Calendar No. 358

116TH CONGRESS
1ST SESSION

S. 2668

To establish a program for research, development, and demonstration of solar energy technologies, and for other purposes.

IN THE SENATE OF THE UNITED STATES

OCTOBER 22, 2019

Ms. SINEMA (for herself and Ms. MCSALLY) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

DECEMBER 17, 2019

Reported by Ms. MURKOWSKI, with an amendment

[Strike out all after the enacting clause and insert the part printed in italic]

A BILL

To establish a program for 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 Energy Research and Development Act of 2019".~~

SEC. 2. DEFINITIONS.

In this Act:

(1) ECONOMICALLY DISTRESSED AREA.—The term ''economically distressed area'' means an area described in section 301(a) of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3161(a)).

(2) ELIGIBLE ENTITY.—The term ''eligible entity'' means—

(A) an institution of higher education;

(B) a National Laboratory;

(C) a Federal research agency;

(D) a State research agency;

(E) a nonprofit research organization;

(F) an industrial entity; and

(G) a consortium of 2 or more entities described in subparagraphs (A) through (F).

(3) INDIAN TRIBE.—The term ''Indian tribe'' has the meaning given the term in section 4 of the Native American Housing Assistance and Self-Determination Act of 1996 (25 U.S.C. 4103).

(4) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given the term in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

(5) NATIONAL LABORATORY.—The term ''National Laboratory'' has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(6) PHOTOVOLTAIC DEVICE.—The term ''photovoltaic device'' means—

(A) a device that converts light directly into electricity through a solid-state, semiconductor process;

(B) the photovoltaic cells of a device described in subparagraph (A); and

(C) the electronic and electrical components of a device described in subparagraph (A).

(7) PROGRAM.—The term ''program'' means the program established under section 3(a)(1).

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

SEC. 3. SOLAR ENERGY TECHNOLOGY PROGRAM.

(a) PROGRAM.—

(1) IN GENERAL.—The Secretary shall establish a solar energy technology program under which the Secretary shall—

(A) award grants on a competitive, merit-reviewed basis to eligible entities to conduct re-

search, development, testing, and evaluation of solar energy technologies; and

(B) carry out other activities in accordance with this section.

(2) PURPOSES.—The purposes of the program are the following:

(A) To improve the energy efficiency, reliability, resilience, security, and capacity of solar energy generation.

(B) To optimize the design and adaptability of solar energy systems to the broadest practical range of geographic and atmospheric conditions.

(C) To reduce the cost of manufacturing, installation, operation, and maintenance of solar energy systems.

(D) To create and improve conversion of solar energy to useful forms.

(3) TARGETS.—In carrying out the program, the Secretary shall address near-term (up to 2 years), mid-term (up to 7 years), and long-term (up to 15 years) challenges to the advancement of solar energy systems.

(4) STEWARDSHIP OF NATIONAL LABORATORY RESOURCES.—In awarding grants under the pro-

gram, the Secretary shall steward relevant capabilities and programs of the National Laboratories.

(5) TECHNICAL ASSISTANCE AND WORKFORCE DEVELOPMENT.—In carrying out the program, for purposes of supporting technical, nonhardware, and information-based advances in solar energy systems development and operations, the Secretary may—

(A) provide technical assistance and carry out analysis activities with eligible entities, including activities that support expanding access to solar energy for low-income individuals and communities, including in economically distressed areas; and

(B) carry out workforce development and training activities, including to support the dissemination of standards and best practices for enabling solar power production.

(6) WILDLIFE IMPACT MITIGATION.—In carrying out the program, the Secretary shall, to the maximum extent practicable, support wildlife impact mitigation technologies and strategies, including the use of distributed solar technologies, to reduce the potential negative impacts of solar energy systems on fish or wildlife, or plants (as those terms are de-

fined in section 3 of the Endangered Species Act of 1973 (16 U.S.C. 1532)).

(7) SUSTAINABLE CHEMISTRY.—Each entity receiving a grant under the program shall endeavor, in carrying out activities under the grant, to incorporate, where appropriate, sustainable and green chemistry and engineering principles, practices, and methodologies.

