

(2) techniques to improve the lifespan of underground transmission and distribution lines;

(3) wireless sensors to improve safety of underground transmission and distribution lines and to predict, identify, detect, and transmit information about degradation and faults; and

(4) methods for improving the resilience and reliability of underground transmission and distribution lines, including technologies and techniques that can mitigate the impact of flooding, storm surge, and seasonal climate cycles on degradation of and damage to underground transmission and distribution lines.

**(g) Grid architecture and scenario development**

**(1) In general**

Subject to paragraph (3), the Secretary shall establish and facilitate a collaborative process to develop model grid architecture and a set of future scenarios for the electric grid to examine the impacts of different combinations of resources (including different quantities of distributed energy resources and large-scale, central generation) on the electric grid.

**(2) Architecture**

In supporting the development of model grid architectures, the Secretary shall—

(A) analyze a variety of grid architecture scenarios that range from minor upgrades to existing transmission grid infrastructure to scenarios that involve the replacement of significant portions of existing transmission grid infrastructure;

(B) analyze the effects of the increasing proliferation of renewable and other zero emissions energy generation sources, increasing use of distributed resources owned by non-utility entities, and the use of digital and automated controls not managed by grid operators;

(C) include a variety of new and emerging distribution grid technologies, including distributed energy resources, electric vehicle charging stations, distribution automation technologies, energy storage, and renewable energy sources;

(D) analyze the effects of local load balancing and other forms of decentralized control;

(E) analyze the effects of changes to grid architectures resulting from modernizing electric grid systems, including communications, controls, markets, consumer choice, emergency response, electrification, and cybersecurity concerns; and

(F) develop integrated grid architectures that incorporate system resilience for cyber, physical, and communications systems.

**(3) Market structure**

The grid architecture and scenarios developed under paragraph (1) shall, to the extent practicable, account for differences in market structure, including an examination of the potential for stranded costs in each type of market structure.

**(h) Computing resources and data coordination research and development**

In carrying out this section, the Secretary shall—

(1) leverage existing computing resources at the National Laboratories; and

(2) develop voluntary standards for data taxonomies and communication protocols in coordination with public and private sector stakeholders.

**(i) Information sharing**

None of the activities authorized in this section shall require private entities to share information or data with the Secretary.

**(j) Resilience**

In this section, the term “resilience” means the ability to withstand and reduce the magnitude or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, or rapidly recover from such an event, including from deliberate attacks, accidents, and naturally occurring threats or incidents.

(Pub. L. 110-140, title XIII, §1304A, as added Pub. L. 116-260, div. Z, title VIII, § 8002, Dec. 27, 2020, 134 Stat. 2579.)

**§ 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.<sup>1</sup>

**(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<sup>2</sup> for each of fiscal years 2008 through 2012.

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

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.

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 December 19, 2007:

(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.

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

<sup>1</sup> So in original. Does not fit with subsec. (b) introductory provisions.

<sup>2</sup> So in original. Probably should be "section".