

112TH CONGRESS  
1ST SESSION

# S. 1351

To promote the development, manufacturing, and use of advanced batteries,  
and for other purposes.

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IN THE SENATE OF THE UNITED STATES

JULY 12, 2011

Ms. STABENOW introduced the following bill; which was read twice and  
referred to the Committee on Energy and Natural Resources

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## A BILL

To promote the development, manufacturing, and use of  
advanced batteries, and for other purposes.

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 (a) **SHORT TITLE.**—This Act may be cited as the  
5 “Battery Innovation Act of 2011”.

6 (b) **TABLE OF CONTENTS.**—The table of contents of  
7 this Act is as follows:

Sec. 1. Short title.  
Sec. 2. Definitions.

### TITLE I—BATTERY SUPPLY

Sec. 101. Grants for lithium production research and development.  
Sec. 102. Study on the supply of raw materials.

## TITLE II—BATTERY RESEARCH AND DEVELOPMENT

## Subtitle A—Battery Research and Development

- Sec. 201. ARPA-E plug-in electric drive vehicle research and development programs.
- Sec. 202. Advanced Battery Breakthrough Achievement Awards.
- Sec. 203. Energy innovation hubs.

## Subtitle B—Vehicle Research and Development

- Sec. 211. Program.
- Sec. 212. Sensing and communications technologies.
- Sec. 213. Manufacturing.
- Sec. 214. User testing facilities.
- Sec. 215. Reporting.

## Subtitle C—Medium- and Heavy-Duty Commercial and Transit Vehicles

- Sec. 221. Program.
- Sec. 222. Class 8 truck and trailer systems demonstration.
- Sec. 223. Technology testing and metrics.
- Sec. 224. Nonroad systems pilot program.

## Subtitle D—Authorization of Appropriations

- Sec. 231. Authorization of appropriations.

## TITLE III—BATTERY MANUFACTURING

- Sec. 301. Advanced battery manufacturing assistance.

## TITLE IV—ALTERNATIVE AND SECONDARY USE OF BATTERIES

- Sec. 401. Alternative and secondary use of batteries.
- Sec. 402. Loan guarantees for advanced battery purchases for use in stationary applications.

1 **SEC. 2. DEFINITIONS.**

2 (a) IN GENERAL.—In this Act:

3 (1) ADVANCED RESEARCH PROJECTS AGENCY—  
 4 ENERGY.—The term “Advanced Research Projects  
 5 Agency—Energy” means the Advanced Research  
 6 Projects Agency—Energy established by section  
 7 5012(b) of the America COMPETES Act (42  
 8 U.S.C. 16538(b)).

1           (2) DEPARTMENT.—The term “Department”  
2 means the Department of Energy.

3           (3) FEDERAL-AID SYSTEM OF HIGHWAYS.—The  
4 term “Federal-aid system of highways” means a  
5 highway system described in section 103 of title 23,  
6 United States Code.

7           (4) PLUG-IN ELECTRIC DRIVE VEHICLE.—The  
8 term “plug-in electric drive vehicle” has the meaning  
9 given the term in section 131(a)(5) of the Energy  
10 Independence and Security Act of 2007 (42 U.S.C.  
11 17011(a)(5)).

12           (5) SECRETARY.—The term “Secretary” means  
13 the Secretary of Energy.

14           (b) DEFINITION OF PLUG-IN ELECTRIC DRIVE VEHI-  
15 CLE.—Section 131(a)(5) of the Energy Independence and  
16 Security Act of 2007 (42 U.S.C. 17011(a)(5)) is amend-  
17 ed—

18           (1) by redesignating subparagraphs (A), (B),  
19 and (C) as clauses (i), (ii), and (iii), respectively,  
20 and indenting appropriately;

21           (2) by striking “means a vehicle that—” and  
22 inserting “means—

23                   “(A) a vehicle that—”;

1           (3) in subparagraph (A)(iii) (as so redesignated), by striking the period at the end and inserting “; and”; and

4           (4) by adding at the end the following:

5                   “(B) any other motor vehicle—

6                           “(i) for which the motive electric  
7                           power can be recharged from an external  
8                           source of power; and

9                           “(ii) that has a maximum speed of  
10                           greater than 25 miles per hour.”.

## 11           **TITLE I—BATTERY SUPPLY**

### 12           **SEC. 101. GRANTS FOR LITHIUM PRODUCTION RESEARCH 13                           AND DEVELOPMENT.**

14           Subtitle E of title VI of the Energy Independence and  
15           Security Act of 2007 (42 U.S.C. 17241 et seq.) is amended  
16           by adding at the end the following:

### 17           **“SEC. 657. GRANTS FOR LITHIUM PRODUCTION RESEARCH 18                           AND DEVELOPMENT.**

19           “(a) DEFINITION OF ELIGIBLE ENTITY.—In this section, the term ‘eligible entity’ means—

21                   “(1) a private partnership or other entity that  
22                   is—

23                           “(A) organized in accordance with Federal  
24                           law; and

1           “(B) engaged in lithium production for use  
2           in advanced battery technologies;

3           “(2) a public entity, such as a State, tribal, or  
4           local governmental entity; or

5           “(3) a consortium of entities described in para-  
6           graphs (1) and (2).

