Calendar No. 387

116TH CONGRESS
1ST SESSION

S. 2660

To establish a grant program for wind energy research, development, and demonstration, and for other purposes.

IN THE SENATE OF THE UNITED STATES

OCTOBER 22, 2019

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

DECEMBER 18, 2019

Reported by Ms. MURKOWSKI, with amendments and an amendment to the title

[Omit the part struck through and insert the part printed in italic]

A BILL

To establish a grant program for wind energy research, development, and demonstration, 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 ''Wind Energy Research and Development Act of 2019''.

SEC. 2. DEFINITIONS.

In this Act:

(1) 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 two or more entities described in subparagraphs (A) through (F).

(2) 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).

(3) 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).

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

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

(6) SUPERSIZED TURBINE.—The term ''supersized turbine'' means a 12-megawatt or greater wind

turbine that typically has a tower height greater than 140 meters and blades greater than 75 meters.

SEC. 3. WIND ENERGY TECHNOLOGY, RESEARCH, DEVELOPMENT, AND TESTING GRANT PROGRAM.

(a) ESTABLISHMENT.—

(1) IN GENERAL.—The Secretary shall establish a program under which the Secretary shall award grants on a competitive, merit-reviewed basis to eligible entities to conduct research, development, testing, and evaluation of wind energy technologies 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 wind energy generation.

(B) To optimize the design and control of wind energy systems for the broadest practical range of atmospheric conditions.

(C) To reduce the cost and risk of permitting, construction, operation, and maintenance of wind energy systems, including using technologies to reduce environmental and community impacts, improve grid integration, and reduce regulatory barriers.

(D) To improve materials, engineering, and manufacturing processes for turbines, including supersized turbines.

(E) To optimize wind plant performance and integration within hybrid energy systems to enhance cost efficiency and electric grid stability and resilience.

(3) 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.

(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) Wind power plant performance and operations, including—

(A) wind flows and turbine-to-turbine interactions;

(B) energy conversion potential;

(C) turbine and wind plant control paradigms;

(D) turbine and wind plant security;

(E) turbine components; and

(F) integrated hybrid plant systems.

(2) New materials and designs relating to blades, rotors, towers, and drivetrains, including—

(A) higher tip speed rotor designs;

(B) low-noise rotor designs;

(C) advanced drivetrain and generator concepts;

(D) modular construction and onsite or near-site manufacturing and assembly techniques, including the use of additive manufacturing;

(E) sustainable and recyclable materials, including thermoplastics, and manufacturing systems;

(F) supersized turbine design and installation approaches; and

(G) lightweight materials.

(3) Offshore wind-specific projects, including—

(A) fixed and floating substructure concepts;

(B) projects to assess and mitigate the impacts of hurricane wind flow, freshwater ice, and other conditions specific to the United States;

(C) innovative operations and maintenance strategies;

(D) analysis of offshore meteorological, geological, and oceanographic data collection;

(E) offshore infrastructure monitoring; and

(F) analysis of corrosion and fatigue for the purpose of extending the design life of offshore wind turbine substructures.

(4) Recycling and reuse of wind energy components.

(5) Wind power forecasting and atmospheric measurement systems, including for turbines and plant systems of varying height.

(6) Distributed wind-specific projects, including—

(A) cost-effective turbine designs, components, and manufacturing; and

(B) microgrid applications.

(7) Advanced transportation mechanisms for wind turbine components.

(8) Transformational technologies for harnessing wind energy, including airborne wind energy concepts.

(9) Methods to extend the operational lifetime of onshore and offshore wind turbines and systems.

(10) Other research areas, as determined by the Secretary.

(c) WIND ENERGY TECHNOLOGY VALIDATION AND MARKET TRANSFORMATION GRANTS.—

(1) DEMONSTRATION PROJECTS.—In carrying out the program, the Secretary shall award grants to eligible entities to carry out demonstration projects that demonstrate and validate new wind energy technologies that have the potential to be cost-competitive for land-based, offshore, and distributed applications.

(2) FACILITY FOR HYBRID ENERGY SYSTEM RESEARCH GRANTS.—In carrying out the program, the Secretary shall award grants to eligible entities to establish a facility or support an existing facility in conducting research and demonstration projects for wind turbines and plants in hybrid energy systems that incorporate diverse generation sources, loads, and storage technologies.

