field-deployable portable mechanical or electromechanical device that can be used for applications such as communications, computation, mobility enhancement, weapons systems, optical devices, cooling, sensors, medical devices, and active biological agent detection systems.

(Pub. L. 109–58, title IX, §924, Aug. 8, 2005, 119 Stat. 865.)

§ 16215. Electric transmission and distribution programs

(a) Program

The Secretary shall establish a comprehensive research, development, and demonstration program to ensure the reliability, efficiency, and environmental integrity of electrical transmission and distribution systems, which shall include—

(1) advanced energy delivery technologies, energy storage technologies, materials, and systems, giving priority to new transmission technologies, including composite conductor materials and other technologies that enhance reliability, operational flexibility, or power-carrying capability;

(2) advanced grid reliability and efficiency technology development;

(3) technologies contributing to significant load reductions;

(4) advanced metering, load management, and control technologies;

(5) technologies to enhance existing grid components;

(6) the development and use of high-temperature superconductors to—

(A) enhance the reliability, operational flexibility, or power-carrying capability of electric transmission or distribution systems; or

(B) increase the efficiency of electric energy generation, transmission, distribution, or storage systems;

(7) integration of power systems, including systems to deliver high-quality electric power, electric power reliability, and combined heat and power;

(8) supply of electricity to the power grid by small scale, distributed and residential-based power generators;

(9) the development and use of advanced grid design, operation, and planning tools;

(10) the development of cost-effective technologies that enable two-way information and power flow between distributed energy resources and the electric grid;

(11) the development of technologies and concepts that enable interoperability between distributed energy resources and other behind-the-meter devices and the electric grid;

(12) any other infrastructure technologies, as appropriate; and

(13) technology transfer and education.

(b) Program plan

(1) In general

Not later than 1 year after August 8, 2005, the Secretary, in consultation with other appropriate Federal agencies, shall prepare and submit to Congress a 5-year program plan to guide activities under this section.

(2) Consultation

In preparing the program plan, the Secretary shall consult with—

(A) utilities;

(B) energy service providers;

(C) manufacturers;

(D) institutions of higher education;

(E) other appropriate State and local agencies;

(F) environmental organizations;

(G) professional and technical societies; and

(H) any other persons the Secretary considers appropriate.

(c) Implementation

The Secretary shall consider implementing the program under this section using a consortium of participants from industry, institutions of higher education, and National Laboratories.

(d) Report

Not later than 2 years after the submission of the plan under subsection (b), the Secretary shall submit to Congress a report—

(1) describing the progress made under this section; and

(2) identifying any additional resources needed to continue the development and commercial application of transmission and distribution of infrastructure technologies.

(e) Power delivery research initiative

(1) In general

The Secretary shall establish a research, development, and demonstration initiative specifically focused on power delivery using components incorporating high temperature superconductivity.

(2) Goals

The goals of the Initiative shall be—

(A) to establish world-class facilities to develop high temperature superconductivity power applications in partnership with manufacturers and utilities;

(B) to provide technical leadership for establishing reliability for high temperature superconductivity power applications, including suitable modeling and analysis;

(C) to facilitate the commercial transition toward direct current power transmission, storage, and use for high power systems using high temperature superconductivity; and

(D) to facilitate the integration of very low impedance high temperature superconducting wires and cables in existing electric networks to improve system performance, power flow control, and reliability.

(3) Inclusions

The Initiative shall include—

(A) feasibility analysis, planning, research, and design to construct demonstrations of superconducting links in high power, direct current, and controllable alternating current transmission systems;

(B) public-private partnerships to demonstrate deployment of high temperature

superconducting cable into testbeds simulating a realistic transmission grid and under varying transmission conditions, including actual grid insertions; and

(C) testbeds developed in cooperation with National Laboratories, industries, and institutions of higher education to—

(i) demonstrate those technologies;

(ii) prepare the technologies for commercial introduction; and

(iii) address cost or performance roadblocks to successful commercial use.

