

**Calendar No. 622**111<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION**S. 2843****[Report No. 111-335]**

To provide for a program of research, development, demonstration, and commercial application in vehicle technologies at the Department of Energy.

---

## IN THE SENATE OF THE UNITED STATES

DECEMBER 7, 2009

Ms. STABENOW (for herself, Mr. BROWN of Ohio, Mr. WYDEN, Mr. NELSON of Florida, Mr. LEVIN, and Mr. BAYH) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

SEPTEMBER 28, 2010

Reported by Mr. BINGAMAN, with an amendment

[Strike out all after the enacting clause and insert the part printed in *italic*]

---

**A BILL**

To provide for a program of research, development, demonstration, and commercial application in vehicle technologies at the Department of Energy.

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

1 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

2 (a) **SHORT TITLE.**—This Act may be cited as the  
3 “Advanced Vehicle Technology Act of 2009”.

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

Sec. 1. Short title; table of contents.  
Sec. 2. Findings and purposes.  
Sec. 3. Definitions.

**TITLE I—VEHICLE RESEARCH AND DEVELOPMENT**

Sec. 101. Program.  
Sec. 102. Sensing and communications technologies.  
Sec. 103. Manufacturing.  
Sec. 104. User testing facilities.  
Sec. 105. Reports.  
Sec. 106. Innovative Automotive Demonstration Program.

**TITLE II—MEDIUM AND HEAVY DUTY COMMERCIAL AND  
TRANSIT VEHICLES**

Sec. 201. Program.  
Sec. 202. Class 8 truck and trailer systems demonstration.  
Sec. 203. Technology testing and metrics.  
Sec. 204. Nonroad systems pilot program.

**TITLE III—AUTHORIZATION OF APPROPRIATIONS**

Sec. 301. Authorization of appropriations.

6 **SEC. 2. FINDINGS AND PURPOSES.**

7 (a) **FINDINGS.**—Congress finds that—

8 (1) according to the Energy Information Ad-  
9 ministration, the transportation sector accounts for  
10 approximately 28 percent of the United States pri-  
11 mary energy demand and greenhouse gas emissions,  
12 and 24 percent of global oil demand;

13 (2) the United States transportation sector is  
14 over 95 percent dependent on petroleum, and over

1 60 percent of petroleum demand is met by imported  
2 supplies;

3 (3) United States heavy truck fuel consumption  
4 will increase 23 percent by 2030, while overall trans-  
5 portation energy use will decline by 1 percent;

6 (4) the domestic automotive and commercial ve-  
7 hicle manufacturing sectors have increasingly limited  
8 resources for research, development, and engineering  
9 of advanced technologies;

10 (5) domestic vehicle, engine, and component  
11 manufacturers are playing a more important role in  
12 vehicle technology development, and should be better  
13 integrated into Federal research efforts;

14 (6) priorities for vehicle technologies research of  
15 the Department of Energy have shifted drastically in  
16 recent years among diesel hybrids, hydrogen fuel cell  
17 vehicles, and plug-in electric hybrids, with little con-  
18 tinuity among the vehicle technologies;

19 (7) the integration of vehicle, communication,  
20 and infrastructure technologies has great potential  
21 for efficiency gains through better management of  
22 the total transportation system; and

23 (8) the Federal Government should balance the  
24 role of the Federal Government in researching  
25 longer-term exploratory concepts and developing

1 nearer-term transformational technologies for do-  
2 mestic-made vehicles.

3 (b) PURPOSES.—The purposes of this Act are—

4 (1) to develop and promote the deployment of  
5 technologies and practices that—

6 (A) improve the fuel efficiency and emis-  
7 sions of all vehicles produced in the United  
8 States; and

9 (B) reduce vehicle reliance on petroleum-  
10 based fuels;

11 (2) to support domestic research, development,  
12 demonstration, deployment, engineering, and com-  
13 mercial application and domestic manufacturing of  
14 advanced vehicles, engines, and components;

15 (3) to enable vehicles to move larger volumes of  
16 goods and more passengers with less energy and  
17 emissions;

18 (4) to develop cost-effective advanced tech-  
19 nologies for wide-scale utilization throughout the  
20 passenger, commercial, government, and transit ve-  
21 hicle sectors;

22 (5) to allow for greater consumer choice of do-  
23 mestic-made vehicle technologies and fuels;

24 (6) to shorten technology development and inte-  
25 gration cycles in the domestic vehicle industry;

1           (7) to ensure a proper balance and diversity of  
2 Federal investment in domestic-made vehicle tech-  
3 nologies;

4           (8) to promote the integration of intelligent ve-  
5 hicle technologies with infrastructure-based informa-  
6 tion and communications systems and the electrical  
7 grid; and

8           (9) to strengthen partnerships between Federal  
9 and State governmental agencies and the private  
10 and academic sectors.

11 **SEC. 3. DEFINITIONS.**

12 In this Act:

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

15           (2) SECRETARY.—The term “Secretary” means  
16 the Secretary of Energy.

17 **TITLE I—VEHICLE RESEARCH**  
18 **AND DEVELOPMENT**

19 **SEC. 101. PROGRAM.**

20           (a) ACTIVITIES.—The Secretary shall conduct a pro-  
21 gram of basic and applied research, development, engi-  
22 neering, demonstration, and commercial application activi-  
23 ties on materials, technologies, and processes with the po-  
24 tential to substantially reduce or eliminate petroleum use

1 by, and emissions from, passenger and commercial vehicles  
2 of the United States, including activities in the areas of—

3           (1) hybridization or full electrification of vehicle  
4           systems;

5           (2) batteries and other energy storage devices;

6           (3) power electronics;

7           (4) vehicle, component, and subsystem manu-  
8           facturing technologies and processes;

9           (5) engine efficiency and combustion optimiza-  
10          tion;

11          (6) waste heat recovery;

12          (7) transmission and drivetrains;

13          (8) hydrogen vehicle technologies, including fuel  
14          cells and internal combustion engines, and hydrogen  
15          infrastructure;

16          (9) aerodynamics, rolling resistance, and acces-  
17          sory power loads of vehicles and associated equip-  
18          ment;

19          (10) vehicle weight reduction, including light-  
20          weight materials;

21          (11) friction and wear reduction;

22          (12) engine and component durability;

23          (13) innovative propulsion systems;

24          (14) advanced boosting systems;

25          (15) hydraulic hybrid technologies;

1           (16) engine compatibility with and optimization  
2           for a variety of transportation fuels, including liquid  
3           and gaseous fuels;

4           (17) predictive engineering, modeling, and sim-  
5           ulation of vehicle and transportation systems;

6           (18) refueling and charging infrastructure for  
7           alternative fueled and electric or plug-in electric hy-  
8           brid vehicles, including the unique challenges facing  
9           rural areas;

10          (19) gaseous fuels storage system integration  
11          and optimization;

12          (20) sensing, communications, and actuation  
13          technologies for vehicle, electrical grid, and infra-  
14          structure;

15          (21) efficient use and recycling of rare earth  
16          materials and reduction of precious metals and other  
17          high-cost materials in vehicles;

18          (22) aftertreatment technologies;

19          (23) thermal management of battery systems;

20          (24) retrofitting advanced vehicle technologies  
21          to existing vehicles;

22          (25) development of common standards, speci-  
23          fications, and architectures for both transportation  
24          and stationary battery applications;

1           (26) development of innovative materials, in-  
2           cluding constructive, connective, and reinforcing ve-  
3           hicle components; and

4           (27) other research areas, as determined by the  
5           Secretary.