7           “(b) GRANTS.—The Secretary shall provide grants to  
8           eligible entities for research, development, demonstration,  
9           and commercial application of domestic industrial pro-  
10          cesses that are designed to enhance domestic lithium pro-  
11          duction for use in advanced battery technologies, as deter-  
12          mined by the Secretary.

13          “(c) USE.—An eligible entity shall use a grant pro-  
14          vided under this subsection to develop or enhance—

15                 “(1) domestic industrial processes that increase  
16                 lithium production, processing, or recycling for use  
17                 in advanced lithium batteries; or

18                 “(2) industrial process associated with new for-  
19                 mulations of lithium feedstock for use in advanced  
20                 lithium batteries.

21          “(d) AUTHORIZATION OF APPROPRIATIONS.—There  
22          are authorized to be appropriated to the Secretary to carry  
23          out this section \$10,000,000 for each of fiscal years 2011  
24          through 2014.”.

1 **SEC. 102. STUDY ON THE SUPPLY OF RAW MATERIALS.**

2 (a) IN GENERAL.—The Secretary of the Interior, in  
3 consultation with the Secretary, shall conduct a study  
4 that—

5 (1) identifies the raw materials needed for the  
6 manufacture of plug-in electric drive vehicles, bat-  
7 teries, and other components for plug-in electric  
8 drive vehicles, and for the infrastructure needed to  
9 support plug-in electric drive vehicles;

10 (2) describes the primary or original sources  
11 and known reserves and resources of those raw ma-  
12 terials;

13 (3) assesses, in consultation with an inde-  
14 pendent analysis entity designated by the Secretary,  
15 the degree of risk to the manufacture, maintenance,  
16 deployment, and use of plug-in electric drive vehicles  
17 associated with the supply of those raw materials;

18 (4) identifies pathways to securing reliable and  
19 resilient supplies of those raw materials; and

20 (5) assesses, in coordination with relevant Fed-  
21 eral agencies (as determined by the Secretary), the  
22 international trade opportunities and barriers, in-  
23 cluding tariffs, for the continued development of ad-  
24 vanced batteries in the United States.

25 (b) REPORT.—Not later than 3 years after the date  
26 of enactment of this Act, the Secretary of the Interior

1 shall submit to Congress a report that describes the re-  
2 sults of the study.

3 (c) AUTHORIZATION OF APPROPRIATIONS.—There is  
4 authorized to be appropriated to carry out this subsection  
5 \$1,500,000.

6 **TITLE II—BATTERY RESEARCH**  
7 **AND DEVELOPMENT**  
8 **Subtitle A—Battery Research and**  
9 **Development**

10 **SEC. 201. ARPA-E PLUG-IN ELECTRIC DRIVE VEHICLE RE-**  
11 **SEARCH AND DEVELOPMENT PROGRAMS.**

12 (a) IN GENERAL.—The Advanced Research Projects  
13 Agency—Energy established by section 5012(b) of the  
14 America COMPETES Act (42 U.S.C. 16538(b)) (referred  
15 to in this section as “ARPA-E”) shall use funds made  
16 available under this section to fund high-risk, high-reward  
17 research and development programs supporting the devel-  
18 opment and manufacture of plug-in electric drive vehicles  
19 and charging infrastructure, including advanced batteries,  
20 plug-in electric drive components, and plug-in electric  
21 drive infrastructure.

22 (b) SUPPLEMENTAL FUNDS.—Funds made available  
23 under this section shall used to supplement (and not sup-  
24 plant) funds made available for the Advanced Research  
25 Projects Agency—Energy.

1 (c) AUTHORIZATION OF APPROPRIATIONS.—There  
2 are authorized to be appropriated to carry out this section  
3 such sums as are necessary for each of fiscal years 2011  
4 through 2014.

5 **SEC. 202. ADVANCED BATTERY BREAKTHROUGH ACHIEVE-**  
6 **MENT AWARDS.**

7 (a) IN GENERAL.—The Secretary may make cash  
8 awards, in amounts determined by the Secretary, in rec-  
9 ognition of breakthrough achievements in research, devel-  
10 opment, demonstration, and commercial application of  
11 batteries that—

12 (1) are able to power a plug-in electric drive ve-  
13 hicle authorized to travel on the Federal-aid system  
14 of highways for at least 500 miles before recharging;

15 (2) are of a size that would not be cost-prohibi-  
16 tive or create space constraints, if mass-produced;

17 (3) are cost-effective (measured in cost per kilo-  
18 watt hour), if mass-produced; and

19 (4) demonstrate advances in battery durability,  
20 energy density, and power density;

21 (5) meet other goals established by the United  
22 States Advanced Battery Consortium; and

23 (6) meet such additional battery specifications  
24 as the Secretary determines to be necessary.

