§ 17385. Smart grid interoperability framework

(a) Interoperability framework

The Director of the National Institute of Standards and Technology shall have primary responsibility to coordinate the development of a framework that includes protocols and model standards for information management to achieve interoperability of smart grid devices and systems. Such protocols and standards shall further align policy, business, and technology approaches in a manner that would enable all electric resources, including demand-side resources, to contribute to an efficient, reliable electricity network. In developing such protocols and standards—

(1) the Director shall seek input and cooperation from the Commission, OEDER and its Smart Grid Task Force, the Smart Grid Advisory Committee, other relevant Federal and State agencies; and

(2) the Director shall also solicit input and cooperation from private entities interested in such protocols and standards, including but not limited to the Gridwise Architecture Council, the International Electrical and Electronics Engineers, the National Electric Reliability Organization recognized by the Federal Energy Regulatory Commission, and National Electrical Manufacturer's Association.

(b) Scope of framework

The framework developed under subsection (a) shall be flexible, uniform and technology neutral, including but not limited to technologies for managing smart grid information, and designed—

(1) to accommodate traditional, centralized generation and transmission resources and consumer distributed resources, including distributed generation, renewable generation, energy storage, energy efficiency, and demand response and enabling devices and systems;

(2) to be flexible to incorporate—

(A) regional and organizational differences; and

(B) technological innovations;

(3) to consider the use of voluntary uniform standards for certain classes of mass-produced electric appliances and equipment for homes and businesses that enable customers, at their election and consistent with applicable State and Federal laws, and are manufactured with the ability to respond to electric grid emergencies and demand response signals by curtailing all, or a portion of, the electrical power consumed by the appliances or equipment in response to an emergency or demand response signal, including through—

(A) load reduction to reduce total electrical demand;

(B) adjustment of load to provide grid ancillary services; and

(C) in the event of a reliability crisis that threatens an outage, short-term load shedding to help preserve the stability of the grid; and

(4) such voluntary standards should incorporate appropriate manufacturer lead time.[1]

(c) Timing of framework development

The Institute shall begin work pursuant to this section within 60 days of December 19, 2007. The Institute shall provide and publish an initial report on progress toward recommended or consensus standards and protocols within 1 year after December 19, 2007, further reports at such times as developments warrant in the judgment of the Institute, and a final report when the Institute determines that the work is completed or that a Federal role is no longer necessary.

(d) Standards for interoperability in Federal jurisdiction

At any time after the Institute's work has led to sufficient consensus in the Commission's judgment, the Commission shall institute a rulemaking proceeding to adopt such standards and protocols as may be necessary to insure smart-grid functionality and interoperability in interstate transmission of electric power, and regional and wholesale electricity markets.

(e) Authorization

There are authorized to be appropriated for the purposes of this section $5,000,000 to the Institute to support the activities required by this subsection[2] for each of fiscal years 2008 through 2012.

(Pub. L. 110–140, title XIII, § 1305, Dec. 19, 2007, 121 Stat. 1787.)

Editorial Notes

CODIFICATION

December 19, 2007, referred to in subsec. (c), was in the original ''enactment'' and was translated as meaning the date of enactment of Pub. L. 110–140, to reflect the probable intent of Congress.

Statutory Notes and Related Subsidiaries

EFFECTIVE DATE

Section effective on the date that is 1 day after Dec. 19, 2007, see section 1601 of Pub. L. 110–140, set out as a note under section 1824 of Title 2, The Congress.

§ 17386. Federal matching fund for smart grid investment costs

(a) Matching fund

The Secretary shall establish a Smart Grid Investment Matching Grant Program to provide grants of up to one-half (50 percent) of qualifying Smart Grid investments.

(b) Qualifying investments

Qualifying Smart Grid investments may include any of the following made on or after November 15, 2021:

(1) In the case of appliances covered for purposes of establishing energy conservation standards under part B of title III of the Energy Policy and Conservation Act of 1975 (42 U.S.C. 6291 et seq.), the documented expenditures incurred by a manufacturer of such appliances associated with purchasing or designing, creating the ability to manufacture, and manufacturing and installing for one calendar year, internal devices that allow the appliance to engage in Smart Grid functions.

[1] So in original. Does not fit with subsec. (b) introductory provisions.

[2] So in original. Probably should be ''section''.

(2) In the case of specialized electricity-using equipment, including motors and drivers, installed in industrial or commercial applications, the documented expenditures incurred by its owner or its manufacturer of installing devices or modifying that equipment to engage in Smart Grid functions.