6           (b) TRANSFORMATIONAL TECHNOLOGY.—The Sec-  
7           retary, in coordination with the Secretary of Transpor-  
8           tation (if appropriate), shall ensure that the Department  
9           continues to support domestic research, development, en-  
10          gineering, demonstration, and commercial application ac-  
11          tivities and maintains competency in mid- to long-term  
12          transformational vehicle technologies with the potential to  
13          achieve deep reductions in petroleum use and emissions,  
14          including activities in the areas of—

15           (1) hydrogen vehicle technologies, including fuel  
16           cells, internal combustion engines, hydrogen storage,  
17           infrastructure, and activities in hydrogen technology  
18           validation and safety codes and standards;

19           (2) multiple battery chemistries and novel en-  
20           ergy storage devices, including nonchemical batteries  
21           and electromechanical storage technologies such as  
22           hydraulics, flywheels, bipolar design, and compressed  
23           air storage;

24           (3) communication and connectivity among ve-  
25           hicles, infrastructure, and the electrical grid;



1           (4) lightweight vehicles and materials; and

2           (5) other innovative technologies research and  
3 development, as determined by the Secretary.

4       (c) INDUSTRY PARTICIPATION.—

5           (1) IN GENERAL.—To the maximum extent  
6 practicable, activities under this Act shall be carried  
7 out in partnership or collaboration with—

8           (A) automotive manufacturers;

9           (B) heavy commercial and transit vehicle  
10 manufacturers;

11           (C) qualified plug-in electric vehicle manu-  
12 facturers;

13           (D) vehicle and engine equipment and  
14 component manufacturers;

15           (E) manufacturing equipment manufactur-  
16 ers;

17           (F) advanced vehicle service providers;

18           (G) fuel producers and energy suppliers;

19           (H) electric utilities;

20           (I) institutions of higher education;

21           (J) National Laboratories; and

22           (K) independent research laboratories.

23           (2) ADMINISTRATION.—In carrying out this  
24 Act, the Secretary shall—

1           (A) determine whether a wide range of  
2 companies that manufacture or assemble vehi-  
3 cles or components in the United States are  
4 represented in ongoing public private partner-  
5 ship activities, including firms that have not  
6 traditionally participated in federally sponsored  
7 research and development activities, and if  
8 practicable, partner with such firms that con-  
9 duct a substantial portion of relevant research  
10 and development activities in the United States;

11           (B) leverage the capabilities and resources  
12 of, and formalize partnerships with, industry-  
13 led stakeholder organizations, nonprofit organi-  
14 zations, industry consortia, and trade associa-  
15 tions with expertise in the research and develop-  
16 ment of, and education and outreach activities  
17 in, advanced automotive and commercial vehicle  
18 technologies;

19           (C) develop more efficient processes for  
20 transferring research findings and technologies  
21 to industry;

22           (D) give consideration to conversion of ex-  
23 isting or former vehicle technology development  
24 or manufacturing facilities for the purposes of  
25 this Act, and support public-private partner-

1           ships dedicated to overcoming barriers in com-  
2           mercial application of transformational vehicle  
3           technologies that use such industry-led facili-  
4           ties;

5           (E) promote efforts to ensure that tech-  
6           nologies developed under this Act are produced  
7           in the United States; and

8           (F) establish public-private partnerships  
9           dedicated to overcoming barriers to the com-  
10          mercial application of transformational vehicle  
11          technologies; using existing industry-led domes-  
12          tic technology development facilities of entities  
13          with demonstrated expertise in successfully de-  
14          signing and engineering precommercial genera-  
15          tions of such transformational technology.

16          (d) INTERAGENCY AND INTRAAGENCY COORDINA-  
17          TION.—To the maximum extent practicable, the Secretary  
18          shall coordinate research, development, engineering, dem-  
19          onstration, and commercial application activities among—

20                (1) relevant programs within the Department,  
21                including—

22                    (A) the Office of Energy Efficiency and  
23                    Renewable Energy;

24                    (B) the Office of Science;

1           (C) the Office of Electricity Delivery and  
2           Energy Reliability;

3           (D) the Office of Fossil Energy;

4           (E) the Advanced Research Projects Agen-  
5           cy—Energy; and

6           (F) other offices, as determined by the  
7           Secretary; and

8           (2) relevant technology research and develop-  
9           ment programs within the Department of Transpor-  
10          tation and other Federal agencies, as determined by  
11          the Secretary.

12          (c) COORDINATION AND NONDUPLICATION.—In co-  
13          ordinating activities, the Secretary shall ensure, to the  
14          maximum extent practicable, that activities do not dupli-  
15          cate activities of other programs within the Department  
16          or other relevant research agencies.

17          (f) FEDERAL DEMONSTRATION OF TECH-  
18          NOLOGIES.—The Secretary shall make information avail-  
19          able to procurement programs of Federal agencies regard-  
20          ing the potential to demonstrate technologies resulting  
21          from activities funded through programs under this Act.

22          (g) INTERGOVERNMENTAL COORDINATION.—The  
23          Secretary shall seek opportunities to leverage resources  
24          and support initiatives of State and local governments in

1 developing and promoting advanced vehicle technologies,  
2 manufacturing, and infrastructure.

3 **SEC. 102. SENSING AND COMMUNICATIONS TECH-**  
4 **NOLOGIES.**

5 (a) IN GENERAL.—The Secretary, in coordination  
6 with the Secretary of Transportation and relevant re-  
7 search programs of other Federal agencies, shall conduct  
8 research, development, engineering, and demonstration ac-  
9 tivities on connectivity of domestic vehicle and transpor-  
10 tation systems, including on sensing, computation, com-  
11 munication, actuation, and information technologies that  
12 allow for reduced fuel use, optimized traffic flow, improved  
13 freight logistics, and vehicle electrification, including tech-  
14 nologies for—

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

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

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

21 (4) vehicle integration with the electrical grid;  
22 and

23 (5) driver-to-vehicle integration and commu-  
24 nication.

1       (b) **COORDINATION.**—The activities carried out under  
2 this section should supplement, and not duplicate, activi-  
3 ties under the intelligent transportation system research  
4 program of the Department of Transportation.

5 **SEC. 103. MANUFACTURING.**

6       The Secretary shall carry out a research, develop-  
7 ment, engineering, demonstration, and commercial appli-  
8 cation program of domestic advanced vehicle manufac-  
9 turing technologies and practices, including innovative  
10 processes to—

11           (1) increase the production rate and decrease  
12 the cost of advanced battery manufacturing;

13           (2) vary the capability of individual manufac-  
14 turing facilities to accommodate different battery  
15 chemistries and configurations;

16           (3) reduce waste streams, emissions, and en-  
17 ergy-intensity of vehicle, engine, advanced battery,  
18 and component manufacturing processes;

19           (4) recycle and remanufacture used batteries  
20 and other vehicle components for reuse in vehicles or  
21 stationary applications;

22           (5) produce cost-effective lightweight materials,  
23 such as advanced metal alloys, polymeric composites,  
24 and carbon fiber;

1           (6) produce lightweight high pressure storage  
2 systems for gaseous fuels;

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

5           (8) improve the calendar life and cycle life of  
6 advanced batteries; and

7           (9) produce permanent magnets for advanced  
8 vehicles.