(b) GRANT SUBJECT AREAS.—In addition to awarding the grants described in subsections (c) through (e), the Secretary shall award grants under the program to eligible entities to carry out research, development, testing, and evaluation in the following subject areas:

(1) Photovoltaic devices and related electronic components, including converters, sensors, energy monitors, communication and control equipment, and protocols.

(2) Concentrated solar power, including solar thermal and concentrating solar photovoltaic technologies.

(3) Low cost, high-quality solar energy systems.

(4) Solar heating and cooling systems, including distributed solar-powered air conditioning.

(5) Low cost, thin-film solar technologies, including the use of perovskite materials in solar cells.

~~(6) Solar technology products that can be easily integrated into new buildings, existing buildings, agricultural and aquatic environments, and other infrastructure.~~

~~(7) Solar technology that is resilient to extreme weather events.~~

~~(8) Solar technology products integrated into transportation applications in coordination with vehicle technologies research and development activities supported by the Department of Energy.~~

~~(9) Storage technologies that address the transience and intermittency of solar energy resources, including batteries, supercapacitors, and thermal storage.~~

~~(10) Microgrids using solar technology.~~

~~(11) Solar technologies enabling safe grid operating conditions, such as fast-disconnect during an emergency.~~

~~(12) Distributed solar energy technologies, such as rooftop solar panels.~~

~~(13) Technologies and designs that enable a broad range of scales for solar power production.~~

~~(14) Advanced solar manufacturing technologies and best practices, including—~~

~~(A) materials and processes;~~

(B) development of industry standards;

(C) design and integration practices; and

(D) optimized packaging methods and new device designs.

(15) Advanced analytic and computing capabilities for better modeling and simulations of solar energy systems.

(16) Electrical grid integration, including—

(A) integration of solar technologies into smart grid, transmission, and distribution;

(B) coordination of solar with other distributed and large-scale energy resources;

(C) electrical power smoothing;

(D) microgrid integration;

(E) community solar;

(F) solar resource forecasting;

(G) regional and national electric system balancing and long-distance transmission options, including direct current and superconducting transmission and long-term storage options;

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

(I) electric grid security, including cyber and physical security.

(17) Nonhardware and information-based advances in solar energy system design, installation, and operation.

(18) Solar energy technology relating to behind-the-meter strategies, including with respect to electricity generation, load, energy efficiency, controls, storage, and electric vehicles.

(19) Next generation demonstration facilities.

(20) Any other subject area determined by the Secretary.

(c) SOLAR ENERGY TECHNOLOGY DEMONSTRATION GRANTS.—

(1) IN GENERAL.—In carrying out the program, the Secretary shall award multiyear grants to eligible entities to carry out demonstration projects to advance the development of solar energy technologies and systems production.

(2) PRIORITY.—In awarding grants under paragraph (1), the Secretary shall give priority to projects that—

(A) are located in geographically diverse regions of the United States;

(B) can be replicated in a variety of regions and climates;

(C) demonstrate technologies that address intermittency, variability, storage challenges, behind-the-meter operations, and independent operational capability;

(D) coordinate solar technologies with other distributed and large-scale energy resources;

(E) facilitate identification of optimum approaches among competing solar energy technologies;

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

(G) support the development of advanced manufacturing technologies that have the potential to improve United States competitiveness in the international solar energy manufacturing sector;

(H) provide the greatest potential to reduce energy costs for consumers and promote accessibility and community implementation of demonstrated technologies;

(I) increase disclosure and transparency of information to all market participants;

(J) promote overall electric infrastructure reliability and resilience in the event of grid functions being disrupted or damaged;

(K) support the development or demonstration of projects in collaboration with Indian tribes and in economically distressed areas; and

(L) satisfy any other priority that the Secretary determines appropriate.

(3) USE OF FUNDS.—To the extent that funding is not otherwise available through other Federal programs or power purchase agreements, grants awarded under paragraph (1) may be used for—

(A) any necessary site engineering study;

(B) an economic assessment of site-specific conditions;

(C) appropriate feasibility studies to determine whether the demonstration project may be replicated;

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

(E) operating the demonstration project for not less than the minimum period required

to fully assess the results and objectives of the project, as determined by a peer-reviewed process; and

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

(4) SOLICITATION.—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 described in paragraph (1).

