

tion projects funded by grants or contracts authorized under this part, see section 9006(b) of div. Z of Pub. L. 116-260, set out as a note under section 16237 of this title.

§ 17211. Definitions

In this part:

(1) Eligible entity

The term “eligible entity” means any of the following entities:

- (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 or a multi-institutional consortium thereof.

(2) Institution of higher education

The term “institution of higher education” means—

- (A) an institution of higher education (as defined in section 1001(a) of title 20); or
- (B) a postsecondary vocational institution (as defined in section 1002(c) of title 20).

(3) Marine energy

The term “marine energy” means energy from—

- (A) waves, tides, and currents in oceans, estuaries, and tidal areas;
- (B) free flowing water in rivers, lakes, streams, and man-made channels;
- (C) differentials in salinity and pressure gradients; and
- (D) differentials in water temperature, including ocean thermal energy conversion.

(4) National laboratory

The term “National Laboratory” has the meaning given such term in section 15801(3) of this title.

(5) Water power

The term “water power” refers to hydropower, including conduit power, pumped storage, and marine energy technologies.

(6) Microgrid

The term “microgrid” has the meaning given such term in section 17231 of this title.

(Pub. L. 110-140, title VI, § 632, as added Pub. L. 116-260, div. Z, title III, § 3001(a), Dec. 27, 2020, 134 Stat. 2479.)

Editorial Notes

PRIOR PROVISIONS

A prior section 17211, Pub. L. 110-140, title VI, § 632, Dec. 19, 2007, 121 Stat. 1686, related to definitions of terms, prior to the general amendment of this part by Pub. L. 116-260.

Statutory Notes and Related Subsidiaries

SHORT TITLE

This part was formerly known as the “Marine and Hydrokinetic Renewable Energy Research and Development Act”, see Short Title note formerly set out under section 17001 of this title.

§ 17212. Water power technology research, development, and demonstration

The Secretary shall carry out a program to conduct research, development, demonstration,

and commercial application of water power technologies in support of each of the following purposes:

(1) To promote research, development, demonstration, and commercial application of water power generation technologies in order to increase capacity and reduce the cost of those technologies.

(2) To promote research and development to improve the environmental impact of water power technologies.

(3) To provide grid reliability and resilience, including through technologies that facilitate new market opportunities, such as ancillary services, for water power.

(4) To promote the development of water power technologies to improve economic growth and enhance cross-institutional foundational workforce development in the water power sector, including in coastal communities.

(Pub. L. 110-140, title VI, § 633, as added Pub. L. 116-260, div. Z, title III, § 3001(a), Dec. 27, 2020, 134 Stat. 2480.)

Editorial Notes

PRIOR PROVISIONS

A prior section 17212, Pub. L. 110-140, title VI, § 633, Dec. 19, 2007, 121 Stat. 1686, related to marine and hydrokinetic renewable energy research and development, prior to the general amendment of this part by Pub. L. 116-260.

§ 17213. Hydropower research, development, and demonstration

The Secretary shall conduct a program of research, development, demonstration, and commercial application for technologies that improve the capacity, efficiency, resilience, security, reliability, affordability, and environmental impact, including potential cumulative environmental impacts, of hydropower systems. In carrying out such program, the Secretary shall prioritize activities designed to—

(1) develop technology for—

- (A) non-powered dams, including aging and potentially hazardous dams;
- (B) pumped storage;
- (C) constructed waterways;
- (D) new stream-reach development;
- (E) modular and small dams;
- (F) increased operational flexibility; and
- (G) enhancement of relevant existing facilities;

(2) develop new strategies and technologies, including analytical methods, physical and numerical tools, and advanced computing, as well as methods to validate such methods and tools, in order to—

(A) extend the operational lifetime of hydropower systems and their physical structures, while improving environmental impact, including potential cumulative environmental impacts;

(B) assist in device and system design, installation, operation, and maintenance; and

(C) reduce costs, limit outages, and increase unit and plant efficiencies, including by examining the impact of changing water

and electricity demand on hydropower generation, flexibility, and provision of grid services;

