

111TH CONGRESS
1ST SESSION

H. R. 3246

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 17, 2009

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

AN ACT

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.**

2 This Act may be cited as the “Advanced Vehicle
3 Technology Act of 2009”.

4 **SEC. 2. FINDINGS.**

5 Congress finds the following:

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

11 (2) The United States transportation sector is
12 over 95 percent dependent on petroleum, and over
13 60 percent of petroleum demand is met by imported
14 supplies.

15 (3) United States heavy truck fuel consumption
16 will increase 23 percent by 2030, while overall trans-
17 portation energy use will decline by 1 percent.

18 (4) The domestic automotive and commercial
19 vehicle manufacturing sectors have increasingly lim-
20 ited resources for research and development of ad-
21 vanced technologies.

22 (5) Vehicle, engine, and component manufactur-
23 ers are playing a more important role in vehicle
24 technology development, and should be better inte-
25 grated into Federal research efforts.

1 (6) Priorities for the Department of Energy’s
2 vehicle technologies research have shifted drastically
3 in recent years among diesel hybrids, hydrogen fuel
4 cell vehicles, and plug-in electric hybrids, with little
5 continuity among them.

6 (7) The integration of vehicle, communication,
7 and infrastructure technologies has great potential
8 for efficiency gains through better management of
9 the total transportation system.

10 (8) The Federal Government should balance its
11 role in researching longer-term exploratory concepts
12 and developing nearer-term transformational tech-
13 nologies for vehicles.

14 **SEC. 3. OBJECTIVES.**

15 The objectives of this Act are to—

16 (1) develop technologies and practices that—

17 (A) improve the fuel efficiency and emis-
18 sions of all vehicles produced in the United
19 States; and

20 (B) reduce vehicle reliance on petroleum-
21 based fuels;

22 (2) support domestic research, development,
23 demonstration, and commercial application and man-
24 ufacturing of advanced vehicles, engines, and compo-
25 nents;

1 (3) enable vehicles to move larger volumes of
2 goods and more passengers with less energy and
3 emissions;

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

7 (5) allow for greater consumer choice of vehicle
8 technologies and fuels;

9 (6) shorten technology development and inte-
10 gration cycles in the vehicle industry;

11 (7) ensure a proper balance and diversity of
12 Federal investment in vehicle technologies; and

13 (8) strengthen partnerships between Federal
14 and State governmental agencies and the private
15 and academic sectors.

16 **SEC. 4. DEFINITIONS.**

17 For the purposes of this Act:

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

20 (2) SECRETARY.—The term “Secretary” means
21 the Secretary of Energy.

22 **SEC. 5. AUTHORIZATION OF APPROPRIATIONS.**

23 (a) IN GENERAL.—The following sums are author-
24 ized to be appropriated to the Secretary for research, de-
25 velopment, demonstration, and commercial application of

1 vehicles and related technologies, including activities au-
2 thorized under this Act:

3 (1) \$550,000,000 for fiscal year 2010.

4 (2) \$560,000,000 for fiscal year 2011.

5 (3) \$570,000,000 for fiscal year 2012.

6 (4) \$580,000,000 for fiscal year 2013.

7 (5) \$590,000,000 for fiscal year 2014.

8 (b) MEDIUM AND HEAVY DUTY COMMERCIAL VEHI-
9 CLES.—From the amounts authorized under subsection
10 (a), there are authorized to be appropriated for carrying
11 out title II—

12 (1) \$200,000,000 for fiscal year 2010;

13 (2) \$210,000,000 for fiscal year 2011;

14 (3) \$220,000,000 for fiscal year 2012;

15 (4) \$230,000,000 for fiscal year 2013; and

16 (5) \$240,000,000 for fiscal year 2014.

17 (c) USER FACILITIES.—From the amounts author-
18 ized under subsection (a), there are authorized to be ap-
19 propriated for carrying out section 104—

20 (1) \$35,000,000 for fiscal year 2010;

21 (2) \$30,000,000 for fiscal year 2011;

22 (3) \$20,000,000 for fiscal year 2012;

23 (4) \$15,000,000 for fiscal year 2013; and

24 (5) \$15,000,000 for fiscal year 2014.