9 **SEC. 104. USER TESTING FACILITIES.**

10        Activities under this Act may include domestic con-  
11 struction, expansion, or modification of new and existing  
12 vehicle, engine, and component research and testing facili-  
13 ties for—

14           (1) testing or simulating interoperability of a  
15 variety of vehicle components and systems;

16           (2) subjecting whole or partial vehicle platforms  
17 to fully representative duty cycles and operating con-  
18 ditions;

19           (3) developing and demonstrating a range of  
20 chemistries and configurations for advanced vehicle  
21 battery manufacturing; and

22           (4) developing and demonstrating test cycles for  
23 new and alternative fuels and other advanced vehicle  
24 technologies.

1 **SEC. 105. REPORTS.**

2 (a) **TECHNOLOGIES.**—Not later than 18 months after  
 3 the date of enactment of this Act and annually thereafter  
 4 through calendar year 2015, the Secretary shall submit  
 5 to Congress a report regarding the technologies developed  
 6 as a result of the activities authorized by this title, with  
 7 a particular emphasis on—

8 (1) whether the technologies were successfully  
 9 adopted for commercial applications; and

10 (2) if so, whether those technologies are manu-  
 11 factured in the United States.

12 (b) **ACTIVITIES.**—At the end of each fiscal year the  
 13 Secretary shall submit to the relevant Congressional com-  
 14 mittees of jurisdiction an annual report on activities un-  
 15 dertaken during the fiscal year under this title, includ-  
 16 ing—

17 (1) active industry participants;

18 (2) efforts to recruit new participants;

19 (3) progress of the program in meeting goals  
 20 and timelines; and

21 (4) a strategic plan for funding of activities  
 22 across agencies.

23 **SEC. 106. INNOVATIVE AUTOMOTIVE DEMONSTRATION**  
 24 **PROGRAM.**

25 (a) **IN GENERAL.**—The Secretary shall establish an  
 26 Innovative Automotive Demonstration Program, within



1 the Vehicle Technologies Program, to encourage the intro-  
2 duction of new domestic-made advanced technology vehi-  
3 cles into the marketplace that are designed in their en-  
4 tirety to achieve very high energy efficiency but still pro-  
5 vide the capabilities required by consumers in the United  
6 States.

7 (b) ADMINISTRATION.—The Program established  
8 under this section shall encourage—

9 (1) the introduction of new light duty vehicles  
10 into the marketplace that are capable of achieving  
11 energy efficiencies significantly greater than required  
12 under applicable and pending corporate average fuel  
13 economy standards; and

14 (2) the use of materials and manufacturing  
15 techniques that minimize environmental impacts.

16 (c) AWARDS.—Awards under this section shall be  
17 made on a competitive basis for demonstration of domes-  
18 tic-made vehicles that—

19 (1) are primarily for use on public streets,  
20 roads, and highways and are not manufactured pri-  
21 marily for off-road use;

22 (2) meet all Federal safety requirements;

23 (3) achieve at least 70 miles per gallon or the  
24 equivalent on drive cycle of the Environmental Pro-  
25 tection Agency;

1           (4) provide vehicle performance that is judged  
2 acceptable to consumers in the United States;

3           (5) be affordable to consumers in the United  
4 States;

5           (6) use materials and manufacturing processes  
6 that minimize environmental impacts;

7           (7) meet all Federal and State emission re-  
8 quirements; and

9           (8) provide new high technology engineering  
10 and production employment opportunities.

11 **TITLE II—MEDIUM AND HEAVY**  
12 **DUTY COMMERCIAL AND**  
13 **TRANSIT VEHICLES**

14 **SEC. 201. PROGRAM.**

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

23           (1) engine efficiency and combustion research;

24           (2) onboard storage technologies for compressed  
25 and liquefied natural gas;

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

1           (18) hydrogen vehicle technologies, including  
2 fuel cells and internal combustion engines, and hy-  
3 drogen infrastructure;

4           (19) retrofitting advanced technologies onto ex-  
5 isting truck fleets; and

6           (20) integration of those and other advanced  
7 systems onto a single truck and trailer platform.

8 (b) DIRECTOR.—

9           (1) IN GENERAL.—The Secretary shall appoint  
10 a full-time Director to coordinate research, develop-  
11 ment, demonstration, and commercial application ac-  
12 tivities in medium- to heavy-duty commercial, rec-  
13 reational, and transit vehicle technologies.

14           (2) DUTIES.—The Director shall—

15           (A) improve coordination and develop con-  
16 sensus between government agency and indus-  
17 try partners, and propose new processes for  
18 program management and priority setting to  
19 better align activities and budgets among part-  
20 ners;

21           (B) regularly conduct workshops, site vis-  
22 its, demonstrations, conferences, investor fo-  
23 rums, and other events in which information  
24 and research findings are shared among pro-  
25 gram participants and interested stakeholders;

1           (C) develop a budget for activities of the  
2 Department regarding the interagency program  
3 established under this title, and provide con-  
4 sultation and guidance on vehicle technology  
5 funding priorities across agencies;

6           (D) determine a process for reviewing pro-  
7 gram technical goals, targets, and timetables  
8 and, if applicable, aided by life-cycle impact and  
9 cost analysis, propose revisions or elimination  
10 based on program progress, available funding,  
11 and rate of technology adoption;

12           (E) evaluate ongoing activities of the pro-  
13 gram and recommend project modifications, in-  
14 cluding the termination of projects, if applica-  
15 ble;

16           (F) recruit new industry participants to  
17 the interagency program, including truck, trail-  
18 er, and component manufacturers who have not  
19 traditionally participated in federally sponsored  
20 research and technology development activities;  
21 and

22           (G) other responsibilities, as determined by  
23 the Secretary, in consultation with interagency  
24 and industry partners.

1           (c) **REPORTS.**—At the end of each fiscal year, the  
 2 Secretary shall submit to Congress an annual report that  
 3 describes activities undertaken during the fiscal year  
 4 under this title, including—

5           (1) active industry participants;

6           (2) efforts to recruit new participants;

7           (3) progress of the program in meeting goals  
 8 and timelines; and

9           (4) a strategic plan for funding of activities  
 10 across agencies.

11 **SEC. 202. 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 hauled or other work performance-based metrics, by 50  
 19 percent, through a combination of technologies described  
 20 in section 201(a).

21           (b) **APPLICANT TEAMS.**—Applicant teams may be  
 22 comprised of truck and trailer manufacturers, engine and  
 23 component manufacturers, fleet customers, information  
 24 and communications technology manufacturers and pro-  
 25 viders, researchers of institutions of higher education, and

1 other applicants, as appropriate, for the development and  
2 demonstration of integrated Class 8 truck and trailer sys-  
3 tems.

4 **SEC. 203. TECHNOLOGY TESTING AND METRICS.**

5 The Secretary, in coordination with the partners of  
6 the interagency research program described in section  
7 201(a)—

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

13 (2) shall evaluate heavy vehicle performance  
14 using work performance-based metrics other than  
15 metrics based on miles per gallon, including—

16 (A) metrics based on units of volume and  
17 weight transported for freight applications; and

18 (B) appropriate metrics based on perform-  
19 ance on nonroad systems; and

20 (3) may construct heavy duty truck and bus  
21 testing facilities.

22 **SEC. 204. NONROAD SYSTEMS PILOT PROGRAM.**

23 (a) IN GENERAL.—The Secretary shall carry out a  
24 pilot program of research, development, demonstration,  
25 and commercial applications of technologies to improve

1 total machine or system efficiency for nonroad mobile  
 2 equipment, including agricultural and construction equip-  
 3 ment.