(5) ORGANIC PHOTOVOLTAIC CELL TECHNOLOGIES.—At least 1 grant awarded under paragraph (1) during fiscal year 2020 shall be for a project to demonstrate organic photovoltaic cell technologies.

(d) NEXT GENERATION SOLAR ENERGY MANUFACTURING INITIATIVE.—

(1) GRANTS.—In carrying out the program, the Secretary shall award multiyear grants to eligible entities for research, development, and demonstration projects to advance new solar energy manufacturing technologies and techniques, including to manufacture solar cells, hardware, and enabling devices.

(2) PRIORITY.—In awarding grants under paragraph (1), to the extent practicable, the Secretary shall—

(A) follow the recommendations in the report described in paragraph (3)(B)(ii); and

(B) give priority to solar energy manufacturing projects that—

(i) reduce capital expenditures or provide lower-cost manufacturing options;

(ii) eliminate manufacturing process steps;

(iii) reduce energy, water, and material inputs;

(iv) establish alternative supply chains for materials and components;

(v) are located on land owned by Indian tribes;

(vi) are located on land in economically distressed areas; and

(vii) take advantage of rapid prototyping, small batch manufacturing, and roll-to-roll processing.

(3) STRATEGIC VISION STUDY.—

(A) IN GENERAL.—The Secretary shall conduct a study on the viable market opportuni-

ties available for solar energy technology manufacturing in the United States, including solar cells, hardware, and enabling technologies.

(B) REPORT.—Not later than September 1, 2020, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate, the Committee on Science, Space, and Technology of the House of Representatives, and any other relevant Committee of Congress a report containing the results of the study under subparagraph (A), including—

(i) a description of—

(I) the ability of relevant businesses or other entities to competitively manufacture solar technology in the United States, including the manufacture of—

(aa) new and advanced materials, such as cells made with new, cost-effective, high-efficiency materials;

(bb) solar module equipment and enabling technologies, including smart inverters, sensors, and tracking equipment; and

(cc) innovative solar module designs and applications, including designs and applications that can directly integrate with new and existing buildings and other infrastructure; and

(II) opportunities and barriers in solar energy technology supply chains in the United States and internationally;

(ii) policy recommendations for enhancing solar energy technology manufacturing in the United States;

(iii) an aggressive 10-year target and plan, beginning in calendar year 2021, to enhance the competitiveness of solar energy technology manufacturing in the United States; and

(iv) needs for future research, development, and demonstration projects in solar manufacturing and related areas, as determined by the Secretary.

(4) EVALUATION.—Not later than 3 years after the date on which the report under paragraph (3)(B) is submitted, and every 4 years thereafter,

the Secretary shall conduct, and make available to the public and the relevant committees of Congress, an independent review of the progress of the grants awarded under paragraph (1) in meeting the recommendations and targets included in the report.

(c) PHOTOVOLTAIC DEVICE RECYCLING RESEARCH, DEVELOPMENT, AND DEMONSTRATION GRANTS.—

(1) IN GENERAL.—In carrying out the program, the Secretary shall award multiyear grants to eligible entities for research, development, and demonstration projects to create innovative and practical approaches to increase the reuse and recycling of photovoltaic devices, including by addressing—

(A) 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 lifecycle environmental impacts, such as greenhouse gas emissions and water usage;

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

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

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

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

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

(G) product design and construction and other tools and techniques to extend the lifecycle of photovoltaic devices, including methods to promote the safe reuse of those devices;

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

(I) the development or demonstration of projects in collaboration with Indian tribes and in economically distressed areas; and

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

(2) APPLICATIONS.—An eligible entity seeking a grant under paragraph (1) shall submit to the Secretary an application at such time, in such manner, and containing such information as the Secretary may require, including a description of—

(A) the proposed project and the contributions of each participating entity;

(B) the applicability of the project to increasing the reuse and recycling of photovoltaic devices with the least environmental impacts as measured by lifecycle analyses;

(C) the potential for incorporating the research results into industry practice; and

(D) the manner in which the project will promote collaboration among scientists and engineers from different disciplines, such as the electrical engineering, materials science, and social science disciplines.

