

PART D—ENERGY STORAGE FOR  
TRANSPORTATION AND ELECTRIC POWER

**§ 17231. Energy storage competitiveness**

**(a) Short title**

This section may be cited as the “United States Energy Storage Competitiveness Act of 2007”.

**(b) Definitions**

In this section:

**(1) Council**

The term “Council” means the Energy Storage Advisory Council established under subsection (e).

**(2) Compressed air energy storage**

The term “compressed air energy storage” means, in the case of an electricity grid application, the storage of energy through the compression of air.

**(3) Electric drive vehicle**

The term “electric drive vehicle” means—

(A) a vehicle that uses an electric motor for all or part of the motive power of the vehicle, including battery electric, hybrid electric, plug-in hybrid electric, fuel cell, and plug-in fuel cell vehicles and rail transportation vehicles; or

(B) mobile equipment that uses an electric motor to replace an internal combustion engine for all or part of the work of the equipment.

**(4) Islanding**

The term “islanding” means a distributed generator or energy storage device continuing to power a location in the absence of electric power from the primary source.

**(5) Flywheel**

The term “flywheel” means, in the case of an electricity grid application, a device used to store rotational kinetic energy.

**(6) Microgrid**

The term “microgrid” means an integrated energy system consisting of interconnected loads and distributed energy resources (including generators and energy storage devices), which as an integrated system can operate in parallel with the utility grid or in an intentional islanding mode.

**(7) Self-healing grid**

The term “self-healing grid” means a grid that is capable of automatically anticipating and responding to power system disturbances (including the isolation of failed sections and components), while optimizing the performance and service of the grid to customers.

**(8) Spinning reserve services**

The term “spinning reserve services” means a quantity of electric generating capacity in excess of the quantity needed to meet peak electric demand.

**(9) Ultracapacitor**

The term “ultracapacitor” means an energy storage device that has a power density comparable to a conventional capacitor but is ca-

pable of exceeding the energy density of a conventional capacitor by several orders of magnitude.

**(c) Program**

The Secretary shall carry out a research, development, and demonstration program to support the ability of the United States to remain globally competitive in energy storage systems for electric drive vehicles, stationary applications, and electricity transmission and distribution.

**(d) Coordination**

In carrying out the activities of this section, the Secretary shall coordinate relevant efforts with appropriate Federal agencies, including the Department of Transportation.

**(e) Energy Storage Advisory Council**

**(1) Establishment**

Not later than 90 days after December 19, 2007, the Secretary shall establish an Energy Storage Advisory Council.

**(2) Composition**

**(A) In general**

Subject to subparagraph (B), the Council shall consist of not less than 15 individuals appointed by the Secretary, based on recommendations of the National Academy of Sciences.

**(B) Energy storage industry**

The Council shall consist primarily of representatives of the energy storage industry of the United States.

**(C) Chairperson**

The Secretary shall select a Chairperson for the Council from among the members appointed under subparagraph (A).

**(3) Meetings**

**(A) In general**

The Council shall meet not less than once a year.

**(B) Federal Advisory Committee Act**

The Federal Advisory Committee Act (5 U.S.C. App.) shall apply to a meeting of the Council.

**(4) Plans**

No later than 1 year after December 19, 2007, and every 5 years thereafter, the Council, in conjunction with the Secretary, shall develop a 5-year plan for integrating basic and applied research so that the United States retains a globally competitive domestic energy storage industry for electric drive vehicles, stationary applications, and electricity transmission and distribution.

**(5) Review**

The Council shall—

(A) assess, every 2 years, the performance of the Department in meeting the goals of the plans developed under paragraph (4); and

(B) make specific recommendations to the Secretary on programs or activities that should be established or terminated to meet those goals.

**(f) Basic research program****(1) Basic research**

The Secretary shall conduct a basic research program on energy storage systems to support electric drive vehicles, stationary applications, and electricity transmission and distribution, including—

- (A) materials design;
- (B) materials synthesis and characterization;
- (C) electrode-active materials, including electrolytes and bioelectrolytes;
- (D) surface and interface dynamics;
- (E) modeling and simulation; and
- (F) thermal behavior and life degradation mechanisms.