(3) In the case of transmission and distribution equipment fitted with monitoring and communications devices to enable smart grid functions, the documented expenditures incurred by the electric utility to purchase and install such monitoring and communications devices.

(4) In the case of metering devices, sensors, control devices, and other devices integrated with and attached to an electric utility system or retail distributor or marketer of electricity that are capable of engaging in Smart Grid functions, the documented expenditures incurred by the electric utility, distributor, or marketer and its customers to purchase and install such devices.

(5) In the case of software that enables devices or computers to engage in Smart Grid functions, the documented purchase costs of the software.

(6) In the case of entities that operate or coordinate operations of regional electric grids, the documented expenditures for purchasing and installing such equipment that allows Smart Grid functions to operate and be combined or coordinated among multiple electric utilities and between that region and other regions.

(7) In the case of persons or entities other than electric utilities owning and operating a distributed electricity generator, the documented expenditures of enabling that generator to be monitored, controlled, or otherwise integrated into grid operations and electricity flows on the grid utilizing Smart Grid functions.

(8) In the case of electric or hybrid-electric vehicles, the documented expenses for devices that allow the vehicle to engage in Smart Grid functions (but not the costs of electricity storage for the vehicle).

(9) In the case of data analytics that enable software to engage in Smart Grid functions, the documented purchase costs of the data analytics.

(10) In the case of buildings, the documented expenses for devices and software, including for installation, that allow buildings to engage in demand flexibility or Smart Grid functions.

(11) In the case of utility communications, operational fiber and wireless broadband communications networks to enable data flow between distribution system components.

(12) In the case of advanced transmission technologies such as dynamic line rating, flow control devices, advanced conductors, network topology optimization, or other hardware, software, and associated protocols applied to existing transmission facilities that increase the operational transfer capacity of a transmission network, the documented expenditures to purchase and install those advanced transmission technologies.

(13) In the case of extreme weather or natural disasters, the ability to redirect or shut off power to minimize blackouts and avoid further damage.

(14) The documented expenditures related to purchasing and implementing Smart Grid functions in such other cases as the Secretary shall identify.

(c) Investments not included

Qualifying Smart Grid investments do not include any of the following:

(1) Investments or expenditures for Smart Grid technologies, devices, or equipment that utilize specific tax credits or deductions under the Internal Revenue Code, as amended.

(2) Expenditures for electricity generation, transmission, or distribution infrastructure or equipment not directly related to enabling Smart Grid functions.

(3) After the final date for State consideration of the Smart Grid Information Standard under section 2621(d)(17)[1] of title 16, an investment that is not in compliance with such standard.

(4) After the development and publication by the Institute of protocols and model standards for interoperability of smart grid devices and technologies, an investment that fails to incorporate any of such protocols or model standards.

(5) Expenditures for physical interconnection of generators or other devices to the grid except those that are directly related to enabling Smart Grid functions.

(6) Expenditures for ongoing salaries, benefits, or personnel costs not incurred in the initial installation, training, or start up of smart grid functions.

(7) Expenditures for travel, lodging, meals or other personal costs.

(8) Ongoing or routine operation, billing, customer relations, security, and maintenance expenditures.

(9) Such other expenditures that the Secretary determines not to be Qualifying Smart Grid Investments by reason of the lack of the ability to perform Smart Grid functions or lack of direct relationship to Smart Grid functions.

(d) Smart grid functions

The term ''smart grid functions'' means any of the following:

(1) The ability to develop, store, send and receive digital information concerning electricity use, costs, prices, time of use, nature of use, storage, or other information relevant to device, grid, or utility operations, to or from or by means of the electric utility system, through one or a combination of devices and technologies.

(2) The ability to develop, store, send and receive digital information concerning electricity use, costs, prices, time of use, nature of use, storage, or other information relevant to device, grid, or utility operations to or from a computer or other control device.

(3) The ability to measure or monitor electricity use as a function of time of day, power quality characteristics such as voltage level, current, cycles per second, or source or type of

[1] See References in Text note below.

generation and to store, synthesize or report that information by digital means.

(4) The ability to sense and localize disruptions or changes in power flows on the grid and communicate such information instantaneously and automatically for purposes of enabling automatic protective responses to sustain reliability and security of grid operations.

(5) The ability to detect, prevent, communicate with regard to, respond to, or recover from system security threats, including cybersecurity threats and terrorism, using digital information, media, and devices.