1 (d) NON-ROAD PILOT PROGRAM.—From the
2 amounts authorized under subsection (a), there are au-
3 thorized to be appropriated for carrying out section 204—

4 (1) \$20,000,000 for fiscal year 2010;

5 (2) \$20,000,000 for fiscal year 2011; and

6 (3) \$20,000,000 for fiscal year 2012.

7 **TITLE I—VEHICLE RESEARCH**
8 **AND DEVELOPMENT**

9 **SEC. 101. PROGRAM.**

10 (a) ACTIVITIES.—The Secretary shall conduct a pro-
11 gram of basic and applied research, development, dem-
12 onstration, and commercial application activities on mate-
13 rials, technologies, and processes with the potential to sub-
14 stantially reduce or eliminate petroleum use and the emis-
15 sions of the Nation’s passenger and commercial vehicles,
16 including activities in the areas of—

17 (1) hybridization or full electrification of vehicle
18 systems;

19 (2) batteries and other energy storage devices;

20 (3) power electronics;

21 (4) vehicle, component, and subsystem manu-
22 facturing technologies and processes;

23 (5) engine efficiency and combustion optimiza-
24 tion;

25 (6) waste heat recovery;

1 (7) transmission and drivetrains;

2 (8) hydrogen vehicle technologies, including fuel
3 cells and internal combustion engines, and hydrogen
4 infrastructure;

5 (9) aerodynamics, rolling resistance, and acces-
6 sory power loads of vehicles and associated equip-
7 ment;

8 (10) vehicle weight reduction;

9 (11) friction and wear reduction;

10 (12) engine and component durability;

11 (13) innovative propulsion systems;

12 (14) advanced boosting systems;

13 (15) hydraulic hybrid technologies;

14 (16) engine compatibility with and optimization
15 for a variety of transportation fuels including liquid
16 and gaseous fuels;

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

19 (18) refueling and charging infrastructure for
20 alternative fueled and electric or plug-in electric hy-
21 brid vehicles, including the unique challenges facing
22 rural areas;

23 (19) gaseous fuels storage system integration
24 and optimization;

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

4 (21) efficient use and recycling of rare earth
5 materials, and reduction of precious metals and
6 other high-cost materials in vehicles;

7 (22) aftertreatment technologies;

8 (23) thermal management of battery systems;

9 (24) retrofitting advanced vehicle technologies
10 to existing vehicles;

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

14 (26) other research areas as determined by the
15 Secretary.

16 (b) TRANSFORMATIONAL TECHNOLOGY.—The Sec-
17 retary shall ensure that the Department continues to sup-
18 port activities and maintains competency in mid- to long-
19 term transformational vehicle technologies with potential
20 to achieve deep reductions in petroleum use and emissions,
21 including activities in the areas of—

22 (1) hydrogen vehicle technologies, including fuel
23 cells, internal combustion engines, hydrogen storage,
24 infrastructure, and activities in hydrogen technology
25 validation and safety codes and standards;

1 (2) multiple battery chemistries and novel en-
2 ergy storage devices, including nonchemical batteries
3 and electromechanical storage technologies such as
4 hydraulics, flywheels, and compressed air storage;

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

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

9 (c) INDUSTRY PARTICIPATION.—To the maximum
10 extent practicable, activities under this Act shall be carried
11 out in partnership or collaboration with automotive manu-
12 facturers, heavy commercial and transit vehicle manufac-
13 turers, qualified plug-in electric vehicle manufacturers, ve-
14 hicle and engine equipment and component manufactur-
15 ers, manufacturing equipment manufacturers, advanced
16 vehicle service providers, fuel producers and energy sup-
17 pliers, electric utilities, universities, national laboratories,
18 and independent research laboratories. In carrying out
19 this Act the Secretary shall—

20 (1) determine whether a wide range of compa-
21 nies that manufacture or assemble vehicles or com-
22 ponents in the United States are represented in on-
23 going public private partnership activities, including
24 firms that have not traditionally participated in fed-
25 erally-sponsored research and development activities,

1 and where possible, partner with such firms that
2 conduct significant and relevant research and devel-
3 opment activities in the United States;

4 (2) leverage the capabilities and resources of,
5 and formalize partnerships with, industry-led stake-
6 holder organizations, nonprofit organizations, indus-
7 try consortia, and trade associations with expertise
8 in the research and development of, and education
9 and outreach activities in, advanced automotive and
10 commercial vehicle technologies;

11 (3) develop more efficient processes for trans-
12 ferring research findings and technologies to indus-
13 try;

14 (4) give consideration to conversion of existing
15 or former vehicle technology development or manu-
16 facturing facilities for the purposes of this Act, and
17 support public-private partnerships dedicated to
18 overcoming barriers in commercial application of
19 transformational vehicle technologies that utilize
20 such industry-led facilities; and

21 (5) promote efforts to ensure that technologies
22 developed under this Act are produced in the United
23 States.