4 (b) INFORMATION TRANSFER.—In carrying out this  
 5 section, the Secretary shall seek opportunities to transfer  
 6 relevant research findings and technologies between the  
 7 nonroad and on-highway equipment and vehicle sectors.

## 8 **TITLE III—AUTHORIZATION OF** 9 **APPROPRIATIONS**

### 10 **SEC. 301. AUTHORIZATION OF APPROPRIATIONS.**

11 There are authorized to be appropriated to the Sec-  
 12 retary such sums as are necessary to carry out this Act.

#### 13 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

14 (a) *SHORT TITLE.*—This Act may be cited as the “Ad-  
 15 vanced Vehicle Technology Act of 2010”.

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

*Sec. 1. Short title; table of contents.*

*Sec. 2. Findings and purposes.*

*Sec. 3. Definitions.*

#### **TITLE I—VEHICLE RESEARCH AND DEVELOPMENT**

*Sec. 101. Program.*

*Sec. 102. Sensing and communications technologies.*

*Sec. 103. Manufacturing.*

*Sec. 104. User testing facilities.*

*Sec. 105. Reports.*

*Sec. 106. Innovative Automotive Demonstration Program.*

#### **TITLE II—MEDIUM AND HEAVY DUTY COMMERCIAL AND TRANSIT VEHICLES**

*Sec. 201. Program.*

*Sec. 202. Class 8 truck and trailer systems demonstration.*

*Sec. 203. Technology testing and metrics.*



*Sec. 204. Nonroad systems pilot program.*

**TITLE III—ADVANCED TECHNOLOGY VEHICLES MANUFACTURING  
INCENTIVE PROGRAM**

*Sec. 301. Advanced technology vehicles manufacturing incentive program.*

**TITLE IV—NATURAL GAS VEHICLES**

*Sec. 401. Natural gas vehicle research, development, and demonstration projects.*

*Sec. 402. Study of increasing natural gas and liquefied petroleum gas vehicles in  
Federal fleet.*

**TITLE V—AUTHORIZATION OF APPROPRIATIONS**

*Sec. 501. Authorization of appropriations.*

*Sec. 502. Cost-sharing requirement.*

**1 SEC. 2. FINDINGS AND PURPOSES.**

2 (a) *FINDINGS.*—Congress finds that—

3 (1) *according to the Energy Information Admin-*  
4 *istration, the transportation sector accounts for ap-*  
5 *proximately 28 percent of the United States primary*  
6 *energy demand and greenhouse gas emissions, and 24*  
7 *percent of global oil demand;*

8 (2) *the United States transportation sector is*  
9 *over 95 percent dependent on petroleum, and over 60*  
10 *percent of petroleum demand is met by imported sup-*  
11 *plies;*

12 (3) *United States heavy truck fuel consumption*  
13 *will increase 23 percent by 2030, while overall trans-*  
14 *portation energy use will decline by 1 percent;*

15 (4) *the domestic automotive and commercial ve-*  
16 *hicle manufacturing sectors have increasingly limited*  
17 *resources for research, development, and engineering*  
18 *of advanced technologies;*

1           (5) *domestic vehicle, engine, and component*  
2           *manufacturers are playing a more important role in*  
3           *vehicle technology development, and should be better*  
4           *integrated into Federal research efforts;*

5           (6) *priorities for vehicle technologies research of*  
6           *the Department of Energy have shifted drastically in*  
7           *recent years among diesel hybrids, hydrogen fuel cell*  
8           *vehicles, and plug-in electric hybrids, with little con-*  
9           *tinuity among the vehicle technologies;*

10          (7) *the integration of vehicle, communication,*  
11          *and infrastructure technologies has great potential for*  
12          *efficiency gains through better management of the*  
13          *total transportation system; and*

14          (8) *the Federal Government should balance the*  
15          *role of the Federal Government in researching longer-*  
16          *term exploratory concepts and developing nearer-term*  
17          *transformational technologies for domestic-made vehi-*  
18          *cles.*

19          (b) *PURPOSES.—The purposes of this Act are—*

20               (1) *to reform and reorient the vehicle tech-*  
21               *nologies programs of the Department of Energy;*

22               (2) *to develop and promote the deployment of*  
23               *technologies and practices that—*

1           (A) improve the fuel efficiency and emis-  
2           sions of all vehicles produced in the United  
3           States; and

4           (B) reduce vehicle reliance on petroleum-  
5           based fuels;

6           (3) to support domestic research, development,  
7           demonstration, deployment, engineering, and commer-  
8           cial application and domestic manufacturing of ad-  
9           vanced vehicles, engines, and components;

10          (4) to enable vehicles to move larger volumes of  
11          goods and more passengers with less energy and emis-  
12          sions;

13          (5) to develop cost-effective advanced technologies  
14          for wide-scale utilization throughout the passenger,  
15          commercial, government, and transit vehicle sectors;

16          (6) to allow for greater consumer choice of do-  
17          mestic-made vehicle technologies and fuels;

18          (7) to shorten technology development and inte-  
19          gration cycles in the domestic vehicle industry;

20          (8) to ensure a proper balance and diversity of  
21          Federal investment in domestic-made vehicle tech-  
22          nologies;

23          (9) to promote the integration of intelligent vehi-  
24          cle technologies with infrastructure-based information

1        *and communications systems and the electrical grid;*  
 2        *and*

3                *(10) to strengthen partnerships between Federal*  
 4        *and State governmental agencies and the private and*  
 5        *academic sectors.*

6    **SEC. 3. DEFINITIONS.**

7        *In this Act:*

8                *(1) ADMINISTRATOR.—The term “Adminis-*  
 9        *trator” means the Administrator of the Environ-*  
 10        *mental Protection Agency.*

11                *(2) DEPARTMENT.—The term “Department”*  
 12        *means the Department of Energy.*

13                *(3) SECRETARY.—The term “Secretary” means*  
 14        *the Secretary of Energy.*

15        **TITLE I—VEHICLE RESEARCH**  
 16                **AND DEVELOPMENT**

17    **SEC. 101. PROGRAM.**

18        *(a) ACTIVITIES.—In carrying out the Vehicle Tech-*  
 19        *nologies Program of the Department, the Secretary shall*  
 20        *conduct basic and applied research, development, engineer-*  
 21        *ing, demonstration, and commercial application activities*  
 22        *on materials, technologies, and processes with the potential*  
 23        *to substantially reduce or eliminate petroleum use by, and*  
 24        *emissions from, passenger and commercial vehicles of the*  
 25        *United States, including activities in the areas of—*

- 1           (1) *hybridization or full electrification of vehicle*
- 2           *systems;*
- 3           (2) *batteries, ultracapacitors, and other energy*
- 4           *storage devices;*
- 5           (3) *power electronics;*
- 6           (4) *vehicle, component, and subsystem manufac-*
- 7           *turing technologies and processes;*
- 8           (5) *engine efficiency and combustion optimiza-*
- 9           *tion;*
- 10          (6) *waste heat recovery;*
- 11          (7) *transmission and drivetrains;*
- 12          (8) *hydrogen vehicle technologies, including fuel*
- 13          *cells and internal combustion engines, and hydrogen*
- 14          *infrastructure;*
- 15          (9) *aerodynamics, rolling resistance, and acces-*
- 16          *sory power loads of vehicles and associated equip-*
- 17          *ment;*
- 18          (10) *vehicle weight reduction, including light-*
- 19          *weight materials;*
- 20          (11) *friction and wear reduction;*
- 21          (12) *engine and component durability;*
- 22          (13) *innovative propulsion systems;*
- 23          (14) *advanced boosting systems;*
- 24          (15) *hydraulic hybrid technologies;*

