantial changes to the design or the site design parameters.''.

(d) SOLAR ENERGY TECHNOLOGIES.—The Secretary shall—

(1) prepare a detailed roadmap for carrying out the provisions in this Act related to solar energy technologies and for implementing the recommendations related to solar energy technologies that are included in the report transmitted under subsection (f);

(2) provide for the establishment of 5 projects in geographic areas that are regionally and climatically diverse to demonstrate the production of hydrogen at solar energy facilities, including one demonstration project at a national laboratory or institution of higher education;

(3) establish a research and development program—

(A) to develop optimized concentrating solar power devices that may be used for the production of both electricity and hydrogen; and

(B) to evaluate the use of thermochemical cycles for hydrogen production at the temperatures attainable with concentrating solar power devices;

(4) coordinate with activities sponsored by the Department of Energy's Office of Nuclear Energy, Science, and Technology on high-temperature materials, thermochemical cycles, and economic issues related to solar energy;

(5) provide for the construction and operation of new concentrating solar power devices or solar power cogeneration facilities that produce hydrogen either concurrently with, or independently of, the production of electricity;

(6) support existing facilities and research programs dedicated to the development and advancement of concentrating solar power devices; and

(7) establish a program—

(A) to research and develop methods that use electricity from photovoltaic devices for the onsite production of hydrogen, such that no intermediate transmission or distribution infra-

structure is required or used and future demand growth may be accommodated;

(B) to evaluate the economics of small-scale electrolysis for hydrogen production; and

(C) to research the potential of modular photovoltaic devices for the development of a hydrogen infrastructure, the security implications of a hydrogen infrastructure, and the benefits potentially derived from a hydrogen infrastructure.

(e) WIND ENERGY TECHNOLOGIES.—The Secretary shall—

(1) prepare a detailed roadmap for carrying out the provisions in this Act related to wind energy technologies and for implementing the recommendations related to wind energy technologies that are included in the report transmitted under subsection (f); and

(2) provide for the establishment of 5 projects in geographic areas that are regionally and climatically diverse to demonstrate the production of hydrogen at existing wind energy facilities, including one demonstration project at a national laboratory or institution of higher education.

(f) REPORT.—The Secretary shall transmit to the Congress not later than 120 days after the date of enactment of this Act a report containing detailed summaries of the roadmaps prepared under subsections (b)(1), (d)(1), and (e)(1), descriptions of the Secretary's progress in establishing the projects and other programs required under this section, and recommendations for promoting the availability of advanced nuclear reactor energy technologies, solar energy technologies, and wind energy technologies for the production of hydrogen.

SEC. 3. HYDROGEN PRODUCTION RESEARCH.

(a) PROGRAM SUPPORT.—The Secretary shall support research programs at institutions of higher education for the development of advanced nuclear reactor energy technologies, solar energy technologies, and wind energy technologies for the production of hydrogen. The research programs supported under this section shall—

(1) enhance fellowship and faculty assistance programs;

(2) provide support for fundamental research;

(3) encourage collaborative research among industry, national laboratories, and institutions of higher education;

(4) support communication and outreach; and

(5) to the greatest extent possible—

(A) be located in geographic areas that are regionally and climatically diverse; and

(B) be located at part B institutions, minority institutions, and institutions of higher education located in States participating in the Experimental Program to Stimulate Competitive Research of the Department of Energy.

(b) NUCLEAR REACTOR RESEARCH PROGRAMS.—Research programs supported under this section that are related to advanced nuclear reactor technologies—

(1) shall be programs that research designs for nuclear reactors capable of producing hydrogen from a variety of feedstocks;

(2) may provide technical assistance, in collaboration with the United States civilian nuclear industry, to relicense and upgrade research nuclear reactors at institutions of higher education involved in such programs;

(3) may use funding authorized under subsection (d)(1) for improvements of research nuclear reactors at institutions of higher education involved in such programs as part of a focused effort that emphasizes research, training, and education; and

(4) may use funding authorized under subsection (d)(1) to offset a portion of the operating

and maintenance costs of a research nuclear reactor at an institution of higher education involved in one of such programs.