(3) OFFSHORE RESEARCH FACILITY GRANTS.—

(A) IN GENERAL.—In carrying out the program, the Secretary shall award grants to eligible entities to establish a facility to conduct

~~research, development, and demonstration projects, in coordination with the oceanic and atmospheric science communities, for ocean and atmospheric resource characterization relevant to offshore wind energy development.~~

~~(B) FACILITY REQUIREMENTS.—A facility established using a grant under subparagraph (A) shall be an offshore facility used to evaluate, test, and advance atmospheric, oceanic, biologic, and geologic monitoring technologies that improve offshore wind energy development, including the generation of benchmark data sets for testing offshore wind energy technologies and informing how those technologies may be financed, insured, and regulated.~~

~~(4) OFFSHORE SUPPORT STRUCTURE TESTING FACILITY GRANTS.—In carrying out the program, the Secretary shall award grants to eligible entities to establish a facility to conduct research, development, and demonstration projects for large-scale and full-scale offshore wind energy support structure components and systems, with an emphasis on innovative structures, including floating substructures.~~

~~(5) APPLICATIONS.—An eligible entity seeking a grant under this subsection shall submit to the~~

Secretary an application at such time, in such manner, and containing such information as the Secretary may require, including, in the case of an application for a grant under paragraph (1), a certification that the proposed demonstration project shall be—

(A) conducted in collaboration with industry and, as appropriate, with institutions of higher education and other Federal research programs; and

(B) of sufficient size and geographic diversity to measure wind energy system performance under the full productive range of wind conditions in the United States.

(d) WIND ENERGY INCUBATOR GRANTS.—In carrying out the program, the Secretary shall award grants to eligible entities to support innovative technologies that are not significantly represented in—

(1) the portfolio of wind energy research activities carried out by the Secretary as of the date of enactment of this Act; or

(2) technology roadmaps used by the Department of Energy as of that date.

(e) MITIGATING REGULATORY AND MARKET BARRIER GRANTS.—

(1) IN GENERAL.—In carrying out the program, the Secretary shall award grants to eligible entities to research, develop, test, and evaluate ways to reduce regulatory and market barriers to the widespread adoption of wind power, including—

(A) grid transmission and integration challenges; and

(B) permitting issues associated with the potential impacts of wind power systems on wildlife, radar systems, local communities, military operations, and airspace.

(2) WILDLIFE IMPACT MITIGATION.—Of the grants awarded under paragraph (1), the Secretary shall ensure that a substantial portion include the development, testing, and evaluation of wildlife impact mitigation technologies or strategies to reduce the potential impacts of wind energy facilities on—

(A) bald and golden eagles;

(B) bat species;

(C) marine wildlife; and

(D) other impacted species.

(f) EDUCATION AND OUTREACH.—In carrying out the program, the Secretary shall support education and outreach activities to disseminate information and promote public understanding of wind technologies and the

~~wind energy workforce, including the Collegiate Wind Competition.~~

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

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

(9) 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).

(10) 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).

(11) 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. WIND ENERGY TECHNOLOGY PROGRAM.

(a) ESTABLISHMENT.—

(1) IN GENERAL.—The Secretary shall establish a program to conduct research, development, testing, evaluation, demonstration, and commercialization of wind 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 wind energy technologies.

(B) To optimize the performance and operation of wind energy components, turbines, and systems, including through the development of new materials, hardware, and software.

(C) To optimize the design and adaptability of wind energy technologies to the broadest practical range of geographic, atmospheric, offshore, and other site conditions, including—

(i) at varying hub heights; and

(ii) through the use of computer modeling.

(D) To support the integration of wind energy technologies with—

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

(ii) other energy technologies and systems, such as—

(I) other generation sources;

(II) demand response technologies;

(III) energy storage technologies; and

(IV) hybrid systems.

(E) To reduce the cost and risk across the lifespan of wind energy technologies, including—

(i) manufacturing, permitting, construction, operations, maintenance, and recycling; and

(ii) through the development of solutions to transportation barriers to wind components.

(F) To reduce and mitigate any potential negative impacts of wind energy technologies on—

(i) human communities;

(ii) military operations;

(iii) aviation;

(iv) radar; and

(v) wildlife and wildlife habitats.

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

(H) To support the domestic wind 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 relating to near-term (up to 2 years), mid-term (up to 7 years), and long-term (up to 15 years) challenges to the advancement

of wind energy technologies, including onshore and offshore technologies.

(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 such as the National Wind Test Center;

(D) providing technical assistance;

(E) entering into contracts and cooperative agreements;

(F) providing small business vouchers;

(G) conducting education and outreach activities;

(H) conducting workforce training 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) Wind power plant performance, operations, and security.

(B) New materials and designs relating to all hardware, software, and components of wind energy technologies, including alternatives to minerals and other commodities from foreign sources that are determined to be vulnerable to disruption.