25 (b) BATTERY ACHIEVEMENT AWARD FUND.—



1           (1) ESTABLISHMENT.—There is established in  
2           the Treasury of the United States a fund to be  
3           known as the “Battery Achievement Award Fund”  
4           (referred to in this section as the “Fund”), to be ad-  
5           ministered by the Secretary, to be available without  
6           fiscal year limitation and subject to appropriation, to  
7           award amounts under this section.

8           (2) TRANSFERS TO FUND.—The Fund shall  
9           consist of such amounts as are appropriated to the  
10          Fund under subsection (c).

11          (3) PROHIBITION.—Amounts in the Fund may  
12          not be made available for any purpose other than a  
13          purposes described in subsection (a).

14          (4) ANNUAL REPORTS.—

15                (A) IN GENERAL.—Not later than 60 days  
16                after the end of each fiscal year beginning with  
17                fiscal year 2012, the Secretary shall submit a  
18                report on the operation of the Fund during the  
19                fiscal year to—

20                        (i) the Committees on Appropriations  
21                        of the House of Representatives and of the  
22                        Senate;

23                        (ii) the Committee on Energy and  
24                        Natural Resources of the Senate; and

1 (iii) the Committee on Energy and  
2 Commerce of the House of Representa-  
3 tives.

4 (B) CONTENTS.—Each report shall in-  
5 clude, for the fiscal year covered by the report,  
6 the following:

7 (i) A statement of the amounts depos-  
8 ited into the Fund.

9 (ii) A description of the expenditures  
10 made from the Fund for the fiscal year, in-  
11 cluding the purpose of the expenditures.

12 (iii) Recommendations for additional  
13 authorities to fulfill the purpose of the  
14 Fund.

15 (iv) A statement of the balance re-  
16 maining in the Fund at the end of the fis-  
17 cal year.

18 (5) SEPARATE APPROPRIATIONS ACCOUNT.—  
19 Section 1105(a) of title 31, United States Code, is  
20 amended—

21 (A) by redesignating paragraphs (35) and  
22 (36) as paragraphs (36) and (37), respectively;

23 (B) by redesignating the second paragraph  
24 (33) (relating to obligational authority and out-

1           lays requested for homeland security) as para-  
2           graph (35); and

3                   (C) by adding at the end the following:

4                   “(38) a separate statement for the Battery  
5           Achievement Award Fund established under section  
6           202(b) of the Battery Innovation Act of 2011, which  
7           shall include the estimated amount of deposits into  
8           the Fund, obligations, and outlays from the Fund.”.

9           (c) **AUTHORIZATION OF APPROPRIATIONS.**—There  
10          are authorized to be appropriated to the Fund such sums  
11          as are necessary to carry out this section.

12          **SEC. 203. ENERGY INNOVATION HUBS.**

13          The Secretary may establish energy innovation  
14          hubs—

15                   (1) to advance highly promising areas of science  
16           and engineering relating to batteries throughout all  
17           applicable stages, including research through pro-  
18           viding promising technology and information to the  
19           private sector; and

20                   (2) to foster unique, cross-disciplinary collabo-  
21           rations by bringing together leading scientists and  
22           engineers to focus on high priority technology relat-  
23           ing to batteries.

1     **Subtitle B—Vehicle Research and**  
2                                   **Development**

3     **SEC. 211. PROGRAM.**

4             (a) **ACTIVITIES.**—The Secretary shall conduct a pro-  
5 gram of basic and applied research, development, engi-  
6 neering, demonstration, and commercial application activi-  
7 ties on materials, technologies, and processes with the po-  
8 tential to substantially reduce or eliminate petroleum use  
9 and the emissions of the passenger and commercial vehi-  
10 cles of the United States, including activities in the areas  
11 of—

12                     (1) hybridization or full electrification of vehicle  
13 systems;

14                     (2) batteries and other energy storage devices;

15                     (3) power electronics;

16                     (4) vehicle, component, and subsystem manu-  
17 facturing technologies and processes;

18                     (5) engine efficiency and combustion optimiza-  
19 tion;

20                     (6) waste heat recovery;

21                     (7) transmission and drivetrains;

22                     (8) hydrogen vehicle technologies, including fuel  
23 cells and internal combustion engines, and hydrogen  
24 infrastructure;