(c) INSTITUTIONS OF HIGHER EDUCATION AND NATIONAL LABORATORY INTERACTIONS.—In conjunction with the programs supported under this section, the Secretary shall develop sabbatical, fellowship, and visiting scientist programs to encourage national laboratories and institutions of higher education to share and exchange personnel.

(d) AUTHORIZATION OF APPROPRIATIONS.—

(1) ADVANCED NUCLEAR REACTOR TECHNOLOGIES RESEARCH PROGRAMS.—For the purpose of supporting research programs related to the development of advanced nuclear reactor technologies under this section, there are authorized to be appropriated to the Secretary—

(A) $65,000,000 for fiscal year 2006;

(B) $74,750,000 for fiscal year 2007;

(C) $85,962,500 for fiscal year 2008;

(D) $98,856,875 for fiscal year 2009;

(E) $113,685,406 for fiscal year 2010;

(F) $130,738,217 for fiscal year 2011;

(G) $150,348,950 for fiscal year 2012;

(H) $172,901,292 for fiscal year 2013;

(I) $198,836,486 for fiscal year 2014; and

(J) $228,661,959 for fiscal year 2015.

(2) SOLAR ENERGY TECHNOLOGIES RESEARCH PROGRAMS.—For the purpose of supporting research programs related to the development of solar energy technologies under this section, there are authorized to be appropriated to the Secretary—

(A) $65,000,000 for fiscal year 2006;

(B) $74,750,000 for fiscal year 2007;

(C) $85,962,500 for fiscal year 2008;

(D) $98,856,875 for fiscal year 2009;

(E) $113,685,406 for fiscal year 2010;

(F) $130,738,217 for fiscal year 2011;

(G) $150,348,950 for fiscal year 2012;

(H) $172,901,292 for fiscal year 2013;

(I) $198,836,486 for fiscal year 2014; and

(J) $228,661,959 for fiscal year 2015.

(3) WIND ENERGY TECHNOLOGIES RESEARCH PROGRAMS.—For the purpose of supporting research programs related to the development of wind energy technologies under this section, there are authorized to be appropriated to the Secretary—

(A) $65,000,000 for fiscal year 2006;

(B) $74,750,000 for fiscal year 2007;

(C) $85,962,500 for fiscal year 2008;

(D) $98,856,875 for fiscal year 2009;

(E) $113,685,406 for fiscal year 2010;

(F) $130,738,217 for fiscal year 2011;

(G) $150,348,950 for fiscal year 2012;

(H) $172,901,292 for fiscal year 2013;

(I) $198,836,486 for fiscal year 2014; and

(J) $228,661,959 for fiscal year 2015.

SEC. 4. DEFINITIONS.

For purposes of this Act—

(1) the term ''advanced nuclear reactor technologies'' means—

(A) technologies related to advanced light water reactors that may be commercially available in the near-term, including mid-sized reactors with passive safety features, for the generation of electric power from nuclear fission and the production of hydrogen; and

(B) technologies related to other nuclear reactors that may require prototype demonstration prior to availability in the mid-term or long-term, including high-temperature, gas-cooled reactors and liquid metal reactors, for the generation of electric power from nuclear fission and the production of hydrogen;

(2) the term ''concentrating solar power devices'' means devices that concentrate the power of the sun by reflection or refraction to improve the efficiency of a photovoltaic or thermal generation process;

(3) the term ''institution of higher education'' has the meaning given to that term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a));

(4) the term ''minority institution'' has the meaning given to that term in section 365 of the Higher Education Act of 1965 (20 U.S.C. 1067k);

(5) the term ''part B institution'' has the meaning given to that term in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061);

(6) the term ''photovoltaic devices'' means devices that convert light directly into electricity through a solid-state, semiconductor process; and

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

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