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H. R. 3585

To guide and provide for United States research, development, and demonstration of solar energy technologies, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

SEPTEMBER 16, 2009

Ms. GIFFORDS introduced the following bill; which was referred to the Committee on Science and Technology

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A BILL

To guide and provide for United States research, development, and demonstration of solar energy technologies, 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 cited as the ''Solar Technology Roadmap Act''.

SEC. 2. DEFINITIONS.

In this Act:

(1) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

(2) SOLAR TECHNOLOGY.—The term ''solar technology'' means—

(A) photovoltaic technologies, including technologies utilizing—

(i) crystalline silicon;

(ii) cadmium telluride;

(iii) semiconductor materials containing copper, indium, and selenium;

(iv) thin film silicon;

(v) gallium arsenide alloy and multi-junctions;

(vi) dye-sensitized and organic solar cell technologies;

(vii) concentrating photovoltaics; and

(viii) other photovoltaic methods identified by the Secretary;

(B) solar thermal electric technology, including linear concentrator systems, dish/engine systems, and power tower systems;

(C) solar thermal water heating technology;

(D) solar heating and air conditioning technologies;

(E) passive solar design in architecture, including both heating and lighting applications; and

(F) related or enabling technologies, including thin films, semiconducting materials, transparent conductors, optics, and technologies that increase durability or decrease cost or weight.

TITLE I—SOLAR TECHNOLOGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION

SEC. 101. PROGRAM.

(a) IN GENERAL.—The Secretary shall conduct a program of research, development, and demonstration for solar technology, including—

(1) photovoltaics;

(2) solar hot water and solar space heating and cooling;

(3) concentrating solar power;

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

(5) manufacturability of low cost, high-quality solar energy systems;

(6) development of solar technology products that can be easily integrated into new and existing buildings; and

(7) other areas as the Secretary considers appropriate.

(b) AWARDS.—The Secretary shall provide awards under this section on a merit-reviewed, competitive basis to—

(1) academic institutions, national laboratories, Federal research agencies, State research agencies, nonprofit organizations, industrial entities, or consortia thereof for research, development, and demonstration activities; and

(2) industry-led consortia for research, development, and demonstration of advanced techniques for manufacturing a variety of solar energy products.

(c) OBJECTIVE.—It is the policy of the United States that at least 75 percent of funding for solar technology research, development, and demonstration activities conducted by the Department of Energy after fiscal year 2014 support activities identified by and recommended under the Solar Technology Roadmap as described in section 102.

SEC. 102. SOLAR TECHNOLOGY ROADMAP.

(a) IN GENERAL.—Not later than 18 months after the date of enactment of this Act, the Solar Technology Roadmap Committee established under section 103 shall develop and transmit to the Secretary of Energy and the Congress a Solar Technology Roadmap that—

(1) presents the best current estimate of the near-term (up to 2 years), mid-term (up to 7 years), and long-term (up to 15 years) research, development, and demonstration needs in solar technology; and

(2) provides guidance to the solar technology research, development, and demonstration activities supported by the Federal Government for the purposes of meeting national priorities in energy security, United States competitiveness, climate change mitigation, and energy diversification.

(b) CONTENTS.—The Solar Technology Roadmap shall—

(1) identify research, development, and demonstration needs to address—

(A) the key solar energy production challenges of intermittency, transience, storage, and scaling, including determining—

(i) which solar-related technological solutions are appropriate for various applications, locations, and seasons;

(ii) how to store excess solar energy in batteries, supercapacitors, compressed air, flywheels, hydrogen, synthetic fuels, thermal storage, or superconductors, or through other means;

(iii) how and when to integrate solar energy into the electricity grid effectively, including—

(I) the integration of solar technologies with a Smart Grid;

(II) electrical power smoothing;

(III) microgrid integration;

(IV) solar resource forecasting;

(V) long distance transmission; and

(VI) ways to address arbitrage over minutes, hours, days, weeks, and seasons with respect to the full range of project scales; and

(iv) how best to integrate solar technologies into buildings;

(B) modeling and simulation;

(C) the design, materials, and manufacture of solar technologies, as well as related factory sciences;

(D) the development of standards;

(E) the need for demonstration facilities;