1           (16) *engine compatibility with and optimization*  
2 *for a variety of transportation fuels, including liquid*  
3 *and gaseous fuels;*

4           (17) *predictive engineering, modeling, and sim-*  
5 *ulation of vehicle and transportation systems;*

6           (18) *refueling and charging infrastructure for al-*  
7 *ternative fueled and electric or plug-in electric hybrid*  
8 *vehicles, including the unique challenges facing rural*  
9 *areas;*

10          (19) *gaseous fuels storage system integration and*  
11 *optimization;*

12          (20) *sensing, communications, and actuation*  
13 *technologies for vehicle, electrical grid, and infrastruc-*  
14 *ture;*

15          (21) *efficient use and recycling of rare earth ma-*  
16 *terials and reduction of precious metals and other*  
17 *high-cost materials in vehicles;*

18          (22) *aftertreatment technologies;*

19          (23) *thermal management of battery systems;*

20          (24) *retrofitting advanced vehicle technologies to*  
21 *existing vehicles;*

22          (25) *development of common standards, speci-*  
23 *fications, and architectures for both transportation*  
24 *and stationary battery applications;*

1           (26) *development of innovative materials, includ-*  
2           *ing constructive, connective, and reinforcing vehicle*  
3           *components; and*

4           (27) *other research areas, as determined by the*  
5           *Secretary.*

6           (b) *TRANSFORMATIONAL TECHNOLOGY.—The Sec-*  
7           *retary, in coordination with the Secretary of Transpor-*  
8           *tation (if appropriate), shall ensure that the Department*  
9           *continues to support domestic research, development, engi-*  
10           *neering, demonstration, and commercial application activi-*  
11           *ties and maintains competency in mid- to long-term trans-*  
12           *formational vehicle technologies with the potential to*  
13           *achieve deep reductions in petroleum use and emissions, in-*  
14           *cluding activities in the areas of—*

15           (1) *hydrogen vehicle technologies, including fuel*  
16           *cells, internal combustion engines, hydrogen storage,*  
17           *infrastructure, and activities in hydrogen technology*  
18           *validation and safety codes and standards;*

19           (2) *multiple battery chemistries and novel energy*  
20           *storage devices, including nonchemical batteries and*  
21           *electromechanical storage technologies such as hydrau-*  
22           *lics, flywheels, bipolar design, and compressed air*  
23           *storage;*

24           (3) *communication and connectivity among ve-*  
25           *hicles, infrastructure, and the electrical grid;*

1           (4) *lightweight vehicles and materials; and*

2           (5) *other innovative technologies research and de-*  
3 *velopment, as determined by the Secretary.*

4           (c) *INDUSTRY PARTICIPATION.—*

5           (1) *IN GENERAL.—To the maximum extent prac-*  
6 *ticable, activities under this Act shall be carried out*  
7 *in partnership or collaboration with—*

8                   (A) *automotive manufacturers;*

9                   (B) *heavy commercial and transit vehicle*  
10 *manufacturers;*

11                   (C) *qualified plug-in electric vehicle manu-*  
12 *facturers;*

13                   (D) *vehicle and engine equipment and com-*  
14 *ponent manufacturers;*

15                   (E) *manufacturing equipment manufactur-*  
16 *ers;*

17                   (F) *advanced vehicle service providers;*

18                   (G) *fuel producers and energy suppliers;*

19                   (H) *electric utilities;*

20                   (I) *institutions of higher education;*

21                   (J) *National Laboratories; and*

22                   (K) *independent research laboratories.*

23           (2) *ADMINISTRATION.—In carrying out this Act,*  
24 *the Secretary shall—*



1           (A) determine whether a wide range of com-  
2           panies that manufacture or assemble vehicles or  
3           components in the United States are represented  
4           in ongoing public private partnership activities,  
5           including firms that have not traditionally par-  
6           ticipated in federally sponsored research and de-  
7           velopment activities, and if practicable, partner  
8           with such firms that conduct a substantial por-  
9           tion of relevant research and development activi-  
10          ties in the United States;

11          (B) leverage the capabilities and resources  
12          of, and formalize partnerships with, industry-led  
13          stakeholder organizations, nonprofit organiza-  
14          tions, industry consortia, and trade associations  
15          with expertise in the research and development  
16          of, and education and outreach activities in, ad-  
17          vanced automotive and commercial vehicle tech-  
18          nologies;

19          (C) develop more efficient processes for  
20          transferring research findings and technologies to  
21          industry;

22          (D) give consideration to conversion of ex-  
23          isting or former vehicle technology development  
24          or manufacturing facilities for the purposes of  
25          this Act, and support public-private partnerships

1           *dedicated to overcoming barriers in commercial*  
2           *application of transformational vehicle tech-*  
3           *nologies that use such industry-led facilities;*

4           (E) *promote efforts to ensure that tech-*  
5           *nologies developed under this Act are produced*  
6           *in the United States; and*

7           (F) *establish public-private partnerships*  
8           *dedicated to overcoming barriers to the commer-*  
9           *cial application of transformational vehicle tech-*  
10           *nologies, using existing industry-led domestic*  
11           *technology development facilities of entities with*  
12           *demonstrated expertise in successfully designing*  
13           *and engineering precommercial generations of*  
14           *such transformational technology.*

15       (d) *INTERAGENCY AND INTRAAGENCY COORDINA-*  
16       *TION.—To the maximum extent practicable, the Secretary*  
17       *shall coordinate research, development, engineering, dem-*  
18       *onstration, and commercial application activities among—*

19           (1) *relevant programs within the Department,*  
20       *including—*

21           (A) *the Office of Energy Efficiency and Re-*  
22           *newable Energy;*

23           (B) *the Office of Science;*

24           (C) *the Office of Electricity Delivery and*  
25           *Energy Reliability;*

1                   (D) the Office of Fossil Energy;

2                   (E) the Advanced Research Projects Agen-  
3                   cy—Energy; and

4                   (F) other offices, as determined by the Sec-  
5                   retary; and

6                   (2) relevant technology research and development  
7                   programs within the Department of Transportation  
8                   and other Federal agencies, as determined by the Sec-  
9                   retary.

10                  (e) COORDINATION AND NONDUPLICATION.—In coordi-  
11                  nating activities, the Secretary shall ensure, to the max-  
12                  imum extent practicable, that activities do not duplicate  
13                  activities of other programs within the Department or other  
14                  relevant research agencies.

15                  (f) FEDERAL DEMONSTRATION OF TECHNOLOGIES.—  
16                  The Secretary shall make information available to procure-  
17                  ment programs of Federal agencies regarding the potential  
18                  to demonstrate technologies resulting from activities funded  
19                  through programs under this Act.

20                  (g) INTERGOVERNMENTAL COORDINATION.—The Sec-  
21                  retary shall seek opportunities to leverage resources and  
22                  support initiatives of State and local governments in devel-  
23                  oping and promoting advanced vehicle technologies, manu-  
24                  facturing, and infrastructure.