(3) DISSEMINATION OF RESULTS.—The Secretary shall publish the results of the projects carried out through grants awarded under paragraph (1) through—

(A) best practices or training materials relating to those grants, for use in the

photovoltaics manufacturing, design, installation, refurbishing, or recycling industries;

(B) coordination with information dissemination programs relating to general recycling of electronic devices; and

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

(f) PHOTOVOLTAIC MATERIALS PHYSICAL PROPERTY DATABASE.—

(1) IN GENERAL.—Not later than September 1, 2021, the Secretary shall establish a comprehensive physical property database of materials for use in photovoltaic devices, which shall include—

(A) identification of materials used in photovoltaic devices;

(B) the quantity of each commercially available material identified under subparagraph (A) and the country of origin of that material;

(C) the quantity of materials used in photovoltaic devices projected to be available

through mining or recycling of photovoltaic and other electronic devices; and

(D) a list of other significant uses for each material identified under subparagraph (A).

(2) PRIORITIES.—Not later than September 1, 2020, the Secretary, in collaboration with private industry, shall develop a plan to establish priorities and requirements for the database described in paragraph (1), including the protection of proprietary information, trade secrets, and other confidential business information.

(3) COORDINATION.—The Secretary shall coordinate with the Director of the National Institute of Standards and Technology, the Administrator of the Environmental Protection Agency, and the Secretary of the Interior to facilitate the incorporation of the database under paragraph (1) with any existing database for materials involved in electronic manufacturing and recycling.

(g) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the program such sums as are necessary for each of fiscal years 2020 through 2024.

SEC. 4. CONFORMING AMENDMENTS.

(a) The Solar Energy Research, Development, and Demonstration Act of 1974 (42 U.S.C. 5551 et seq.) is repealed.

(b) Section 6(b)(3) of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5905(b)(3)) is amended—

(1) by striking subparagraph (L); and

(2) by redesignating subparagraphs (M) through (S) as subparagraphs (L) through (R), respectively.

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

(d) Section 4(a) of the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989 (42 U.S.C. 12003(a)) is amended—

(1) in the matter preceding paragraph (1), by striking ''photovoltaics, and solar thermal energy'' and inserting ''alcohol from biomass, and other technologies'';

(2) by striking paragraphs (2) and (3); and

(3) by redesignating paragraphs (4) and (5) as paragraphs (2) and (3), respectively.

(e) Section 931 of the Energy Policy Act of 2005 (42 U.S.C. 16231) is amended—

~~(1) in subsection (a)(2)—~~

~~(A) by striking subparagraph (A); and~~

~~(B) by redesignating subparagraphs (B) through (E) as subparagraphs (A) through (D), respectively;~~

~~(2) by striking subsection (d); and~~

~~(3) by redesignating subsections (e) through (g) as subsections (d) through (f), respectively.~~

~~(f) Sections 606 and 607 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17174, 17175) are repealed.~~

~~SEC. 5. SAVINGS PROVISION.~~

~~The repeal of the Solar Energy Research, Development, and Demonstration Act of 1974 (42 U.S.C. 5551 et seq.) under section 4(a) shall not affect the authority of the Secretary to conduct research and development on solar energy.~~

SECTION 1. SHORT TITLE.

This Act may be cited as the "Solar Energy Research and Development Act of 2019".

SEC. 2. DEFINITIONS.

In this Act:

(1) ECONOMICALLY DISTRESSED AREA.—The term "economically distressed area" means an area described in section 301(a) of the Public Works and

Economic Development Act of 1965 (42 U.S.C. 3161(a)).

(2) ELIGIBLE ENTITY.—The term "eligible entity" means—

(A) an institution of higher education;

(B) a National Laboratory;

(C) a Federal research agency;

(D) a State research agency;

(E) a research agency associated with a territory or freely associated state;

(F) a tribal energy development organization;

(G) an Indian tribe;

(H) a tribal organization;

(I) a Native Hawaiian community-based organization;

(J) a nonprofit research organization;

(K) an industrial entity;

(L) any other entity, as determined by the Secretary; and

(M) a consortium of 2 or more entities described in subparagraphs (A) through (L).

(3) INDIAN TRIBE.—The term "Indian tribe" has the meaning given the term in section 4 of the Indian

Self-Determination and Education Assistance Act (25 U.S.C. 5304).