(F) optimized packaging methods; and

(G) environmental, safety, and health concerns including reuse, recycling, hazardous materials disposal, and photovoltaic waste issues;

(2) identify opportunities for coordination with partner industries such as those for semiconductors, LED lighting, energy storage, Smart Grid, and wind that can benefit from similar advances;

(3) establish research, development, and demonstration goals with specific timeframes with respect to solar technologies for—

(A) improving performance;

(B) decreasing cost of electricity generated;

(C) improving reliability; and

(D) decreasing negative environmental impacts and maximizing the environmental benefits of solar technologies by examining life-cycle assessments of greenhouse gas emissions, energy payback time, and water usage; and

(4) include recommendations, as appropriate, to guide solar technology research, development, and demonstration activities.

(c) REVISIONS AND UPDATES.—

(1) REVISIONS.—Once every 3 years after completion of the first Solar Technology Roadmap under this Act, the Solar Technology Roadmap Committee shall conduct a comprehensive review and revision of the Solar Technology Roadmap.

(2) UPDATES.—The Solar Technology Roadmap Committee shall update the Solar Technology Roadmap annually as necessary.

SEC. 103. SOLAR TECHNOLOGY ROADMAP COMMITTEE.

(a) ESTABLISHMENT.—Not later than 4 months after the date of enactment of this Act, the Secretary shall establish, and provide support for as necessary, a Solar Technology Roadmap Committee.

(b) MEMBERSHIP.—

(1) IN GENERAL.—The Solar Technology Roadmap Committee shall consist of at least 11 members. Each member shall be appointed by the Secretary from among subject matter experts representing—

(A) different sectors of the solar technology industry, including manufacturers and equipment suppliers;

(B) national laboratories;

(C) academia;

(D) relevant Federal agencies;

(E) relevant State and local government entities; and

(F) other entities or organizations, as appropriate.

(2) TERMS.—

(A) IN GENERAL.—Except as provided in subparagraph (B), the term of a member of the Solar Technology Roadmap Committee shall be 3 years.

(B) ORIGINAL TERMS.—Of the members appointed originally to the Solar Technology Roadmap Committee, approximately ⅓ shall be appointed for a 2-year term, approximately ⅓ shall be appointed for a 3-year term, and approximately ⅓ shall be appointed for a 4-year term.

(3) LIMIT ON TERMS.—A member of the Solar Technology Roadmap Committee may serve more than 1 term, except that such member may not serve a subsequent term unless 2 years have elapsed since the end of a previous term.

(4) INDUSTRY PARTICIPATION.—At least ⅓ of the members of the Solar Technology Roadmap Committee shall be individuals described in paragraph (1)(A).

(5) CHAIR.—The Secretary shall select a Chair from among the members of the Committee. The Chair shall not be an employee of the Federal Government.

(c) EXPERT ADVICE.—In developing the Solar Technology Roadmap, the Solar Technology Roadmap Committee may establish subcommittees, working groups comprised of experts outside the membership of the Solar Technology Roadmap Committee, and other means of gathering expert advice on—

(1) particular solar technologies or technological challenges;

(2) crosscutting issues or activities relating to more than 1 particular solar technology or technological challenge; or

(3) any other area the Solar Technology Roadmap Committee considers appropriate.

(d) FEDERAL ADVISORY COMMITTEE ACT.—The Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the Solar Technology Roadmap Committee.

SEC. 104. INTERAGENCY COORDINATION.

The Director of the Office of Science and Technology Policy shall coordinate Federal interagency activities identified in and related to the Solar Technology Roadmap.

SEC. 105. SOLAR TECHNOLOGY DEMONSTRATION PROJECTS.

(a) ESTABLISHMENT OF PROGRAM.—The Secretary shall establish a program to provide grants for demonstration projects to support the development of solar energy production, consistent with the Solar Technology Roadmap.