24 (d) INTERAGENCY AND INTRAAGENCY COORDINA-
25 TION.—To the maximum extent practicable, the Secretary

1 shall coordinate research, development, demonstration,
2 and commercial application activities among—

3 (1) relevant programs within the Department,
4 including—

5 (A) the Office of Energy Efficiency and
6 Renewable Energy;

7 (B) the Office of Science;

8 (C) the Office of Electricity Delivery and
9 Energy Reliability;

10 (D) the Office of Fossil Energy;

11 (E) the Advanced Research Projects Agen-
12 cy—Energy; and

13 (F) other offices as determined by the Sec-
14 retary; and

15 (2) relevant technology research and develop-
16 ment programs within other Federal agencies, as de-
17 termined by the Secretary.

18 (e) COORDINATION AND NONDUPLICATION.—In co-
19 ordinating activities the Secretary shall ensure, to the
20 maximum extent practicable, that activities do not dupli-
21 cate those of other programs within the Department or
22 other relevant research agencies.

23 (f) FEDERAL DEMONSTRATION OF TECH-
24 NOLOGIES.—The Secretary shall make information avail-
25 able to procurement programs of Federal agencies regard-

1 ing the potential to demonstrate technologies resulting
2 from activities funded through programs under this Act.

3 (g) INTERGOVERNMENTAL COORDINATION.—The
4 Secretary shall seek opportunities to leverage resources
5 and support initiatives of State and local governments in
6 developing and promoting advanced vehicle technologies,
7 manufacturing, and infrastructure.

8 **SEC. 102. SENSING AND COMMUNICATIONS TECH-**
9 **NOLOGIES.**

10 The Secretary, in coordination with the relevant re-
11 search programs of other Federal agencies, shall conduct
12 research, development, and demonstration activities on
13 connectivity of vehicle and transportation systems, includ-
14 ing on sensing, computation, communication, and actu-
15 ation technologies that allow for reduced fuel use, opti-
16 mized traffic flow, and vehicle electrification, including
17 technologies for—

18 (1) onboard vehicle, engine, and component
19 sensing and actuation;

20 (2) vehicle-to-vehicle sensing and communica-
21 tion;

22 (3) vehicle-to-infrastructure sensing and com-
23 munication; and

24 (4) vehicle integration with the electrical grid.

1 **SEC. 103. MANUFACTURING.**

2 The Secretary shall carry out a research, develop-
3 ment, demonstration, and commercial application program
4 of advanced vehicle manufacturing technologies and prac-
5 tices, 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. 104. USER TESTING FACILITIES.**

4 Activities under this Act may include construction,
5 expansion, or modification of new and existing vehicle, en-
6 gine, and component research and testing facilities for—

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

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

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

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

18 **SEC. 105. REPORTING.**

19 Not later than 18 months after the date of enactment
20 of this Act and annually thereafter through 2015, the Sec-
21 retary of Energy shall transmit to Congress a report re-
22 garding the technologies developed as a result of the ac-
23 tivities authorized by this title, with a particular emphasis
24 on whether the technologies were successfully adopted for

1 commercial applications, and if so, whether those tech-
2 nologies are manufactured in the United States.

3 **SEC. 106. REPORTING.**

4 At the end of each fiscal year the Secretary shall sub-
5 mit to the relevant Congressional committees of jurisdic-
6 tion an annual report describing activities undertaken in
7 the previous year under this title, active industry partici-
8 pants, efforts to recruit new participants, progress of the
9 program in meeting goals and timelines, and a strategic
10 plan for funding of activities across agencies.