(4) INSTITUTION OF HIGHER EDUCATION.—The term "institution of higher education" has the meaning given the term in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

(5) NATIONAL LABORATORY.—The term "National Laboratory" has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(6) NATIVE HAWAIIAN COMMUNITY-BASED ORGANIZATION.—The term "Native Hawaiian community-based organization" has the meaning given the term in section 6207 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7517).

(7) PHOTOVOLTAIC DEVICE.—The term "photovoltaic device" means—

(A) a device that converts light directly into electricity through a solid-state, semiconductor process;

(B) the photovoltaic cells of a device described in subparagraph (A); and

(C) the electronic and electrical components of a device described in subparagraph (A).

(8) PROGRAM.—The term "program" means the program established under section 3(a)(1).

(9) SECRETARY.—The term "Secretary" means the Secretary of Energy.

(10) SOLAR ENERGY.—The term "solar energy" means—

(A) thermal or electric energy derived from radiation from the Sun; or

(B) energy resulting from a chemical reaction caused by radiation recently originated in the Sun.

(11) TERRITORY OR FREELY ASSOCIATED STATE.—The term "territory or freely associated state" has the meaning given the term "insular area" in section 1404 of the Food and Agriculture Act of 1977 (7 U.S.C. 3103).

(12) TRIBAL ENERGY DEVELOPMENT ORGANIZATION.—The term "tribal energy development organization" has the meaning given the term in section 2601 of the Energy Policy Act of 1992 (25 U.S.C. 3501).

(13) TRIBAL ORGANIZATION.—The term "tribal organization" has the meaning given the term in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5304).

SEC. 3. SOLAR ENERGY TECHNOLOGY PROGRAM.

(a) ESTABLISHMENT.—

(1) IN GENERAL.—The Secretary shall establish a program to conduct research, development, testing, evaluation, demonstration, and commercialization of solar energy technologies in accordance with this section.

(2) PURPOSES.—The purposes of the program are the following:

(A) To improve the energy efficiency, cost effectiveness, reliability, resilience, security, integration, manufacturability, and recyclability of solar energy technologies.

(B) To optimize the performance and operation of solar energy components, cells, and systems, and enabling technologies, including through the development of new materials, hardware, and software.

(C) To optimize the design and adaptability of solar energy systems to the broadest practical range of geographic and atmospheric conditions.

(D) To support the integration of solar energy technologies with the electric grid and complementary energy technologies.

(E) To create and improve the conversion of solar energy to other useful forms of energy or other products.

(F) To reduce and mitigate any potential negative impacts of solar energy technologies on humans, wildlife, and wildlife habitats.

(G) To address barriers to the commercialization and export of solar energy technologies.

(H) To support the domestic solar industry, workforce, and supply chain.

(3) TARGETS.—Not later than 180 days after the date of enactment of this Act, the Secretary shall establish targets for the program to address near-term (up to 2 years), mid-term (up to 7 years), and long-term (up to 15 years) challenges to the advancement of solar energy systems.

(b) ACTIVITIES.—

(1) TYPES OF ACTIVITIES.—In carrying out the program, the Secretary shall carry out research, development, demonstration, and commercialization activities, including—

(A) awarding grants and awards, on a competitive, merit-reviewed basis;

(B) performing precompetitive research and development;

(C) establishing or maintaining demonstration facilities and projects, including through stewardship of existing facilities;

(D) providing technical assistance;

(E) entering into contracts and cooperative agreements;

(F) providing small business vouchers;

(G) establishing prize competitions;

(H) conducting education and outreach activities; and

(I) conducting analyses, studies, and reports.

(2) SUBJECT AREAS.—The Secretary shall carry out research, development, testing, evaluation, demonstration, and commercialization activities in the following subject areas:

(A) Advanced solar energy technologies, including—

(i) new materials, components, designs, and systems, including perovskites;

(ii) advanced photovoltaic and thin-film devices;

(iii) concentrated solar power;

(iv) solar heating and cooling; and

(v) enabling technologies for solar energy systems, including hardware and software.

(B) Solar energy technology performance, operations, and security.