(b) IMPLEMENTATION.—In carrying out the demonstration program under this section, to the extent practicable, the Secretary shall—

(1) include at least 10 photovoltaic technology projects that generate between 1 and 3 megawatts;

(2) include at least 2 but not more than 3 solar thermal electric technology projects that generate greater than 30 megawatts; and

(3) make awards for projects that—

(A) are located and can be replicated at a wide range of sites;

(B) demonstrate technologies that address intermittency, transience, and storage challenges;

(C) facilitate identification of optimum techniques among competing alternatives;

(D) include business commercialization plans that have the potential for production of equipment at high volumes;

(E) improve United States competitiveness and lead to development of manufacturing technology;

(F) demonstrate positive environmental performance through life-cycle analysis; and

(G) satisfy other criteria that the Secretary considers necessary to carry out the program.

(c) GRANT AWARDS.—Funding provided under this section may be used, to the extent that funding is not otherwise available through other Federal programs or power purchase agreements, for—

(1) a necessary and appropriate site engineering study;

(2) a detailed economic assessment of site-specific conditions;

(3) appropriate feasibility studies to determine whether the demonstration can be replicated;

(4) installation of equipment, service, and support;

(5) operation for a minimum of 3 years and monitoring for the duration of the demonstration; and

(6) validation of technical, economic, and environmental assumptions and documentation of lessons learned.

(d) GRANT SELECTION.—Not later than 90 days after the date of enactment of this Act and annually thereafter, the Secretary shall conduct a national solicitation for applications for grants under this section. Grant recipients shall be selected on a merit-reviewed, competitive basis. The Secretary shall give preference to proposals that address multiple elements described in subsection (b).

(e) LIMITATIONS.—Funding shall not be provided under this section for more than 50 percent of the costs of the project for which assistance is provided. Not more than a total of $300,000,000 shall be provided under this section for the period encompassing fiscal years 2011 through 2015.

SEC. 106. PHOTOVOLTAIC PERFORMANCE STUDY.

(a) IN GENERAL.—Not later than one year after the date of enactment of this Act, the Secretary shall transmit to the Congress the results of a study that analyzes the performance of photovoltaic installations in the United States. The study shall assess the current performance of

photovoltaic installations and identify opportunities to improve the energy productivity of these systems through management, technology, and installation best practices. Such study shall include—

(1) identification of the average energy productivity of current commercial and residential installations;

(2) assessment of areas where energy productivity is reduced, including wire loss, module mismatch, shading, dust, and other factors;

(3) identification of practices and technologies that improve energy productivity;

(4) analysis of the potential cost savings and energy productivity gains to the Federal, State, and local governments, utilities, private enterprise, and consumers available through the adoption, installation, and use of high-performance photovoltaic technologies and practices; and

(5) an overview of current government incentives at the Federal, State, and local levels that encourage the adoption of highly efficient photovoltaic systems and practices.

(b) PUBLIC INPUT.—The Secretary shall ensure that interested stakeholders, including affected industry stakeholders and energy efficiency advocates, have a meaningful

opportunity to provide comments, data, and other information on the scope, contents, and conclusions of the study.

SEC. 107. SOLAR ENERGY PROGRAM REAUTHORIZATION.

(a) IN GENERAL.—There are authorized to be appropriated to the Secretary to carry out section 101(a)—

(1) $350,000,000 for fiscal year 2011;

(2) $400,000,000 for fiscal year 2012;

(3) $450,000,000 for fiscal year 2013;

(4) $500,000,000 for fiscal year 2014; and

(5) $550,000,000 for fiscal year 2015.

(b) ROADMAP IDENTIFIED ACTIVITIES.—The Secretary shall dedicate a percentage of funding received pursuant to subsection (a) for research, development, and demonstration activities identified by and recommended under the Solar Technology Roadmap in the following percentages:

(1) For fiscal year 2012, at least 30 percent.

(2) For fiscal year 2013, at least 45 percent.

(3) For fiscal year 2014, at least 60 percent.

(4) For fiscal year 2015, at least 75 percent.

(c) SOLAR TECHNOLOGY ROADMAP.—The Secretary may use up to $2,000,000 of the funds appropriated pursuant to subsection (a) for each fiscal year to support the

establishment and maintenance of the Solar Technology Roadmap.

(d) EXTENSION OF AUTHORIZATIONS.—Of funds authorized by subsection (a), there are authorized to be appropriated to the Secretary to carry out—

(1) section 602 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17171) $12,000,000 for each of the fiscal years 2013 through 2015; and

(2) section 604 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17172) $10,000,000 for each of the fiscal years 2013 through 2015.