- 1           (9) compressed natural gas and liquefied petro-
- 2           leum gas vehicle technologies;
- 3           (10) aerodynamics, rolling resistance, and ac-
- 4           cessory power loads of vehicles and associated equip-
- 5           ment;
- 6           (11) vehicle weight reduction, including
- 7           lightweighting materials;
- 8           (12) friction and wear reduction;
- 9           (13) engine and component durability;
- 10          (14) innovative propulsion systems;
- 11          (15) advanced boosting systems;
- 12          (16) hydraulic hybrid technologies;
- 13          (17) engine compatibility with and optimization
- 14          for a variety of transportation fuels including nat-
- 15          ural gas and other liquid and gaseous fuels;
- 16          (18) predictive engineering, modeling, and sim-
- 17          ulation of vehicle and transportation systems;
- 18          (19) refueling and charging infrastructure for
- 19          alternative fueled and electric or plug-in electric hy-
- 20          brid vehicles, including the unique challenges facing
- 21          rural areas;
- 22          (20) gaseous fuels storage systems and system
- 23          integration and optimization;

1           (21) sensing, communications, and actuation  
2 technologies for vehicle, electrical grid, and infra-  
3 structure;

4           (22) efficient use, substitution, and recycling of  
5 potentially critical materials in vehicles, including  
6 rare earth elements and precious metals, at risk of  
7 supply disruption;

8           (23) aftertreatment technologies;

9           (24) thermal management of battery systems;

10          (25) retrofitting advanced vehicle technologies  
11 to existing vehicles;

12          (26) development of common standards, speci-  
13 fications, and architectures for both transportation  
14 and stationary battery applications;

15          (27) advanced internal combustion engines; and

16          (28) other research areas as determined by the  
17 Secretary.

18       (b) TRANSFORMATIONAL TECHNOLOGY.—The Sec-  
19 retary shall ensure that the Department continues to sup-  
20 port research, development, engineering, demonstration,  
21 and commercial application activities and maintains com-  
22 petency in mid- to long-term transformational vehicle tech-  
23 nologies with potential to achieve deep reductions in petro-  
24 leum use and emissions, including activities in the areas  
25 of—

1           (1) hydrogen vehicle technologies, including fuel  
2           cells, internal combustion engines, hydrogen storage,  
3           infrastructure, and activities in hydrogen technology  
4           validation and safety codes and standards;

5           (2) multiple battery chemistries and novel en-  
6           ergy storage devices, including nonchemical batteries  
7           and electromechanical storage technologies such as  
8           hydraulics, flywheels, and compressed air storage;

9           (3) communication, connectivity, and power  
10          flow among vehicles, infrastructure, and the elec-  
11          trical grid; and

12          (4) other innovative technologies research and  
13          development, as determined by the Secretary.

14          (c) INDUSTRY PARTICIPATION.—To the maximum  
15          extent practicable, activities under this Act shall be carried  
16          out in partnership or collaboration with automotive manu-  
17          facturers, heavy commercial, vocational, and transit vehi-  
18          cle manufacturers, qualified plug-in electric vehicle manu-  
19          facturers, compressed natural gas and liquefied petroleum  
20          gas vehicle manufacturers, vehicle and engine equipment  
21          and component manufacturers, manufacturing equipment  
22          manufacturers, advanced vehicle service providers, fuel  
23          producers and energy suppliers, electric utilities, univer-  
24          sities, national laboratories, and independent research lab-  
25          oratories. In carrying out this Act the Secretary shall—

1           (1) determine whether a wide range of compa-  
2           nies that manufacture or assemble vehicles or com-  
3           ponents in the United States are represented in on-  
4           going public private partnership activities, including  
5           firms that have not traditionally participated in fed-  
6           erally sponsored research and development activities,  
7           and where possible, partner with such firms that  
8           conduct significant and relevant research and devel-  
9           opment activities in the United States;

10           (2) leverage the capabilities and resources of,  
11           and formalize partnerships with, industry-led stake-  
12           holder organizations, nonprofit organizations, indus-  
13           try consortia, and trade associations with expertise  
14           in the research and development of, and education  
15           and outreach activities in, advanced automotive and  
16           commercial vehicle technologies;

17           (3) develop more efficient processes for trans-  
18           ferring research findings and technologies to indus-  
19           try;

20           (4) give consideration to conversion of existing  
21           or former vehicle technology development or manu-  
22           facturing facilities for the purposes of this Act;

23           (5) establish and support public-private part-  
24           nerships, dedicated to overcoming barriers in com-  
25           mercial application of transformational vehicle tech-



1 nologies, that utilize such industry-led technology de-  
2 velopment facilities of entities with demonstrated ex-  
3 pertise in successfully designing and engineering  
4 pre-commercial generations of such transformational  
5 technology; and

6 (6) promote efforts to ensure that technology  
7 research, development, engineering, and commercial  
8 application activities funded under this Act are car-  
9 ried out in the United States.