**(2) Nanoscience centers**

The Secretary, in cooperation with the Council, shall coordinate the activities of the nanoscience centers of the Department to help the energy storage research centers of the Department maintain a globally competitive posture in energy storage systems for electric drive vehicles, stationary applications, and electricity transmission and distribution.

**(3) Funding**

For activities carried out under this subsection, in addition to funding activities at National Laboratories, the Secretary shall award funds to, and coordinate activities with, a range of stakeholders including the public, private, and academic sectors.

**(g) Applied research program****(1) In general**

The Secretary shall conduct an applied research program on energy storage systems to support electric drive vehicles, stationary applications, and electricity transmission and distribution technologies, including—

- (A) ultracapacitors;
- (B) flywheels;
- (C) batteries and battery systems (including flow batteries);
- (D) compressed air energy systems;
- (E) power conditioning electronics;
- (F) manufacturing technologies for energy storage systems;
- (G) thermal management systems; and
- (H) hydrogen as an energy storage medium.

**(2) Funding**

For activities carried out under this subsection, in addition to funding activities at National Laboratories, the Secretary shall provide funds to, and coordinate activities with, a range of stakeholders, including the public, private, and academic sectors.

**(h) Energy storage research centers****(1) In general**

The Secretary shall establish, through competitive bids, not more than 4 energy storage research centers to translate basic research into applied technologies to advance the capability of the United States to maintain a globally competitive posture in energy storage systems for electric drive vehicles, stationary

applications, and electricity transmission and distribution.

**(2) Program management**

The centers shall be managed by the Under Secretary for Science of the Department.

**(3) Participation agreements**

As a condition of participating in a center, a participant shall enter into a participation agreement with the center that requires that activities conducted by the participant for the center promote the goal of enabling the United States to compete successfully in global energy storage markets.

**(4) Plans**

A center shall conduct activities that promote the achievement of the goals of the plans of the Council under subsection (e)(4).

**(5) National laboratories**

A national laboratory (as defined in section 15801 of this title) may participate in a center established under this subsection, including a cooperative research and development agreement (as defined in section 3710a(d) of title 15).

**(6) Disclosure**

Section 13293 of this title may apply to any project carried out through a grant, contract, or cooperative agreement under this subsection.

**(7) Intellectual property**

In accordance with section 202(a)(ii) of title 35, section 2182 of this title, and section 5908 of this title, the Secretary may require, for any new invention developed under this subsection, that—

(A) if an industrial participant is active in a<sup>1</sup> energy storage research center established under this subsection relating to the advancement of energy storage technologies carried out, in whole or in part, with Federal funding, the industrial participant be granted the first option to negotiate with the invention owner, at least in the field of energy storage technologies, nonexclusive licenses, and royalties on terms that are reasonable, as determined by the Secretary;

(B) if 1 or more industry participants are active in a center, during a 2-year period beginning on the date on which an invention is made—

(i) the patent holder shall not negotiate any license or royalty agreement with any entity that is not an industrial participant under this subsection; and

(ii) the patent holder shall negotiate nonexclusive licenses and royalties in good faith with any interested industrial participant under this subsection; and

(C) the new invention be developed under such other terms as the Secretary determines to be necessary to promote the accelerated commercialization of inventions made under this subsection to advance the capability of the United States to successfully compete in global energy storage markets.

<sup>1</sup> So in original. Probably should be "an".

**(i) Energy storage systems demonstrations****(1) In general**

The Secretary shall carry out a program of new demonstrations of advanced energy storage systems.

**(2) Scope**

The demonstrations shall—

- (A) be regionally diversified; and
- (B) expand on the existing technology demonstration program of the Department.