1 **SEC. 102. SENSING AND COMMUNICATIONS TECHNOLOGIES.**

2       (a) *IN GENERAL.*—*The Secretary, in coordination*  
3 *with the Secretary of Transportation and relevant research*  
4 *programs of other Federal agencies, shall conduct research,*  
5 *development, engineering, and demonstration activities on*  
6 *connectivity of domestic vehicle and transportation systems,*  
7 *including on sensing, computation, communication, actu-*  
8 *ation, and information technologies that allow for reduced*  
9 *fuel use, optimized traffic flow, improved freight logistics,*  
10 *and vehicle electrification, including technologies for—*

11               (1) *onboard vehicle, engine, and component sens-*  
12 *ing and actuation;*

13               (2) *vehicle-to-vehicle sensing and communica-*  
14 *tion;*

15               (3) *vehicle-to-infrastructure sensing and commu-*  
16 *nication;*

17               (4) *vehicle integration with the electrical grid;*  
18 *and*

19               (5) *driver-to-vehicle integration and communica-*  
20 *tion.*

21       (b) *COORDINATION.*—*The activities carried out under*  
22 *this section should supplement, and not duplicate, activities*  
23 *under the intelligent transportation system research pro-*  
24 *gram of the Department of Transportation.*

1 **SEC. 103. MANUFACTURING.**

2 *The Secretary shall carry out a research, development,*  
3 *engineering, demonstration, and commercial application*  
4 *program of domestic advanced vehicle manufacturing tech-*  
5 *nologies and practices, including innovative processes to—*

6 (1) *increase the production rate and decrease the*  
7 *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 energy-*  
12 *intensity of vehicle, engine, advanced battery, and*  
13 *component manufacturing processes;*

14 (4) *recycle and remanufacture used batteries and*  
15 *other vehicle components for reuse in vehicles or sta-*  
16 *tionary 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 hydro-*  
23 *gen and fuel cell vehicles and components;*

24 (8) *improve the calendar life and cycle life of ad-*  
25 *vanced batteries; and*

1           (9) *produce permanent magnets for advanced ve-*  
2       *hicles.*

3 **SEC. 104. USER TESTING FACILITIES.**

4       *Activities under this Act may include domestic con-*  
5 *struction, expansion, or modification of new and existing*  
6 *vehicle, engine, and component research and testing facili-*  
7 *ties 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 vehicle*  
18 *technologies.*

19 **SEC. 105. REPORTS.**

20       (a) *TECHNOLOGIES.*—*Not later than 18 months after*  
21 *the date of enactment of this Act and annually thereafter*  
22 *through calendar year 2015, the Secretary shall submit to*  
23 *Congress a report regarding the technologies developed as*  
24 *a result of the activities authorized by this title, with a par-*  
25 *ticular emphasis on—*

1           (1) *whether the technologies were successfully*  
2           *adopted for commercial applications; and*

3           (2) *if so, whether those technologies are manufac-*  
4           *tured in the United States.*

5           (b) *ACTIVITIES.*—*At the end of each fiscal year the Sec-*  
6           *retary shall submit to the relevant Congressional commit-*  
7           *tees of jurisdiction an annual report on activities under-*  
8           *taken during the fiscal year under this title, including—*

9           (1) *active industry participants;*

10          (2) *efforts to recruit new participants;*

11          (3) *progress of the program in meeting goals and*  
12          *timelines; and*

13          (4) *a strategic plan for funding of activities*  
14          *across agencies.*

15   **SEC. 106. INNOVATIVE AUTOMOTIVE DEMONSTRATION PRO-**  
16                                   **GRAM.**

17          (a) *IN GENERAL.*—*The Secretary shall establish an In-*  
18          *novative Automotive Demonstration Program, within the*  
19          *Vehicle Technologies Program, to encourage the introduc-*  
20          *tion of new domestic-made advanced technology vehicles*  
21          *into the marketplace that are designed in their entirety to*  
22          *achieve very high energy efficiency but still provide the ca-*  
23          *pabilities required by consumers in the United States.*

24          (b) *ADMINISTRATION.*—*The Program established under*  
25          *this section shall encourage—*

1           (1) *the introduction of new light duty vehicles*  
2 *into the marketplace that are capable of achieving en-*  
3 *ergy efficiencies significantly greater than required*  
4 *under applicable and pending corporate average fuel*  
5 *economy standards; and*

6           (2) *the use of materials and manufacturing tech-*  
7 *niques that minimize environmental impacts.*

8           (c) *AWARDS.—Awards under this section shall be made*  
9 *on a competitive basis for demonstration of domestic-made*  
10 *vehicles that—*

11           (1) *are primarily for use on public streets, roads,*  
12 *and highways and are not manufactured primarily*  
13 *for off-road use;*

14           (2) *meet all Federal safety requirements;*

15           (3) *achieve at least 70 miles per gallon or the*  
16 *equivalent on drive cycle of the Environmental Pro-*  
17 *tection Agency;*

18           (4) *provide vehicle performance that is judged*  
19 *acceptable to consumers in the United States;*

20           (5) *be affordable to consumers in the United*  
21 *States;*

22           (6) *use materials and manufacturing processes*  
23 *that minimize environmental impacts;*

24           (7) *meet all Federal and State emission require-*  
25 *ments; and*



1           (8) *provide new high technology engineering and*  
2           *production employment opportunities.*

3   **TITLE II—MEDIUM AND HEAVY**  
4       **DUTY COMMERCIAL AND**  
5       **TRANSIT VEHICLES**

6   **SEC. 201. PROGRAM.**

7           (a) *IN GENERAL.*—*In carrying out the 21st Century*  
8   *Truck Partnership of the Department, the Secretary, in*  
9   *partnership with relevant research and development pro-*  
10 *grams in other Federal agencies and a range of appropriate*  
11 *industry stakeholders, shall conduct cooperative research,*  
12 *development, demonstration, and commercial application*  
13 *activities on advanced technologies for medium- to heavy-*  
14 *duty commercial, recreational, and transit vehicles, includ-*  
15 *ing activities in the areas of—*

16           (1) *engine efficiency and combustion research;*

17           (2) *onboard storage technologies for compressed*  
18           *and liquefied natural gas;*

19           (3) *development and integration of engine tech-*  
20           *nologies designed for natural gas operation of a vari-*  
21           *ety of vehicle platforms;*

22           (4) *waste heat recovery and conversion;*

23           (5) *improved aerodynamics and tire rolling re-*  
24           *sistance;*

- 1           (6) *energy and space-efficient emissions control*  
2           *systems;*
- 3           (7) *heavy hybrid, hybrid hydraulic, plug-in hy-*  
4           *brid, and electric platforms, and energy storage tech-*  
5           *nologies;*
- 6           (8) *drivetrain optimization;*
- 7           (9) *friction and wear reduction;*
- 8           (10) *engine idle and parasitic energy loss reduc-*  
9           *tion;*
- 10          (11) *electrification of accessory loads;*
- 11          (12) *onboard sensing and communications tech-*  
12          *nologies;*
- 13          (13) *advanced lightweight materials and vehicle*  
14          *designs;*
- 15          (14) *increasing load capacity per vehicle;*
- 16          (15) *thermal management of battery systems;*
- 17          (16) *recharging infrastructure;*
- 18          (17) *complete vehicle modeling and simulation;*
- 19          (18) *hydrogen vehicle technologies, including fuel*  
20          *cells and internal combustion engines, and hydrogen*  
21          *infrastructure;*
- 22          (19) *retrofitting advanced technologies onto exist-*  
23          *ing truck fleets; and*
- 24          (20) *integration of those and other advanced sys-*  
25          *tems onto a single truck and trailer platform.*

1       **(b) DIRECTOR.**—

2               **(1) IN GENERAL.**—*The Secretary shall appoint a*  
3 *full-time Director to coordinate research, development,*  
4 *demonstration, and commercial application activities*  
5 *in medium- to heavy-duty commercial, recreational,*  
6 *and transit vehicle technologies.*