(6) The ability of any appliance or machine to respond to such signals, measurements, or communications automatically or in a manner programmed by its owner or operator without independent human intervention.

(7) The ability to use digital information to operate functionalities on the electric utility grid that were previously electro-mechanical or manual.

(8) The ability to use digital controls to manage and modify electricity demand, enable congestion management, assist in voltage control, provide operating reserves, and provide frequency regulation.

(9) The ability to use data analytics and software-as-service to provide flexibility by improving the visibility of the electrical system to grid operators that can help quickly rebalance the electrical system with autonomous controls.

(10) The ability to facilitate the aggregation or integration of distributed energy resources to serve as assets for the grid.

(11) The ability to provide energy storage to meet fluctuating electricity demand, provide voltage support, and integrate intermittent generation sources, including vehicle-to-grid technologies.

(12) The ability of hardware, software, and associated protocols applied to existing transmission facilities to increase the operational transfer capacity of a transmission network.

(13) The ability to anticipate and mitigate impacts of extreme weather or natural disasters on grid resiliency.

(14) The ability to facilitate the integration of renewable energy resources, electric vehicle charging infrastructure, and vehicle-to-grid technologies.

(15) The ability to reliably meet increased demand from electric vehicles and the electrification of appliances and other sectors.

(16) Such other functions as the Secretary may identify as being necessary or useful to the operation of a Smart Grid.

(e) Procedures and rules

(1) The Secretary shall, within 60 days after February 17, 2009, by means of a notice of intent and subsequent solicitation of grant proposals—

(A) establish procedures by which applicants can obtain grants of not more than one-half of their documented costs;

(B) require as a condition of receiving funding under this subsection that demonstration projects utilize open protocols and standards (including Internet-based protocols and standards) if available and appropriate;

(C) establish procedures to ensure that there is no duplication or multiple payment for the same investment or costs, that the grant goes to the party making the actual expenditures for the qualifying Smart Grid investments, and that the grants made have a significant effect in encouraging and facilitating the development of a smart grid;

(D) establish procedures to ensure there will be public records of grants made, recipients, and qualifying Smart Grid investments which have received grants; and

(E) establish procedures to provide advance payment of moneys up to the full amount of the grant award.

(2) The Secretary shall have discretion and exercise reasonable judgment to deny grants for investments that do not qualify.

(f) Authorization of appropriations

There are authorized to be appropriated to the Secretary such sums as are necessary for the administration of this section and the grants to be made pursuant to this section for fiscal years 2008 through 2012.

(Pub. L. 110–140, title XIII, § 1306, Dec. 19, 2007, 121 Stat. 1789; Pub. L. 111–5, div. A, title IV, § 405(5)–(8), Feb. 17, 2009, 123 Stat. 144; Pub. L. 117–58, div. D, title I, § 40107(a), Nov. 15, 2021, 135 Stat. 940.)

Editorial Notes

REFERENCES IN TEXT

The Energy Policy and Conservation Act, referred to in subsec. (b)(1), is Pub. L. 94–163, Dec. 22, 1975, 89 Stat. 871. Part B of title III of the Act is classified generally to part A (§ 6291 et seq.) of subchapter III of chapter 77 of this title. For complete classification of this Act to the Code, see Short Title note set out under section 6201 of this title and Tables.

Section 2621(d)(17) of title 16, referred to in subsec. (c)(3), was redesignated section 2621(d)(19) by Pub. L. 111–5, div. A, title IV, § 408(a), Feb. 17, 2009, 123 Stat. 146.

AMENDMENTS

2021—Subsec. (b). Pub. L. 117–58, § 40107(a)(1)(A), substituted ''November 15, 2021'' for ''December 19, 2007'' in introductory provisions.

Subsec. (b)(9) to (14). Pub. L. 117–58, § 40107(a)(1)(B), (C), added pars. (9) to (13) and redesignated former par. (9) as (14).

Subsec. (d)(9) to (16). Pub. L. 117–58, § 40107(a)(2), added pars. (9) to (15) and redesignated former par. (9) as (16).

2009—Subsec. (a). Pub. L. 111–5, § 405(5), substituted ''grants of up to one-half (50 percent)'' for ''reimbursement of one-fifth (20 percent)''.

Subsec. (b)(9). Pub. L. 111–5, § 405(6), struck out last sentence which read as follows: ''In making such grants, the Secretary shall seek to reward innovation and early adaptation, even if success is not complete, rather than deployment of proven and commercially viable technologies.''