SEC. 108. EXISTING PROGRAMS.

Except as otherwise specified in this Act, this Act shall supersede any duplicative or conflicting solar research, development, and demonstration programs within the Department of Energy.

SEC. 109. REPEALS.

The following are hereby repealed:

(1) The Solar Energy Research, Development, and Demonstration Act of 1974 (42 U.S.C. 5551 et seq.), except for section 10.

(2) The Solar Photovoltaic Energy Research, Development, and Demonstration Act of 1978 (42 U.S.C. 5581 et seq.).

(3) Section 4(a)(2) and (3) of the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989 (42 U.S.C. 12003(a)(2) and (3)).

TITLE II—PHOTOVOLTAIC RECYCLING

SEC. 201. PHOTOVOLTAIC DEVICE RECYCLING RESEARCH, DEVELOPMENT, AND DEMONSTRATION.

(a) DEFINITION.—In this section, the term ''photovoltaic device'' includes photovoltaic cells and the electronic and electrical components of such devices.

(b) IN GENERAL.—In order to address the issues described in section 102(b)(1)(G), the Secretary shall award multiyear grants for research, development, and demonstration activities to create innovative and practical approaches to increase reuse and recycling of photovoltaic devices and, through such activities, to contribute to the professional development of scientists, engineers, and technicians in the fields of photovoltaic and electronic device manufacturing, design, refurbishing, and recycling. The activities supported under this section shall address—

(1) technology to increase the efficiency of photovoltaic device recycling and maximize the recovery of valuable raw materials for use in new products while minimizing the life-cycle environmental impacts such as greenhouse gas emissions and water usage;

(2) expanded uses for materials from recycled photovoltaic devices;

(3) development and demonstration of environmentally responsible alternatives to the use of hazardous materials in photovoltaic devices and the production of such devices;

(4) development of methods to separate and remove hazardous materials from photovoltaic devices and to recycle or dispose of those materials in a safe manner;

(5) product design and construction to facilitate disassembly and recycling of photovoltaic devices;

(6) tools and methods to aid in assessing the environmental impacts of the production of photovoltaic devices and photovoltaic device recycling and disposal;

(7) product design and construction and other tools and techniques to extend the life cycle of pho-

tovoltaic devices, including methods to promote their safe reuse;

(8) strategies to increase consumer acceptance and practice of recycling of photovoltaic devices; and

(9) processes to reduce the costs and environmental impact of disposal of toxic materials used in photovoltaic devices.

(c) MERIT REVIEW.—Grants shall be awarded under this section on a merit-reviewed, competitive basis.

(d) APPLICATIONS.—Each application shall include a description of—

(1) the project that will be undertaken and the contributions of each participating entity;

(2) the applicability of the project to increasing reuse and recycling of photovoltaic devices with the least environmental impacts as measured by life-cycle analyses, and the potential for incorporating the research results into industry practice; and

(3) how the project will promote collaboration among scientists and engineers from different disciplines, such as electrical engineering, materials science, and social science.

(e) DISSEMINATION OF RESULTS.—The results of activities supported under this section shall be made publicly available through—

(1) development of best practices or training materials for use in the photovoltaics manufacturing, design, refurbishing, or recycling industries;

(2) dissemination at industry conferences;

(3) coordination with information dissemination programs relating to recycling of electronic devices in general;

(4) demonstration projects; and

(5) educational materials for the public produced in conjunction with State and local governments or nonprofit organizations on the problems and solutions related to reuse and recycling of photovoltaic devices.

(f) PHOTOVOLTAIC MATERIALS PHYSICAL PROPERTY DATABASE.—

(1) IN GENERAL.—The Secretary shall establish an initiative to develop a comprehensive physical property database of materials for use in photovoltaic devices.

(2) PRIORITIES.—The Secretary, working with private industry, shall develop a plan to establish priorities and requirements for the database under this subsection.

(3) COORDINATION.—The Secretary shall coordinate with the Director of the National Institute

of Standards and Technology and the Administrator of the Environmental Protection Agency to facilitate the incorporation of the database under this subsection with any existing ''green'' database for electronic manufacturing and recycling.

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