(C) Integration of solar energy technologies with—

(i) the electric grid, including transmission, distribution, microgrids, and distributed energy systems;

(ii) other energy technologies, including—

(I) other generation sources;

(II) demand response technologies; and

(III) energy storage technologies; and

(iii) other nonelectric applications, such as in the agriculture, transportation, industrial, and fuels sectors.

(D) Advanced solar energy manufacturing technologies and practices, including materials, processes, and design.

(E) Methods to improve the lifetime, maintenance, recycling, and reuse of solar energy components and systems.

(F) Solar energy forecasting, modeling, and atmospheric measurement systems, including for small-scale, large-scale, and aggregated systems.

(G) Hybrid solar energy systems that incorporate diverse—

(i) generation sources;

(ii) loads; and

(iii) storage technologies.

(H) Reducing market barriers to the adoption of solar energy technologies, including impacts on, or challenges relating to—

(i) distributed solar technologies, including the development of best practices, models, and voluntary streamlined processes for local permitting of distributed solar energy systems to reduce costs;

(ii) local communities;

(iii) wildlife and wildlife habitats; and

(iv) any other appropriate matter, as determined by the Secretary.

(I) Transformational technologies for harnessing solar energy.

(J) Other research areas that advance the purposes of the program, as determined by the Secretary.

(3) PRIORITIZATION.—In carrying out activities under the program, the Secretary shall give priority to projects that—

(A) are located in a geographically diverse range of eligible entities;

(B) support the development or demonstration of projects—

(i) in collaboration with tribal energy development organizations, Indian tribes, tribal organizations, Native Hawaiian community-based organizations, or territories or freely associated states; or

(ii) in economically distressed areas;

(C) can be replicated in a variety of regions and climates;

(D) include business commercialization plans that have the potential for—

(i) domestic manufacturing and production of solar energy technologies; or

(ii) exports of solar energy technologies; and

(E) satisfy any other priority that the Secretary determines to be appropriate.

(4) COORDINATION.—To the maximum extent practicable, the Secretary shall coordinate activities under the program with other relevant programs and capabilities of the Department of Energy and other Federal research programs.

(5) USE OF FUNDS.—To the extent that funding is not otherwise available through other Federal programs or power purchase agreements, funding awarded under this subsection may be used for additional nontechnology costs, as determined to be appropriate by the Secretary, such as engineering or feasibility studies.

(c) ADVANCED SOLAR ENERGY MANUFACTURING INITIATIVE.—

(1) GRANTS.—In addition to the program activities described in subsection (b), in carrying out the program, the Secretary shall award multiyear grants to eligible entities for research, development, and demonstration projects to advance new solar energy manufacturing technologies and techniques.

(2) PRIORITY.—In awarding grants under paragraph (1), to the extent practicable, the Secretary

shall give priority to solar energy manufacturing projects that—

(A) increase efficiency and cost effectiveness in—

(i) the manufacturing process; and

(ii) the use of resources.

(B) support domestic supply chains for materials and components;

(C) identify and incorporate nonhazardous alternative materials for components and devices;

(D) operate in partnership with tribal energy development organizations, Indian tribes, tribal organizations, Native Hawaiian community-based organizations, or territories or freely associated states; or

(E) are located in economically distressed areas.

(3) EVALUATION.—Not later than 3 years after the date of enactment of this Act, and every 4 years thereafter, the Secretary shall conduct, and make available to the public and the relevant committees of Congress, an independent review of the progress of the grants awarded under paragraph (1).

(d) SOLAR ENERGY TECHNOLOGY RECYCLING RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.—

(1) IN GENERAL.—In addition to the program activities described in subsection (b), in carrying out the program, the Secretary shall award multiyear grants to eligible entities for research, development, and demonstration projects to create innovative and practical approaches to increase the reuse and recycling of solar energy technologies, including—

(A) by increasing the efficiency and cost effectiveness of the recovery of raw materials from solar energy technology components and systems, including enabling technologies such as inverters;

(B) by minimizing environmental impacts from the recovery and disposal processes;

(C) by addressing any barriers to the research, development, demonstration, and commercialization of technologies and processes for the disassembly and recycling of solar energy devices;

(D) by developing alternative materials, designs, manufacturing processes, and other aspects of solar energy technologies and the disassembly and resource recovery process that enable effi-

cient, cost effective, and environmentally responsible disassembly of, and resource recovery from, solar energy technologies; and

(E) strategies to increase consumer acceptance of, and participation in, the recycling of photovoltaic devices.

