

110TH CONGRESS  
1ST SESSION

# H. R. 3776

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IN THE SENATE OF THE UNITED STATES

OCTOBER 23, 2007

Received; read twice and referred to the Committee on Energy and Natural  
Resources

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## AN ACT

To provide for research, development, and demonstration programs in advanced energy storage systems for electric drive vehicles, stationary applications, and electricity transmission and distribution applications, to support the ability of the United States to remain globally competitive in this field, and to promote the efficient delivery and use of energy.

1       *Be it enacted by the Senate and House of Representa-*  
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4       This Act may be cited as the “Energy Storage Tech-  
5 nology Advancement Act of 2007”.

6 **SEC. 2. DEFINITIONS.**

7       For purposes of this Act—

8           (1) the term “Department” means the Depart-  
9       ment of Energy;

10          (2) the term “electric drive vehicle” means—

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

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

19          (3) the term “islanding” means a distributed  
20       generator or energy storage device continuing to  
21       power a location in the absence of electric power  
22       from the primary source;

23          (4) the term “microgrid” means an integrated  
24       energy system consisting of interconnected loads and  
25       distributed energy resources, including generators

1 and energy storage devices, which as an integrated  
2 system can operate in parallel with the utility grid  
3 or in an intentional islanding mode;

4 (5) the term “Secretary” means the Secretary  
5 of Energy;

6 (6) the term “self-healing grid” means a grid  
7 that is capable of automatically anticipating and re-  
8 sponding to power system disturbances, including  
9 the isolation of failed sections and components, while  
10 optimizing its own performance and service to cus-  
11 tomers; and

12 (7) the term “spinning reserve services” means  
13 an amount of electric generating capacity in excess  
14 of the amount needed to meet peak electric demand.

15 **SEC. 3. BASIC RESEARCH PROGRAM.**

16 (a) IN GENERAL.—The Secretary shall conduct a  
17 basic research program to support the development of en-  
18 ergy storage systems for electric drive vehicles, stationary  
19 applications, and electricity transmission and distribution,  
20 including research on—

21 (1) materials design;

22 (2) materials synthesis and characterization;

23 (3) electrolytes;

24 (4) surface and interface dynamics;

25 (5) modeling and simulation; and

1           (6) thermal behavior and life degradation mech-  
2           anisms.

3           (b) FUNDING.—For activities carried out under this  
4           section, in addition to funding activities at National Lab-  
5           oratories, the Secretary shall award funds to, and coordi-  
6           nate activities with, a range of stakeholders including the  
7           public, private, and academic sectors.

8           (c) AUTHORIZATION OF APPROPRIATIONS.—There  
9           are authorized to be appropriated to the Secretary for car-  
10          rying out this section \$50,000,000 for each of the fiscal  
11          years 2009 through 2014.

12       **SEC. 4. APPLIED RESEARCH PROGRAM.**

13          (a) IN GENERAL.—The Secretary shall conduct an  
14          applied research program on energy storage systems to  
15          support electric drive vehicle, stationary application, and  
16          electricity transmission and distribution technologies, in-  
17          cluding research on—

18               (1) ultracapacitors;

19               (2) flywheels;

20               (3) batteries and battery systems (including  
21          flow batteries);

22               (4) compressed air energy systems;

23               (5) power conditioning electronics;

24               (6) manufacturing technologies for energy stor-  
25          age systems;

1 (7) thermal management systems; and

2 (8) hydrogen as an energy storage medium.

3 (b) FUNDING.—For activities carried out under this  
4 section, in addition to funding activities at National Lab-  
5 oratories, the Secretary shall award funds to, and coordi-  
6 nate activities with, a range of stakeholders including the  
7 public, private, and academic sectors.

8 (c) AUTHORIZATION OF APPROPRIATIONS.—There  
9 are authorized to be appropriated to the Secretary for car-  
10 rying out this section \$80,000,000 for each of the fiscal  
11 years 2009 through 2014.

12 **SEC. 5. ENERGY STORAGE SYSTEMS DEMONSTRATIONS.**

13 (a) IN GENERAL.—The Secretary shall carry out a  
14 program of new demonstrations of advanced energy stor-  
15 age systems. These demonstrations shall be regionally di-  
16 versified and shall expand on the Department’s existing  
17 technology demonstration program. These demonstrations  
18 should include the participation of a range of stakeholders,  
19 such as rural electric cooperatives, investor owned utilities,  
20 municipally owned electric utilities, energy storage sys-  
21 tems manufacturers, electric drive vehicle manufacturers,  
22 the renewable energy production industry, State or local  
23 energy offices, the fuel cell industry, and universities.  
24 Each of the demonstrations shall include one or more of  
25 the following objectives:

1           (1) Energy storage to improve the feasibility of  
2           “micro-grids” or “islanding”, or the transmission  
3           and distribution capability to improve reliability in  
4           rural areas.

5           (2) Integration of an energy storage system  
6           with a self-healing grid.

7           (3) Use of energy storage to improve security to  
8           emergency response infrastructure.

9           (4) Integration with a renewable energy produc-  
10          tion source, either at the source or away from the  
11          source.

12          (5) Use of energy storage to provide ancillary  
13          services, such as spinning reserve services, for grid  
14          management.

15          (6) Advancement of power conversion systems  
16          to make them smarter, more efficient, able to com-  
17          municate with other inverters, and able to control  
18          voltage.

19          (7) Use of energy storage to optimize trans-  
20          mission and distribution operation and power qual-  
21          ity, which could address overloaded lines and main-  
22          tenance of transformers and substations.

23          (8) Use of advanced energy storage for peak  
24          load management of homes, businesses, and the  
25          grid.

1           (9) Use of energy storage devices to fill up  
2           nonpeak generation periods for electricity demand to  
3           make better use of existing grid assets.

4           (b) AUTHORIZATION OF APPROPRIATIONS.—There  
5           are authorized to be appropriated to the Secretary for car-  
6           rying out this section \$30,000,000 for each of the fiscal  
7           years 2009 through 2014.

8           **SEC. 6. VEHICLE ENERGY STORAGE DEMONSTRATION.**

9           (a) IN GENERAL.—The Secretary shall carry out a  
10          program of electric drive vehicle energy storage technology  
11          demonstrations. These technology demonstrations shall be  
12          conducted through consortia, which may include energy  
13          storage systems manufacturers and their suppliers, elec-  
14          tric drive vehicle manufacturers, rural electric coopera-  
15          tives, investor owned utilities, municipal and rural electric  
16          utilities, State and local governments, metropolitan trans-  
17          portation authorities, and universities. The program shall  
18          demonstrate one or more of the following:

19               (1) Novel, high capacity, high efficiency energy  
20               storage, charging, and control systems, along with  
21               the collection of data on performance characteristics  
22               such as battery life, energy storage capacity, and  
23               power delivery capacity.

24               (2) Advanced onboard energy management sys-  
25               tems, and highly efficient battery cooling systems.



1 **SEC. 8. COORDINATION AND NONDUPLICATION.**

2 To the maximum extent practicable, the Secretary  
3 shall coordinate activities under this Act with other pro-  
4 grams and laboratories of the Department and other Fed-  
5 eral research programs.

6 **SEC. 9. COST SHARING.**

7 The Secretary shall carry out the programs under  
8 sections 6 and 7 in compliance with section 988 (a)  
9 through (d) and section 989 of the Energy Policy Act of  
10 2005 (42 U.S.C. 16352(a) through (d) and 16353).

Passed the House of Representatives October 22,  
2007.

Attest:

LORRAINE C. MILLER,

*Clerk.*