(f) Transmission and distribution grid planning and operations initiative

(1) In general

The Secretary shall establish a research, development, and demonstration initiative specifically focused on tools needed to plan, operate, and expand the transmission and distribution grids in the presence of competitive market mechanisms for energy, load demand, customer response, and ancillary services.

(2) Goals

The goals of the Initiative shall be—

(A)(i) to develop and use a geographically distributed center, consisting of institutions of higher education, and National Laboratories, with expertise and facilities to develop the underlying theory and software for power system application; and

(ii) to ensure commercial development in partnership with software vendors and utilities;

(B) to provide technical leadership in engineering and economic analysis for the reliability and efficiency of power systems planning and operations in the presence of competitive markets for electricity;

(C) to model, simulate, and experiment with new market mechanisms and operating practices to understand and optimize those new methods before actual use; and

(D) to provide technical support and technology transfer to electric utilities and other participants in the domestic electric industry and marketplace.

(g) High-voltage transmission lines

As part of the program described in subsection (a), the Secretary shall award a grant to a university research program to design and test, in consultation with the Tennessee Valley Authority, state-of-the-art optimization techniques for power flow through existing high voltage transmission lines.

(Pub. L. 109–58, title IX, § 925, Aug. 8, 2005, 119 Stat. 865; Pub. L. 116–260, div. Z, title VIII, § 8004(a), Dec. 27, 2020, 134 Stat. 2583.)

Editorial Notes

AMENDMENTS

2020—Subsec. (a)(10) to (13). Pub. L. 116–260 added pars. (10) and (11) and redesignated former pars. (10) and (11) as (12) and (13), respectively.

Statutory Notes and Related Subsidiaries

COORDINATION OF EFFORTS

Pub. L. 116–260, div. Z, title VIII, § 8006, Dec. 27, 2020, 134 Stat. 2586, provided that: ''In carrying out the amendments made by this title [enacting sections 16236, 17014, 17384a, 17387, and 17388 of this title and amending this section, section 17384 of this title and sections 3501 and 3502 of Title 25, Indians], the Secretary [probably means Secretary of Energy] shall coordinate with relevant entities to the maximum extent practicable, including—

''(1) electric utilities;

''(2) private sector entities;

''(3) representatives of all sectors of the electric power industry;

''(4) transmission organizations;

''(5) transmission owners and operators;

''(6) distribution organizations;

''(7) distribution asset owners and operators;

''(8) State, Tribal, local, and territorial governments and regulatory authorities;

''(9) academic institutions;

''(10) the National Laboratories;

''(11) other Federal agencies;

''(12) nonprofit organizations;

''(13) the Federal Energy Regulatory Commission;

''(14) the North American Reliability Corporation;

''(15) independent system operators; and

''(16) programs and program offices at the Department.''

PART C—RENEWABLE ENERGY

§ 16231. Renewable energy

(a) In general

(1) Objectives

The Secretary shall conduct programs of renewable energy research, development, demonstration, and commercial application, including activities described in this part. Such programs shall take into consideration the following objectives:

(A) Increasing the conversion efficiency of all forms of renewable energy through improved technologies.

(B) Decreasing the cost of renewable energy generation and delivery.

(C) Promoting the diversity of the energy supply.

(D) Decreasing the dependence of the United States on foreign energy supplies.

(E) Improving United States energy security.

(F) Decreasing the environmental impact of energy-related activities.

(G) Increasing the export of renewable generation equipment from the United States.

(2) Programs

(A) Geothermal

The Secretary shall conduct a program of research, development, demonstration, and commercial application for geothermal energy. The program shall focus on developing improved technologies for reducing the costs of geothermal energy installations, including technologies for—

(i) improving detection of geothermal resources;

(ii) decreasing drilling costs;

(iii) decreasing maintenance costs through improved materials;

(iv) increasing the potential for other revenue sources, such as mineral production; and

(v) increasing the understanding of reservoir life cycle and management.