(2) DISSEMINATION OF RESULTS.—The Secretary shall make available to the public and the relevant committees of Congress the results of the projects carried out through grants awarded under paragraph (1), including any educational and outreach materials.

(e) SOLAR ENERGY TECHNOLOGY MATERIALS PHYSICAL PROPERTY DATABASE.—

(1) IN GENERAL.—Not later than September 1, 2021, the Secretary shall establish a comprehensive physical property database of materials for use in solar energy technologies, which shall identify the type, quantity, country of origin, source, significant uses, and physical properties of materials used in solar energy technologies.

(2) COORDINATION.—In establishing the database described in paragraph (1), the Secretary shall coordinate with—

(A) the Director of the National Institute of Standards and Technology;

(B) the Administrator of the Environmental Protection Agency;

(C) the Secretary of the Interior; and

(D) relevant industry stakeholders, as determined by the Secretary.

(f) SOLAR ENERGY TECHNOLOGY PROGRAM STRATEGIC VISION.—

(1) IN GENERAL.—Not later than September 1, 2021, and every 6 years thereafter, the Secretary shall submit to Congress a report on the strategic vision, progress, goals, and targets of the program, including assessments of solar energy markets and manufacturing.

(2) PREPARATION.—The Secretary shall coordinate the preparation of the report under paragraph (1) with—

(A) existing peer review processes;

(B) studies conducted by the National Laboratories; and

(C) the multiyear program planning required under section 994 of the Energy Policy Act of 2005 (42 U.S.C. 16358).

(g) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out the program $270,000,000 for each of fiscal years 2020 through 2024.

SEC. 4. CONFORMING AMENDMENTS.

(a) The Solar Energy Research, Development, and Demonstration Act of 1974 (42 U.S.C. 5551 et seq.) is repealed.

(b) Section 6(b)(3) of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5905(b)(3)) is amended—

(1) by striking subparagraph (L); and

(2) by redesignating subparagraphs (M) through (S) as subparagraphs (L) through (R), respectively.

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

(d) Section 4 of the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989 (42 U.S.C. 12003) is amended—

*(1) in the section heading, by striking "**PHOTOVOLTAICS, AND SOLAR THERMAL**" and inserting "**ALCOHOL FROM BIOMASS, AND OTHER TECHNOLOGY**";*

(2) in subsection (a)—

(A) in the matter preceding paragraph (1), by striking "photovoltaics, and solar thermal energy" and inserting "alcohol from biomass, and other energy technology";

(B) by striking paragraphs (2) and (3); and

(C) by redesignating paragraphs (4) and (5) as paragraphs (2) and (3), respectively; and

(3) in subsection (c)—

(A) in the matter preceding paragraph (1), by striking "the Photovoltaic Energy Systems Program, the Solar Thermal Energy Systems Program,";

(B) in paragraph (1)—

(i) by striking subparagraph (A); and

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

(C) in paragraph (2)—

(i) by striking subparagraph (A); and

(ii) by redesignating subparagraphs (B) and (C) as subparagraphs (A) and (B), respectively.

(e) Section 931 of the Energy Policy Act of 2005 (42 U.S.C. 16231) is amended—

(1) in subsection (a)(2)—

(A) by striking subparagraph (A); and

(B) by redesignating subparagraphs (B) through (E) as subparagraphs (A) through (D), respectively;

(2) by striking subsection (d); and

(3) by redesignating subsections (e) through (g) as subsections (d) through (f), respectively.

(f) Sections 606 and 607 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17174, 17175) are repealed.

SEC. 5. SAVINGS PROVISION.

The repeal of the Solar Energy Research, Development, and Demonstration Act of 1974 (42 U.S.C. 5551 et seq.) under section 4(a) shall not affect the authority of the Secretary to conduct research and development on solar energy.

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116TH CONGRESS
1ST SESSION

S. 2668

A BILL

To establish a program for research, development, and demonstration of solar energy technologies, and for other purposes.

DECEMBER 17, 2019

Reported with an amendment