10 (d) INTERAGENCY AND INTRAAGENCY COORDINA-  
11 TION.—To the maximum extent practicable, the Secretary  
12 shall coordinate research, development, demonstration,  
13 and commercial application activities among—

14 (1) relevant programs within the Department,  
15 including—

16 (A) the Office of Energy Efficiency and  
17 Renewable Energy;

18 (B) the Office of Science;

19 (C) the Office of Electricity Delivery and  
20 Energy Reliability;

21 (D) the Office of Fossil Energy;

22 (E) the Advanced Research Projects Agen-  
23 cy—Energy; and

24 (F) other offices as determined by the Sec-  
25 retary; and

1           (2) relevant technology research and develop-  
2           ment programs within the Department of Transpor-  
3           tation and other Federal agencies, as determined by  
4           the Secretary.

5           (e) COORDINATION AND NONDUPLICATION.—In co-  
6           ordinating activities the Secretary shall ensure, to the  
7           maximum extent practicable, that activities do not dupli-  
8           cate those of other programs within the Department or  
9           other relevant research agencies.

10          (f) FEDERAL DEMONSTRATION OF TECH-  
11          NOLOGIES.—The Secretary shall make information avail-  
12          able to procurement programs of Federal agencies regard-  
13          ing the potential to demonstrate technologies resulting  
14          from activities funded through programs under this Act.

15          (g) INTERGOVERNMENTAL COORDINATION.—The  
16          Secretary shall seek opportunities to leverage resources  
17          and support initiatives of State and local governments in  
18          developing and promoting advanced vehicle technologies,  
19          manufacturing, and infrastructure.

20          (h) CRITERIA.—When awarding grants under this  
21          program, the Secretary shall give priority to those tech-  
22          nologies (either individually or as part of a system) that—

23                (1) provide the greatest aggregate fuel savings  
24                based on the reasonable projected sales volumes of  
25                the technology; and

1           (2) provide the greatest increase in United  
2 States employment.

3 **SEC. 212. SENSING AND COMMUNICATIONS TECH-**  
4 **NOLOGIES.**

5           (a) IN GENERAL.—The Secretary, in coordination  
6 with the Secretary of Transportation and the relevant re-  
7 search programs of other Federal agencies, shall conduct  
8 research, development, engineering, and demonstration ac-  
9 tivities on connectivity of vehicle and transportation sys-  
10 tems, including on sensing, computation, communication,  
11 and actuation technologies that allow for reduced fuel use,  
12 optimized traffic flow, and vehicle electrification, including  
13 technologies for—

14           (1) onboard vehicle, engine, and component  
15 sensing and actuation;

16           (2) vehicle-to-vehicle sensing and communica-  
17 tion;

18           (3) vehicle-to-infrastructure sensing and com-  
19 munication; and

20           (4) vehicle integration with the electrical grid  
21 and communications to provide grid services.

22           (b) COORDINATION.—The activities carried out under  
23 this section shall supplement (and not supplant) activities  
24 under the intelligent transportation system research pro-  
25 gram of the Department of Transportation.

1 **SEC. 213. MANUFACTURING.**

2 The Secretary shall carry out a research, develop-  
3 ment, engineering, demonstration, and commercial appli-  
4 cation program of advanced vehicle manufacturing tech-  
5 nologies and practices, including innovative processes to—

6 (1) increase the production rate and decrease  
7 the cost of advanced battery manufacturing;

8 (2) vary the capability of individual manufac-  
9 turing facilities to accommodate different battery  
10 chemistries and configurations;

11 (3) reduce waste streams, emissions, and en-  
12 ergy-intensity of vehicle, engine, advanced battery  
13 and component manufacturing processes;

14 (4) recycle and remanufacture used batteries  
15 and other vehicle components for reuse in vehicles or  
16 stationary applications;

17 (5) produce cost-effective lightweight materials  
18 such as advanced metal alloys, polymeric composites,  
19 and carbon fiber;

20 (6) produce lightweight high pressure storage  
21 systems for gaseous fuels;

22 (7) design and manufacture purpose-built hy-  
23 drogen and fuel cell vehicles and components;

24 (8) improve the calendar life and cycle life of  
25 advanced batteries; and

1           (9) produce permanent magnets for advanced  
2           vehicles.

3 **SEC. 214. USER TESTING FACILITIES.**

4           Activities under this subtitle may include construc-  
5           tion, expansion, or modification of new and existing vehi-  
6           cle, engine, and component research and testing facilities  
7           for—

8           (1) testing or simulating interoperability of a  
9           variety of vehicle components and systems;

10           (2) subjecting whole or partial vehicle platforms  
11           to fully representative duty cycles and operating con-  
12           ditions;

13           (3) developing and demonstrating a range of  
14           chemistries and configurations for advanced vehicle  
15           battery manufacturing; and

16           (4) developing and demonstrating test cycles for  
17           new and alternative fuels, and other advanced vehi-  
18           cle technologies.

19 **SEC. 215. REPORTING.**

20           (a) **TECHNOLOGIES DEVELOPED.**—Not later than 18  
21           months after the date of enactment of this Act and annu-  
22           ally thereafter through 2017, the Secretary of Energy  
23           shall transmit to Congress a report regarding the tech-  
24           nologies developed as a result of the activities authorized  
25           by this subtitle, with a particular emphasis on whether the

1 technologies were successfully adopted for commercial ap-  
2 plications, and if so, whether products relying on those  
3 technologies are manufactured in the United States.