Subsec. (c)(1). Pub. L. 111–5, § 405(7), substituted ''utilize'' for ''are eligible for''.

Subsec. (e). Pub. L. 111–5, § 405(8), amended subsec. (e) generally. Prior to amendment, text related to establishment of procedures by which applicants who have made qualifying Smart Grid investments can seek and obtain reimbursement of one-fifth of documented expenditures.

Statutory Notes and Related Subsidiaries

EFFECTIVE DATE

Section effective on the date that is 1 day after Dec. 19, 2007, see section 1601 of Pub. L. 110–140, set out as a note under section 1824 of Title 2, The Congress.

WAGE RATE REQUIREMENTS

For provisions relating to rates of wages to be paid to laborers and mechanics on projects for construction, alteration, or repair work funded under div. D or an amendment by div. D of Pub. L. 117–58, including authority of Secretary of Labor, see section 18851 of this title.

§ 17387. Integrated energy systems

(a) In general

Not later than 180 days after December 27, 2020, the Secretary shall establish a research, development, and demonstration program to develop cost-effective integrated energy systems, including—

(1) development of computer modeling to design different configurations of integrated energy systems and to optimize system operation;

(2) research on system integration needed to plan, design, build, and operate integrated energy systems, including interconnection requirements with the electric grid;

(3) development of integrated energy systems for various applications, including—

(A) thermal energy generation and storage for buildings and manufacturing;

(B) electricity storage coupled with energy generation;

(C) desalination;

(D) production of liquid and gaseous fuels; and

(E) production of chemicals such as ammonia and ethylene;

(4) development of testing facilities for integrated energy systems; and

(5) research on incorporation of various technologies for integrated energy systems, including nuclear energy, renewable energy, storage, and carbon capture, utilization, and sequestration technologies.

(b) Strategic plan

(1) In general

Not later than 1 year after December 27, 2020, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a strategic plan that identifies opportunities, challenges, and standards needed for the development and commercial application of integrated energy systems. The strategic plan shall include—

(A) analysis of the potential benefits of development of integrated electric systems on the electric grid;

(B) analysis of the potential contributions of integrated energy systems to different grid architecture scenarios;

(C) research and development goals for various integrated energy systems, including those identified in subsection (a);

(D) assessment of policy and market barriers to the adoption of integrated energy systems;

(E) analysis of the technical and economic feasibility of adoption of different integrated energy systems; and

(F) a 10-year roadmap to guide the program established under subsection (a).

(2) Updates

Not less than once every 3 years for the duration of this research program, the Secretary shall submit an updated version of the strategic plan to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

(c) Program implementation

In carrying out the research, development, demonstration, and commercial application aims of subsection (a), the Secretary shall—

(1) implement the recommendations set forth in the strategic plan in subsection (b);

(2) coordinate across all relevant program offices at the Department, including—

(A) the Office of Energy Efficiency and Renewable Energy;

(B) the Office of Nuclear Energy; and

(C) the Office of Fossil Energy;

(3) leverage existing programs and resources of the Department; and

(4) prioritize activities that accelerate the development of integrated electricity generation, storage, and distribution systems with net zero greenhouse gas emissions.

(d) Integrated energy system defined

The term ''integrated energy system'' means a system composed of 2 or more co-located or jointly operated sub-systems of energy generation, energy storage, or other energy technologies.

(Pub. L. 110–140, title XIII, § 1310, as added Pub. L. 116–260, div. Z, title VIII, § 8003, Dec. 27, 2020, 134 Stat. 2581.)

§ 17388. Advisory committee

(a) In general

Not later than 180 days after December 27, 2020, the Secretary shall designate an existing advisory committee to advise the Secretary on the authorization of research, development, and demonstration projects under sections 17384 and 17384a of this title.

(b) Responsibility

The Secretary shall annually solicit from the advisory committee—

(1) comments to identify grid modernization technology needs;

(2) an assessment of the progress of the research activities on grid modernization; and

(3) assistance in annually updating grid modernization technology roadmaps.

(Pub. L. 110–140, title XIII, § 1311, as added Pub. L. 116–260, div. Z, title VIII, § 8005, Dec. 27, 2020, 134 Stat. 2585.)

§ 17389. Technology demonstration on the distribution grid

(a) In general

The Secretary shall establish a grant program to carry out eligible projects related to the mod-