**(3) Stakeholders**

In carrying out the demonstrations, the Secretary shall, to the maximum extent practicable, include the participation of a range of stakeholders, including—

- (A) rural electric cooperatives;
- (B) investor owned utilities;
- (C) municipally owned electric utilities;
- (D) energy storage systems manufacturers;
- (E) electric drive vehicle manufacturers;
- (F) the renewable energy production industry;
- (G) State or local energy offices;
- (H) the fuel cell industry; and
- (I) institutions of higher education.

**(4) Objectives**

Each of the demonstrations shall include 1 or more of the following:

- (A) Energy storage to improve the feasibility of microgrids or islanding, or transmission and distribution capability, to improve reliability in rural areas.
- (B) Integration of an energy storage system with a self-healing grid.
- (C) Use of energy storage to improve security to emergency response infrastructure and ensure availability of emergency backup power for consumers.
- (D) Integration with a renewable energy production source, at the source or away from the source.
- (E) Use of energy storage to provide ancillary services, such as spinning reserve services, for grid management.
- (F) Advancement of power conversion systems to make the systems smarter, more efficient, able to communicate with other inverters, and able to control voltage.
- (G) Use of energy storage to optimize transmission and distribution operation and power quality, which could address overloaded lines and maintenance of transformers and substations.
- (H) Use of advanced energy storage for peak load management of homes, businesses, and the grid.
- (I) Use of energy storage devices to store energy during nonpeak generation periods to make better use of existing grid assets.

**(j) Vehicle energy storage demonstration****(1) In general**

The Secretary shall carry out a program of electric drive vehicle energy storage technology demonstrations.

**(2) Consortia**

The technology demonstrations shall be conducted through consortia, which may include—

- (A) energy storage systems manufacturers and suppliers of the manufacturers;
- (B) electric drive vehicle manufacturers;
- (C) rural electric cooperatives;
- (D) investor owned utilities;
- (E) municipal and rural electric utilities;
- (F) State and local governments;
- (G) metropolitan transportation authorities; and
- (H) institutions of higher education.

**(3) Objectives**

The program shall demonstrate 1 or more of the following:

- (A) Novel, high capacity, high efficiency energy storage, charging, and control systems, along with the collection of data on performance characteristics, such as battery life, energy storage capacity, and power delivery capacity.
- (B) Advanced onboard energy management systems and highly efficient battery cooling systems.
- (C) Integration of those systems on a prototype vehicular platform, including with drivetrain systems for passenger, commercial, and nonroad electric drive vehicles.
- (D) New technologies and processes that reduce manufacturing costs.
- (E) Integration of advanced vehicle technologies with electricity distribution system and smart metering technology.
- (F) Control systems that minimize emissions profiles in cases in which clean diesel engines are part of a plug-in hybrid drive system.

**(k) Secondary applications and disposal of electric drive vehicle batteries**

The Secretary shall carry out a program of research, development, and demonstration of—

- (1) secondary applications of energy storage devices following service in electric drive vehicles; and
- (2) technologies and processes for final recycling and disposal of the devices.

**(l) Cost sharing**

The Secretary shall carry out the programs established under this section in accordance with section 16352 of this title.

**(m) Merit review of proposals**

The Secretary shall carry out the programs established under subsections (i), (j), and (k) in accordance with section 16353 of this title.

**(n) Coordination and nonduplication**

To the maximum extent practicable, the Secretary shall coordinate activities under this section with other programs and laboratories of the Department and other Federal research programs.

**(o) Review by National Academy of Sciences**

On the business day that is 5 years after December 19, 2007, the Secretary shall offer to enter into an arrangement with the National Academy of Sciences to assess the performance of the Department in carrying out this section.

**(p) Authorization of appropriations**

There are authorized to be appropriated to carry out—

(1) the basic research program under subsection (f) \$50,000,000 for each of fiscal years 2009 through 2018;

(2) the applied research program under subsection (g) \$80,000,000 for each of fiscal years 2009 through 2018; and;<sup>2</sup>

(3) the energy storage research center program under subsection (h) \$100,000,000 for each of fiscal years 2009 through 2018;

(4) the energy storage systems demonstration program under subsection (i) \$30,000,000 for each of fiscal years 2009 through 2018;

(5) the vehicle energy storage demonstration program under subsection (j) \$30,000,000 for each of fiscal years 2009 through 2018; and

(6) the secondary applications and disposal of electric drive vehicle batteries program under subsection (k) \$5,000,000 for each of fiscal years 2009 through 2018.