4 (b) ADDITIONAL MATTERS.—At the end of each fis-  
5 cal year through 2017, the Secretary shall submit to the  
6 relevant Congressional committees of jurisdiction an an-  
7 nual report describing activities undertaken in the pre-  
8 vious year under this subtitle, active industry participants,  
9 efforts to recruit new participants committed to design,  
10 engineering, and manufacturing of advanced vehicle tech-  
11 nologies in the United States, progress of the program in  
12 meeting goals and timelines, and a strategic plan for fund-  
13 ing of activities across agencies.

14 **Subtitle C—Medium- and Heavy-**  
15 **Duty Commercial and Transit**  
16 **Vehicles**

17 **SEC. 221. PROGRAM.**

18 (a) IN GENERAL.—The Secretary, in partnership  
19 with relevant research and development programs in other  
20 Federal agencies, and a range of appropriate industry  
21 stakeholders, shall carry out a program of cooperative re-  
22 search, development, demonstration, and commercial ap-  
23 plication activities on advanced technologies for medium-  
24 to heavy-duty commercial, vocational, recreational, and  
25 transit vehicles, including activities in the areas of—

- 1 (1) engine efficiency and combustion research;
- 2 (2) onboard storage technologies for compressed
- 3 natural gas and liquefied petroleum gas;
- 4 (3) development and integration of engine tech-
- 5 nologies designed for compressed natural gas and
- 6 liquefied petroleum gas operation of a variety of ve-
- 7 hicle platforms;
- 8 (4) waste heat recovery and conversion;
- 9 (5) improved aerodynamics and tire rolling re-
- 10 sistance;
- 11 (6) energy and space-efficient emissions control
- 12 systems;
- 13 (7) heavy hybrid, hybrid hydraulic, plug-in hy-
- 14 brid, and electric platforms, and energy storage
- 15 technologies;
- 16 (8) drivetrain optimization;
- 17 (9) friction and wear reduction;
- 18 (10) engine idle and parasitic energy loss reduc-
- 19 tion;
- 20 (11) electrification of accessory loads;
- 21 (12) onboard sensing and communications tech-
- 22 nologies;
- 23 (13) advanced lightweighting materials and ve-
- 24 hicle designs;
- 25 (14) increasing load capacity per vehicle;

- 1 (15) thermal management of battery systems;
- 2 (16) recharging infrastructure;
- 3 (17) compressed natural gas and liquefied pe-
- 4 troleum gas infrastructure;
- 5 (18) advanced internal combustion engines;
- 6 (19) complete vehicle modeling and simulation;
- 7 (20) hydrogen vehicle technologies, including
- 8 fuel cells and internal combustion engines, and hy-
- 9 drogen infrastructure;
- 10 (21) retrofitting advanced technologies onto ex-
- 11 isting truck fleets; and
- 12 (22) integration of these and other advanced
- 13 systems onto a single truck and trailer platform.

14 (b) LEADERSHIP.—The Secretary shall appoint a  
15 full-time Director to coordinate research, development,  
16 demonstration, and commercial application activities in  
17 medium- to heavy-duty commercial, recreational, and tran-  
18 sit vehicle technologies. Responsibilities of the Director  
19 shall be to—

- 20 (1) improve coordination and develop consensus
- 21 between government agency and industry partners,
- 22 and propose new processes for program management
- 23 and priority setting to better align activities and
- 24 budgets among partners;



1           (2) regularly convene workshops, site visits,  
2           demonstrations, conferences, investor forums, and  
3           other events in which information and research find-  
4           ings are shared among program participants and in-  
5           terested stakeholders;

6           (3) develop a budget for the Department's ac-  
7           tivities with regard to the interagency program, and  
8           provide consultation and guidance on vehicle tech-  
9           nology funding priorities across agencies;

10          (4) determine a process for reviewing program  
11          technical goals, targets, and timetables and, where  
12          applicable, aided by life-cycle impact and cost anal-  
13          ysis, propose revisions or elimination based on pro-  
14          gram progress, available funding, and rate of tech-  
15          nology adoption;

16          (5) evaluate ongoing activities of the program  
17          and recommend project modifications, including the  
18          termination of projects, where applicable;

19          (6) recruit new industry participants to the  
20          interagency program, including truck, trailer, and  
21          component manufacturers who have not traditionally  
22          participated in federally sponsored research and  
23          technology development activities; and

1           (7) other responsibilities as determined by the  
2       Secretary, in consultation with interagency and in-  
3       dustry partners.

4       (c) REPORTING.—At the end of each fiscal year, the  
5       Secretary shall submit to the Congress an annual report  
6       describing activities undertaken in the previous year, ac-  
7       tive industry participants, efforts to recruit new partici-  
8       pants, progress of the program in meeting goals and  
9       timelines, and a strategic plan for funding of activities  
10      across agencies.