(C) Advanced wind energy manufacturing technologies and practices, including materials, processes, and design.

(D) Offshore wind-specific projects and plants, including—

(i) the deep water floating systems, materials, components, and operation of offshore facilities; and

(ii) the monitoring and analysis of site and environmental considerations unique to offshore sites.

(E) Integration of wind energy technologies with—

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

(ii) other energy technologies, including—

(I) other generation sources;

(II) demand response technologies; and

(III) energy storage technologies.

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

(G) Wind power forecasting and atmospheric measurement systems, including for turbines and plant systems of varying height.

(H) Hybrid wind energy systems that incorporate diverse—

(i) generation sources;

(ii) loads; and

(iii) storage technologies.

(I) Reducing, including through education and outreach activities, market barriers to the adoption of wind energy technologies, such as impacts on, or challenges relating to—

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

(ii) airspace;

(iii) military uses;

(iv) radar;

(v) local communities;

(vi) wildlife and wildlife habitats; and

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

(J) Advanced physics-based and data analysis computational tools, in coordination with the high-performance computing programs of the Department of Energy.

(K) Transformational technologies for harnessing wind energy.

(L) 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 geographically diverse regions of the United States;

(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 wind energy technologies; or

(ii) exports of wind 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.

(c) WIND TECHNICIAN TRAINING GRANT PROGRAM.—The Secretary may award grants, on a competitive basis, to eligible entities to purchase large pieces of wind component equipment, such as nacelles, towers, and blades, for use in training wind technician students in onshore or offshore wind applications.

~~(g)~~*(d)* WAGES.—Notwithstanding any other provision of law, all laborers and mechanics employed by contractors or subcontractors on projects funded by grants under this section shall be paid wages at rates not less than those prevailing on projects of a similar character in the locality, as determined by the Secretary of Labor, in accordance with subchapter IV of chapter 31 of title 40, United States Code.

~~(h) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the program—~~

~~(1) $103,692,000 for fiscal year 2020;~~

~~(2) $108,876,600 for fiscal year 2021;~~

~~(3) $114,320,430 for fiscal year 2022;~~

~~(4) $120,036,452 for fiscal year 2023; and~~

~~(5) $126,038,274 for fiscal year 2024.~~

~~SEC. 4. CONFORMING AMENDMENTS.~~

~~(1) Section 4 of the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989 (42 U.S.C. 12003) is amended—~~

~~(A) in subsection (a)—~~

~~(i) by striking paragraph (1); and~~

~~(ii) by redesignating paragraphs (2) through (5) as paragraphs (1) through (4), respectively; and~~

~~(B) in subsection (c), in the matter preceding paragraph (1), by striking "the Wind Energy Research Program,".~~

~~(2) Section 931(a)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16231(a)(2)) is amended—~~

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

~~(B) by redesignating subparagraphs (C) through (E) as subparagraphs (B) through (D), respectively.~~

~~(3) Section 636 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17215) is amended by striking "section 931(a)(2)(E)(i)" and all that follows through the period at the end and inserting "subparagraph (D)(i) of section 931(a)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16231(a)(2)).".~~

(e) WIND ENERGY 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 wind 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).

(f) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out the program $120,000,000 for each of fiscal years 2020 through 2024.

SEC. 4. CONFORMING AMENDMENTS.

(a) 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 "**WIND, PHOTOVOLTAICS, AND SOLAR THERMAL**" and*

*inserting "**PHOTOVOLTAICS, SOLAR THERMAL, AND OTHER TECHNOLOGY**";*

(2) in subsection (a)—

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

(B) by striking paragraph (1); and

(C) by redesignating paragraphs (2) through (5) as paragraphs (1) through (4), respectively; and

(3) in subsection (c), in the matter preceding paragraph (1), by striking "the Wind Energy Research Program,".

(b) Section 931(a)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16231(a)(2)) is amended—

(1) by striking subparagraph (B); and

(2) by redesignating subparagraphs (C) through (E) as subparagraphs (B) through (D), respectively.

(c) Section 636 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17215) is amended by striking "section 931(a)(2)(E)(i)" and all that follows through the period at the end and inserting "subparagraph (D)(i) of section 931(a)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16231(a)(2)).".

Amend the title so as to read: ''A bill to establish a program for wind energy research, development, and demonstration, and for other purposes.''.

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116TH CONGRESS
1ST SESSION

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A BILL

To establish a grant program for wind energy research, development, and demonstration, and for other purposes.

DECEMBER 18, 2019

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