(Pub. L. 110-140, title VI, § 641, Dec. 19, 2007, 121 Stat. 1688.)

#### REFERENCES IN TEXT

The Federal Advisory Committee Act, referred to in subsec. (e)(3)(B), is Pub. L. 92-463, Oct. 6, 1972, 86 Stat. 770, which is set out in the Appendix to Title 5, Government Organization and Employees.

#### PART E—MISCELLANEOUS PROVISIONS

### § 17241. Lightweight materials research and development

#### (a) In general

As soon as practicable after December 19, 2007, the Secretary of Energy shall establish a program to determine ways in which the weight of motor vehicles could be reduced to improve fuel efficiency without compromising passenger safety by conducting research, development, and demonstration relating to—

(1) the development of new materials (including cast metal composite materials formed by autocombustion synthesis) and material processes that yield a higher strength-to-weight ratio or other properties that reduce vehicle weight; and

(2) reducing the cost of—

(A) lightweight materials (including high-strength steel alloys, aluminum, magnesium, metal composites, and carbon fiber reinforced polymer composites) with the properties required for construction of lighter-weight vehicles; and

(B) materials processing, automated manufacturing, joining, and recycling lightweight materials for high-volume applications.

#### (b) Authorization of appropriations

There is authorized to be appropriated to carry out this section \$80,000,000 for the period of fiscal years 2008 through 2012.

(Pub. L. 110-140, title VI, § 651, Dec. 19, 2007, 121 Stat. 1694.)

### § 17242. Commercial insulation demonstration program

#### (a) Definitions

In this section:

#### (1) Advanced insulation

The term “advanced insulation” means insulation that has an R value of not less than R35 per inch.

#### (2) Covered refrigeration unit

The term “covered refrigeration unit” means any—

(A) commercial refrigerated truck;

(B) commercial refrigerated trailer; or

(C) commercial refrigerator, freezer, or refrigerator-freezer described in section 6313(c) of this title.

#### (b) Report

Not later than 90 days after December 19, 2007, the Secretary shall submit to Congress a report that includes an evaluation of—

(1) the state of technological advancement of advanced insulation; and

(2) the projected amount of cost savings that would be generated by implementing advanced insulation into covered refrigeration units.

#### (c) Demonstration program

##### (1) Establishment

If the Secretary determines in the report described in subsection (b) that the implementation of advanced insulation into covered refrigeration units would generate an economically justifiable amount of cost savings, the Secretary, in cooperation with manufacturers of covered refrigeration units, shall establish a demonstration program under which the Secretary shall demonstrate the cost-effectiveness of advanced insulation.

##### (2) Disclosure

The Secretary may, for a period of up to 5 years after an award is granted under the demonstration program, exempt from mandatory disclosure under section 552 of title 5 (popularly known as the Freedom of Information Act) information that the Secretary determines would be a privileged or confidential trade secret or commercial or financial information under subsection (b)(4) of such section if the information had been obtained from a non-Government party.

##### (3) Cost-sharing

Section 16352 of this title shall apply to any project carried out under this subsection.

#### (d) Authorization of appropriations

There is authorized to be appropriated to carry out this section \$8,000,000 for the period of fiscal years 2009 through 2014.

(Pub. L. 110-140, title VI, § 652, Dec. 19, 2007, 121 Stat. 1694.)

### § 17243. Bright Tomorrow Lighting Prizes

#### (a) Establishment

Not later than 1 year after December 19, 2007, as part of the program carried out under section 16396 of this title, the Secretary shall establish and award Bright Tomorrow Lighting Prizes for solid state lighting in accordance with this section.

<sup>2</sup>So in original.