7               **(2) DUTIES.**—*The Director shall—*

8                       **(A)** *improve coordination and develop con-*  
9 *sensus between government agency and industry*  
10 *partners, and propose new processes for program*  
11 *management and priority setting to better align*  
12 *activities and budgets among partners;*

13                      **(B)** *regularly conduct workshops, site visits,*  
14 *demonstrations, conferences, investor forums, and*  
15 *other events in which information and research*  
16 *findings are shared among program participants*  
17 *and interested stakeholders;*

18                      **(C)** *develop a budget for activities of the De-*  
19 *partment regarding the interagency program es-*  
20 *tablished under this title, and provide consulta-*  
21 *tion and guidance on vehicle technology funding*  
22 *priorities across agencies;*

23                      **(D)** *determine a process for reviewing pro-*  
24 *gram technical goals, targets, and timetables*  
25 *and, if applicable, aided by life-cycle impact and*

1           *cost analysis, propose revisions or elimination*  
2           *based on program progress, available funding,*  
3           *and rate of technology adoption;*

4           *(E) evaluate ongoing activities of the pro-*  
5           *gram and recommend project modifications, in-*  
6           *cluding the termination of projects, if applicable;*  
7           *and*

8           *(F) other responsibilities, as determined by*  
9           *the Secretary, in consultation with interagency*  
10          *and industry partners.*

11          *(c) REPORTS.—At the end of each fiscal year, the Sec-*  
12          *retary shall submit to Congress an annual report that de-*  
13          *scribes activities undertaken during the fiscal year under*  
14          *this title, including—*

15                 *(1) active industry participants;*

16                 *(2) progress of the program in meeting goals and*  
17                 *timelines; and*

18                 *(3) a strategic plan for funding of activities*  
19                 *across agencies.*

20          **SEC. 202. CLASS 8 TRUCK AND TRAILER SYSTEMS DEM-**  
21                                 **ONSTRATION.**

22                 *(a) IN GENERAL.—The Secretary shall conduct a com-*  
23                 *petitive grant program to demonstrate the integration of*  
24                 *multiple advanced technologies on Class 8 truck and trailer*  
25                 *platforms with a goal of improving overall freight effi-*

1 *ciency, as measured in tons and volume of freight hauled*  
2 *or other work performance-based metrics, by 50 percent,*  
3 *through a combination of technologies described in section*  
4 *201(a).*

5 *(b) APPLICANT TEAMS.—Applicant teams may be*  
6 *comprised of truck and trailer manufacturers, engine and*  
7 *component manufacturers, fleet customers, information and*  
8 *communications technology manufacturers and providers,*  
9 *researchers of institutions of higher education, and other*  
10 *applicants, as appropriate, for the development and dem-*  
11 *onstration of integrated Class 8 truck and trailer systems.*

12 **SEC. 203. TECHNOLOGY TESTING AND METRICS.**

13 *The Secretary, in coordination with the partners of the*  
14 *21st Century Truck Partnership of the Department—*

15 *(1) shall develop standard testing procedures and*  
16 *technologies for evaluating the performance of ad-*  
17 *vanced heavy vehicle technologies under a range of*  
18 *representative duty cycles and operating conditions,*  
19 *including heavy hybrid propulsion systems;*

20 *(2) shall evaluate heavy vehicle performance*  
21 *using work performance-based metrics other than*  
22 *metrics based on miles per gallon, including—*

23 *(A) metrics based on units of volume and*  
24 *weight transported for freight applications; and*

1                   (B) appropriate metrics based on perform-  
 2                   ance on nonroad systems; and  
 3                   (3) may construct heavy duty truck and bus test-  
 4                   ing facilities.

5 **SEC. 204. NONROAD SYSTEMS PILOT PROGRAM.**

6           (a) *IN GENERAL.*—The Secretary shall carry out a  
 7 pilot program of research, development, demonstration, and  
 8 commercial applications of technologies to improve total  
 9 machine or system efficiency for nonroad mobile equipment,  
 10 including agricultural and construction equipment.

11           (b) *INFORMATION TRANSFER.*—In carrying out this  
 12 section, the Secretary shall seek opportunities to transfer  
 13 relevant research findings and technologies between the  
 14 nonroad and on-highway equipment and vehicle sectors.

15 **TITLE III—ADVANCED TECH-**  
 16 **NOLOGY VEHICLES MANUFAC-**  
 17 **TURING INCENTIVE PROGRAM**

18 **SEC. 301. ADVANCED TECHNOLOGY VEHICLES MANUFAC-**  
 19 **TURING INCENTIVE PROGRAM.**

20           Section 136 of the Energy Independence and Security  
 21 Act of 2007 (42 U.S.C. 17013) is amended—

22                   (1) in subsection (a)—

23                           (A) in paragraph (1)—

1                   (i) by redesignating subparagraphs (A)  
2                   through (C) as clauses (i) through (iii), re-  
3                   spectively, and indenting appropriately;

4                   (ii) in the matter preceding clause (i)  
5                   (as redesignated by clause (i)), by striking  
6                   “means an ultra efficient vehicle or a light  
7                   duty vehicle that meets—” and inserting  
8                   the following:

9                   “means—

10

11                   “(A) an ultra efficient vehicle or a light  
12                   duty vehicle that meets—”;

13

14

15                   (iii) in clause (iii) (as redesignated by  
16                   clause (i)), by striking the period at the end  
17                   and inserting “; or”; and

18                   (iv) by adding at the end the following:

19                   “(B) a vehicle such as a medium-duty or  
20                   heavy-duty work truck, bus, or rail transit vehi-  
21                   cle that—

22                   “(i) is used on a public street, road,  
23                   highway, or transitway;

1           “(ii) meets each applicable emissions  
2           standard that is established as of the date of  
3           the application; and

4           “(iii) as determined by the Secretary,  
5           the deployment of which will reduce con-  
6           sumption of motor fuels by 25 percent or  
7           more, as compared to current surface trans-  
8           portation technologies that perform a simi-  
9           lar function, unless the Secretary deter-  
10          mines that—

11                 “(I) the percentage is not achiev-  
12                 able for a vehicle type or class; and

13                 “(II) an alternative percentage for  
14                 that vehicle type or class will result in  
15                 substantial reductions in motor fuel  
16                 consumption.”;

17          (B) in paragraph (3)(B)—

18                 (i) by striking “equipment and” and  
19                 inserting “equipment,”; and

20                 (ii) by inserting “, and manufacturing  
21                 process equipment” after “suppliers”; and

22          (C) by striking paragraph (4) and inserting  
23          the following:

24                 “(4) *QUALIFYING COMPONENTS.*—The term  
25                 ‘qualifying components’ means components, systems,



1       or groups of subsystems that the Secretary determines  
2       to—

3               “(A) be designed for improving fuel econ-  
4               omy of advanced technology vehicles; and

5               “(B) contribute measurably to the overall  
6               fuel economy of the advanced technology vehi-  
7               cles.”;

8               (2) in subsection (b), in the matter preceding  
9               paragraph (1), by striking “to automobile” and in-  
10              serting “to advanced technology vehicle”;

11              (3) in subsection (d)(1), in the first sentence, by  
12              striking “a total of not more than \$ 25,000,000,000  
13              in”;

14              (4) in subsection (h)—

15                      (A) in the subsection heading, by striking  
16                      “*AUTOMOBILE*” and inserting “*ADVANCED*  
17                      *TECHNOLOGY VEHICLE*”; and

18                      (B) in paragraph (1)(B), by striking “*auto-*  
19                      *mobiles*” each place it appears and inserting  
20                      “*advanced technology vehicles*”; and

21              (5) in subsection (i), by striking “2012” and in-  
22              serting “2015”.