11 **SEC. 107. INNOVATIVE AUTOMOTIVE DEMONSTRATION**
12 **PROGRAM.**

13 The Secretary shall establish an Innovative Auto-
14 motive Demonstration Program, within the existing Vehi-
15 cle Technologies Program, to encourage the introduction
16 of new vehicles into the marketplace that are designed in
17 their entirety to achieve very high energy efficiency but
18 still provide the capabilities required by the American con-
19 sumer. This program shall encourage introduction of new
20 light duty vehicles into the marketplace capable of achiev-
21 ing energy efficiencies significantly greater than required
22 under current and pending Federal Corporate Average
23 Fuel Economy (CAFE) standards. This program shall
24 also encourage the use of materials and manufacturing
25 techniques that minimize environmental impacts. Awards

1 under this section shall be made on a competitive basis
2 for demonstration of vehicles that—

3 (1) carry at least four passengers;

4 (2) meet all Federal safety requirements;

5 (3) achieve at least 70 miles per gallon or the
6 equivalent on the Environmental Protection Agency
7 drive cycle;

8 (4) provide vehicle performance that is judged
9 acceptable to the United States consumer;

10 (5) be affordable to the American consumer;

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

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

15 (8) provide new high technology engineering
16 and production employment opportunities.

17 **TITLE II—MEDIUM AND HEAVY**
18 **DUTY COMMERCIAL AND**
19 **TRANSIT VEHICLES**

20 **SEC. 201. PROGRAM.**

21 (a) IN GENERAL.—The Secretary, in partnership
22 with relevant research and development programs in other
23 Federal agencies, and a range of appropriate industry
24 stakeholders, shall carry out a program of cooperative re-
25 search, development, demonstration, and commercial ap-

1 plication activities on advanced technologies for medium-
2 to heavy-duty commercial, recreational, and transit vehi-
3 cles, including activities in the areas of—

4 (1) engine efficiency and combustion research;

5 (2) on board storage technologies for com-
6 pressed and liquefied natural gas;

7 (3) development and integration of engine tech-
8 nologies designed for natural gas operation of a vari-
9 ety of vehicle platforms;

10 (4) waste heat recovery and conversion;

11 (5) improved aerodynamics and tire rolling re-
12 sistance;

13 (6) energy and space-efficient emissions control
14 systems;

15 (7) heavy hybrid, hybrid hydraulic, plug-in hy-
16 brid, and electric platforms, and energy storage
17 technologies;

18 (8) drivetrain optimization;

19 (9) friction and wear reduction;

20 (10) engine idle and parasitic energy loss reduc-
21 tion;

22 (11) electrification of accessory loads;

23 (12) onboard sensing and communications tech-
24 nologies;

1 (13) advanced lightweighting materials and ve-
2 hicle designs;

3 (14) increasing load capacity per vehicle;

4 (15) thermal management of battery systems;

5 (16) recharging infrastructure;

6 (17) complete vehicle modeling and simulation;

7 (18) hydrogen vehicle technologies, including
8 fuel cells and internal combustion engines, and hy-
9 drogen infrastructure;

10 (19) retrofitting advanced technologies onto ex-
11 isting truck fleets; and

12 (20) 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. 202. CLASS 8 TRUCK AND TRAILER SYSTEMS DEM-**
12 **ONSTRATION.**

13 The Secretary shall conduct a competitive grant pro-
14 gram to demonstrate the integration of multiple advanced
15 technologies on Class 8 truck and trailer platforms with
16 a goal of improving overall freight efficiency, as measured
17 in tons and volume of freight hauled or other work per-
18 formance-based metrics, by 50 percent, including a com-
19 bination of technologies listed in section 201(a). Applicant
20 teams may be comprised of truck and trailer manufactur-
21 ers, engine and component manufacturers, fleet cus-
22 tomers, university researchers, and other applicants as ap-
23 propriate for the development and demonstration of inte-
24 grated Class 8 truck and trailer systems.

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

2 The Secretary, in coordination with the partners of
3 the interagency research program described in section
4 201(a)—

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

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

16 (3) may construct heavy duty truck and bus
17 testing facilities.

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

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

- 1 nologies between the nonroad and on-highway equipment
- 2 and vehicle sectors.

Passed the House of Representatives September 16,
2009.

Attest: LORRAINE C. MILLER,
Clerk.