11   **SEC. 222. CLASS 8 TRUCK AND TRAILER SYSTEMS DEM-**  
12                           **ONSTRATION.**

13      (a) IN GENERAL.—The Secretary shall conduct a  
14      competitive grant program to demonstrate the integration  
15      of multiple advanced technologies on Class 8 truck and  
16      trailer platforms with a goal of improving overall freight  
17      efficiency, as measured in tons and volume of freight  
18      hailed or other work performance-based metrics, by 50  
19      percent, including a combination of technologies listed in  
20      section 221(a).

21      (b) APPLICANT TEAMS.—Applicant teams may be  
22      comprised of truck and trailer manufacturers, engine and  
23      component manufacturers, fleet customers, university re-  
24      searchers, and other applicants as appropriate for the de-

1 velopment and demonstration of integrated Class 8 truck  
2 and trailer systems.

3 **SEC. 223. TECHNOLOGY TESTING AND METRICS.**

4 The Secretary, in coordination with the partners of  
5 the interagency research program described in section  
6 221(a)—

7 (1) shall develop standard testing procedures  
8 and technologies for evaluating the performance of  
9 advanced heavy vehicle technologies under a range of  
10 representative duty cycles and operating conditions,  
11 including for heavy hybrid propulsion systems;

12 (2) shall evaluate heavy vehicle performance  
13 using work performance-based metrics other than  
14 those based on miles per gallon, including those  
15 based on units of volume and weight transported for  
16 freight applications, and appropriate metrics based  
17 on the work performed by nonroad systems; and

18 (3) may construct heavy-duty truck and bus  
19 testing facilities.

20 **SEC. 224. NONROAD SYSTEMS PILOT PROGRAM.**

21 The Secretary shall undertake a pilot program of re-  
22 search, development, demonstration, and commercial ap-  
23 plications of technologies to improve total machine or sys-  
24 tem efficiency for nonroad mobile equipment including ag-  
25 ricultural and construction equipment, and shall seek op-

1 portunities to transfer relevant research findings and tech-  
 2 nologies between the nonroad and on-highway equipment  
 3 and vehicle sectors.

## 4           **Subtitle D—Authorization of** 5                           **Appropriations**

### 6 **SEC. 231. AUTHORIZATION OF APPROPRIATIONS.**

7           (a) IN GENERAL.—There are authorized to be appro-  
 8 priated to the Secretary for United States research, devel-  
 9 opment, engineering, demonstration, and commercial ap-  
 10 plication of vehicles and related technologies, including ac-  
 11 tivities authorized under subtitles B and C, such sums as  
 12 may be necessary for each of fiscal years 2012 through  
 13 2016.

14           (b) COST-SHARING REQUIREMENT.—The activities  
 15 carried out under this title shall be subject to the cost-  
 16 sharing requirements of section 988 of the Energy Policy  
 17 Act of 2005 (42 U.S.C. 16352).

## 18                           **TITLE III—BATTERY** 19                           **MANUFACTURING**

### 20 **SEC. 301. ADVANCED BATTERY MANUFACTURING ASSIST-** 21                           **ANCE.**

22           (a) IN GENERAL.—The Secretary shall make grants  
 23 for the manufacturing of advanced batteries and compo-  
 24 nents, and provide facility funding awards, to manufactur-  
 25 ers of advanced battery systems and vehicle batteries that

1 are produced in the United States, including manufactur-  
2 ers of advanced lithium ion batteries and hybrid electrical  
3 systems, component manufacturers, software designers,  
4 and system design and vehicle integrators.

5 (b) APPOINTMENT OF HIGHLY QUALIFIED INDIVID-  
6 UALS.—

7 (1) IN GENERAL.—Subject to paragraphs (2)  
8 through (4), notwithstanding section 3304 of title 5,  
9 United States Code, and without regard to sections  
10 3309 through 3318 of that title, the Secretary, on  
11 a determination that there is a severe shortage of  
12 candidates or a critical hiring need for particular po-  
13 sitions, may from funds made available to carry out  
14 this section, recruit and directly appoint highly  
15 qualified individuals into the competitive service to  
16 carry out this section.

17 (2) EXCEPTIONS.—The authority provided  
18 under paragraph (1) shall not apply to positions in  
19 the excepted service or the Senior Executive Service.

20 (3) MERIT PRINCIPLES.—Any action authorized  
21 under paragraph (1) shall be consistent with the  
22 merit principles of section 2301 of title 5, United  
23 States Code.

24 (4) PUBLIC NOTICE.—In carrying out this sub-  
25 section, the Secretary shall comply with the public

1 notice requirements of section 3327 of title 5,  
2 United States Code.

3 (c) AUTHORIZATION OF APPROPRIATIONS.—There is  
4 authorized to be appropriated to carry out this section  
5 \$2,000,000,000.