1                   **TITLE IV—NATURAL GAS**  
2                                   **VEHICLES**

3   **SEC. 401. NATURAL GAS VEHICLE RESEARCH, DEVELOP-**  
4                                   **MENT, AND DEMONSTRATION PROJECTS.**

5           (a) *IN GENERAL.*—*The Secretary, in coordination*  
6 *with the Administrator, shall conduct a program of natural*  
7 *gas vehicle research, development, and demonstration.*

8           (b) *PURPOSES.*—*The purposes of the program con-*  
9 *ducted under this section are to focus on—*

10                   (1) *the continued improvement and development*  
11 *of new, cleaner, more efficient light-duty, medium-*  
12 *duty, and heavy-duty natural gas and vehicle en-*  
13 *gines;*

14                   (2) *the integration of those engines into light-*  
15 *duty, medium-duty, and heavy-duty natural gas vehi-*  
16 *cles for onroad and offroad applications;*

17                   (3) *the expansion of product availability by as-*  
18 *sisting manufacturers with the certification of the en-*  
19 *gines or vehicles described in paragraph (1) or (2) to*  
20 *comply with Federal or California certification re-*  
21 *quirements and in-use emission standards;*

22                   (4) *the demonstration and proper operation and*  
23 *use of the vehicles described in paragraph (2) under*  
24 *all operating conditions;*

1           (5) *the development and improvement of nation-*  
2 *ally recognized codes and standards for the continued*  
3 *safe operation of vehicles described in paragraph (2)*  
4 *and the components of the vehicles;*

5           (6) *the improvement in the reliability and effi-*  
6 *ciency of natural gas fueling station infrastructure;*

7           (7) *the certification of natural gas fueling sta-*  
8 *tion infrastructure to nationally recognized and in-*  
9 *dustry safety standards;*

10          (8) *the improvement in the reliability and effi-*  
11 *ciency of onboard natural gas fuel storage systems;*

12          (9) *the development of new natural gas fuel stor-*  
13 *age materials;*

14          (10) *the certification of onboard natural gas fuel*  
15 *storage systems to nationally recognized and industry*  
16 *safety standards; and*

17          (11) *the use of natural gas engines in hybrid ve-*  
18 *hicles.*

19       (c) *CERTIFICATION OF AFTERMARKET CONVERSION*  
20 *SYSTEMS.—*

21           (1) *IN GENERAL.—The Secretary shall coordi-*  
22 *nate with the Administrator on issues relating to*  
23 *streamlining the certification of natural gas*  
24 *aftermarket conversion systems to comply with appro-*

1        *appropriate Federal certification requirements and in-use*  
2        *emission standards.*

3            (2) *STREAMLINED CERTIFICATION.*—*For pur-*  
4        *poses of paragraph (1), streamlined certification shall*  
5        *include providing aftermarket conversion system*  
6        *manufacturers the option to continue to sell and in-*  
7        *stall systems on engines and test groups for which the*  
8        *manufacturers have previously received a certificate*  
9        *of conformity without having to request a new certifi-*  
10       *cate in future years.*

11          (d) *COOPERATION AND COORDINATION WITH INDUS-*  
12       *TRY.*—*In developing and carrying out the program under*  
13       *this section, the Secretary shall coordinate with the natural*  
14       *gas vehicle industry to ensure, to the maximum extent prac-*  
15       *ticable, cooperation between the public and the private sec-*  
16       *tor.*

17          (e) *ADMINISTRATION.*—*The program under this section*  
18       *shall be conducted in accordance with sections 3001 and*  
19       *3002 of the Energy Policy Act of 1992 (42 U.S.C. 13541,*  
20       *13542).*

21          (f) *REPORT.*—*Not later than 2 years after the date of*  
22       *enactment of this Act, the Secretary shall submit to the ap-*  
23       *propriate committees of Congress a report on the implemen-*  
24       *tation of this section.*

1       (g) *AUTHORIZATION OF APPROPRIATIONS.*—*There is*  
 2 *authorized to be appropriated to the Secretary to carry out*  
 3 *this section \$30,000,000 for each of fiscal years 2011*  
 4 *through 2015.*

5 **SEC. 402. STUDY OF INCREASING NATURAL GAS AND LIQUE-**  
 6 **FIED PETROLEUM GAS VEHICLES IN FEDERAL**  
 7 **FLEET.**

8       (a) *IN GENERAL.*—*The Administrator of General*  
 9 *Services, in consultation with the Administrator and the*  
 10 *Secretary, shall conduct a study of the means by which the*  
 11 *Federal fleet could increase the number of light-, medium-*  
 12 *, and heavy-duty natural gas and liquefied petroleum gas*  
 13 *vehicles in the fleet.*

14       (b) *COMPONENTS.*—*In conducting the study, the Ad-*  
 15 *ministrator of General Services shall—*

16           (1) *take into consideration Executive Order*  
 17 *13514 (74 Fed. Reg. 52117; relating to Federal lead-*  
 18 *ership in environmental, energy, and economic per-*  
 19 *formance) requiring agencies to meet a 30-percent re-*  
 20 *duction in vehicle fleet petroleum use by 2020;*

21           (2) *assess—*

22               (A) *the barriers to increasing the number of*  
 23 *natural gas and liquefied petroleum gas vehicles*  
 24 *in the Federal fleet;*

1           (B) the potential for maximizing the use of  
2           natural gas and liquefied petroleum gas vehicles  
3           in the fleet;

4           (C) the expected reductions in petroleum use  
5           and greenhouse gas emissions as part of the po-  
6           tential impacts of increasing natural gas and  
7           liquefied petroleum in the fleet; and

8           (D) the lifecycle costs involved in fleet con-  
9           versions, including the cost savings from reduced  
10          fuel consumption;

11          (3) provide a separate analysis of the potential  
12          costs of installing the specific fueling infrastructure  
13          required to increase natural gas and liquefied petro-  
14          leum gas in the fleet; and

15          (4) include feasibility assessments for increasing  
16          the number of light-, medium-, and heavy-duty nat-  
17          ural gas and liquefied petroleum gas vehicles in the  
18          fleet over a base period of 10 years and accelerated  
19          periods of 3 and 5 years.

20          (c) *REPORT.*—Not later than 180 days after the date  
21          of enactment of this Act, the Administrator of General Serv-  
22          ices shall submit to the appropriate committees of Congress  
23          a report on the results of the study conducted under this  
24          section.

1     **TITLE V—AUTHORIZATION OF**  
2                    **APPROPRIATIONS**

3     **SEC. 501. AUTHORIZATION OF APPROPRIATIONS.**

4            *There are authorized to be appropriated to the Sec-*  
5     *retary such sums as are necessary to carry out this Act.*

6     **SEC. 502. COST-SHARING REQUIREMENT.**

7            *The activities carried out under this Act shall be sub-*  
8     *ject to the cost-sharing requirements of section 988 of the*  
9     *Energy Policy Act of 2005 (42 U.S.C. 16352).*

Calendar No. 622

111<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

**S. 2843**

[Report No. 111-335]

---

---

## **A BILL**

To provide for a program of research, development, demonstration, and commercial application in vehicle technologies at the Department of Energy.

---

---

SEPTEMBER 28, 2010

Reported with an amendment