(3) study, in conjunction with other relevant Federal agencies as appropriate, methods to improve the hydropower licensing process, including by compiling current and accepted best practices, public comments, and methodologies to assess the full range of potential environmental and economic impacts;

(4) identify opportunities for joint research, development, and demonstration programs between hydropower systems, which may include—

(A) pumped storage systems and other renewable energy systems;

(B) small hydro facilities and other energy storage systems;

(C) other hybrid energy systems;

(D) small hydro facilities and critical infrastructure, including water infrastructure; and

(E) hydro facilities and responsive load technologies, which may include smart buildings and city systems;

(5) improve the reliability of hydropower technologies, including during extreme weather events;

(6) develop methods and technologies to improve environmental impact, including potential cumulative environmental impacts, of hydropower and pumped storage technologies, including potential impacts on wildlife, such as—

(A) fisheries;

(B) aquatic life and resources;

(C) navigation of waterways; and

(D) upstream and downstream environmental conditions, including sediment movement, water quality, and flow volumes;

(7) identify ways to increase power generation by—

(A) diversifying plant configuration options;

(B) improving pump-back efficiencies;

(C) investigating multi-phase systems;

(D) developing, testing, and monitoring advanced generators with faster cycling times, variable speeds, and improved efficiencies;

(E) developing, testing, and monitoring advanced turbines capable of improving environmental impact, including potential cumulative environmental impacts, including small turbine designs;

(F) developing standardized powertrain components;

(G) developing components with advanced materials and manufacturing processes, including additive manufacturing; and

(H) developing analytical tools that enable hydropower to provide grid services that, amongst other services, improve grid integration of other energy sources;

(8) advance new pumped storage technologies, including—

(A) systems with adjustable speed and other new pumping and generating equipment designs;

(B) modular systems;

(C) alternative closed-loop systems, including mines and quarries; and

(D) other innovative equipment and materials as determined by the Secretary;

(9) reduce civil works costs and construction times for hydropower and pumped storage systems, including comprehensive data and systems analysis of hydropower and pumped storage construction technologies and processes in order to identify areas for whole-system efficiency gains;

(10) advance efficient and reliable integration of hydropower and pumped storage systems with the electric grid by—

(A) improving methods for operational forecasting of renewable energy systems to identify opportunities for hydropower applications in pumped storage and hybrid energy systems, including forecasting of seasonal and annual energy storage;

(B) considering aggregating small distributed hydropower assets; and

(C) identifying barriers to grid scale implementation of hydropower and pumped storage technologies;

(11) improve computational fluid dynamic modeling methods;

(12) improve flow measurement methods, including maintenance of continuous flow measurement equipment;

(13) identify best methods for compiling data on all hydropower resources and assets, including identifying potential for increased capacity; and

(14) identify mechanisms to test and validate performance of hydropower and pumped storage technologies.

(Pub. L. 110-140, title VI, § 634, as added Pub. L. 116-260, div. Z, title III, § 3001(a), Dec. 27, 2020, 134 Stat. 2480.)

Editorial Notes

PRIOR PROVISIONS

A prior section 17213, Pub. L. 110-140, title VI, § 634, Dec. 19, 2007, 121 Stat. 1687, related to National Marine Renewable Energy Research, Development, and Demonstration Centers, prior to the general amendment of this part by Pub. L. 116-260.

§ 17214. Marine energy research, development, and demonstration

(a) In general

The Secretary, in consultation with the Secretary of Defense, Secretary of Commerce (acting through the Under Secretary of Commerce for Oceans and Atmosphere) and other relevant Federal agencies, shall conduct a program of research, development, demonstration, and commercial application of marine energy technology, including activities to—

(1) assist technology development to improve the components, processes, and systems used for power generation from marine energy resources at a variety of scales;

(2) establish and expand critical testing infrastructure and facilities necessary to—

(A) demonstrate and prove marine energy devices at a range of scales in a manner that is cost-effective and efficient; and