6 **TITLE IV—ALTERNATIVE AND**  
7 **SECONDARY USE OF BATTERIES**

8 **SEC. 401. ALTERNATIVE AND SECONDARY USE OF BAT-**  
9 **TERIES.**

10 (a) ALTERNATIVE AND SECONDARY USE APPLICA-  
11 TIONS PROGRAM.—

12 (1) IN GENERAL.—The Secretary shall carry  
13 out a research, development, and demonstration pro-  
14 gram that builds upon any work carried out under  
15 section 915 of the Energy Policy Act of 2005 (42  
16 U.S.C. 16195) and—

17 (A) identifies possible uses of a vehicle bat-  
18 tery after the useful life of the battery in a ve-  
19 hicle has been exhausted;

20 (B) assesses the potential for markets for  
21 uses described in subparagraph (A) to develop,  
22 as well as any barriers to the development of  
23 the markets;

24 (C) identifies the infrastructure, tech-  
25 nology, and equipment needed to manage the

1 charging activity of the batteries used in sta-  
2 tionary sources; and

3 (D) identifies the potential uses of a vehi-  
4 cle battery—

5 (i) with the most promise for market  
6 development; and

7 (ii) for which market development  
8 would be aided by a demonstration project.

9 (2) REPORT.—Not later than 2 years after the  
10 date of enactment of this Act, the Secretary shall  
11 submit to the appropriate committees of Congress  
12 an initial report on the findings of the program de-  
13 scribed in paragraph (1), including recommendations  
14 for stationary energy storage and other potential ap-  
15 plications for batteries used in plug-in electric drive  
16 vehicles.

17 (b) ALTERNATIVE AND SECONDARY USE DEM-  
18 ONSTRATION PROJECTS.—

19 (1) IN GENERAL.—The Secretary shall—

20 (A) develop guidelines for projects that  
21 demonstrate the alternative and secondary uses  
22 of vehicle batteries; and

23 (B) coordinate with the Secretary of De-  
24 fense to demonstrate the use of batteries to

1 provide onsite power on United States military  
2 facilities.

3 (2) PUBLICATION OF GUIDELINES.—Not later  
4 than 30 months after the date of enactment of this  
5 Act, the Secretary shall—

6 (A) publish the guidelines described in  
7 paragraph (1); and

8 (B) solicit applications for funding for  
9 demonstration projects.

10 (3) GRANT PROGRAM.—Not later than 18  
11 months after the date of enactment of this Act, the  
12 Secretary shall select proposals for grant funding  
13 under this section, based on an assessment of which  
14 proposals are mostly likely to contribute to the devel-  
15 opment of a secondary market for batteries.

16 **SEC. 402. LOAN GUARANTEES FOR ADVANCED BATTERY**  
17 **PURCHASES FOR USE IN STATIONARY APPLI-**  
18 **CATIONS.**

19 Subtitle B of title I of the Energy Independence and  
20 Security Act of 2007 (42 U.S.C. 17011 et seq.) is amend-  
21 ed by adding at the end the following:

22 **“SEC. 137. LOAN GUARANTEES FOR ADVANCED BATTERY**  
23 **PURCHASES.**

24 “(a) DEFINITIONS.—In this section:



1           “(1) QUALIFIED AUTOMOTIVE BATTERY.—The  
2 term ‘qualified automotive battery’ means a battery  
3 that—

4                   “(A) has at least 4 kilowatt hours of bat-  
5 tery capacity; and

6                   “(B) is designed for use in qualified plug-  
7 in electric drive motor vehicles but is purchased  
8 for nonautomotive applications.

9           “(2) ELIGIBLE ENTITY.—The term ‘eligible en-  
10 tity’ means—

11                   “(A) an original equipment manufacturer;

12                   “(B) an electric utility;

13                   “(C) any provider of range extension infra-  
14 structure; or

15                   “(D) any other qualified entity, as deter-  
16 mined by the Secretary.

17           “(b) LOAN GUARANTEES.—

18                   “(1) IN GENERAL.—The Secretary shall guar-  
19 antee loans made to eligible entities for the aggre-  
20 gate purchase of not less than 200 qualified auto-  
21 motive batteries in a calendar year that have a total  
22 minimum power rating of 1 megawatt and use ad-  
23 vanced battery technology.

24                   “(2) RESTRICTION.—As a condition of receiving  
25 a loan guarantee under this section, an entity pur-

1 chasing qualified automotive batteries with loan  
2 funds guaranteed under this section shall comply  
3 with the provisions of the Buy American Act (41  
4 U.S.C. 10a et seq.).

5 “(c) REGULATIONS.—The Secretary shall promulgate  
6 such regulations as are necessary to carry out this section.

7 “(d) AUTHORIZATION OF APPROPRIATIONS.—There  
8 is authorized to be appropriated to carry out this section  
9 \$50,000,000.”.

○