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H. R. 1367

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

IN THE HOUSE OF REPRESENTATIVES

APRIL 5, 2011

Mr. PETERS (for himself, Mr. DINGELL, Ms. SUTTON, Mr. CONYERS, Mr. KILDEE, Mr. CLARKE of Michigan, Mr. LARSON of Connecticut, Mr. CONNOLLY of Virginia, Mr. KUCINICH, and Mr. LEVIN) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Advanced Vehicle
5 Technology Act of 2011”.

6 **SEC. 2. FINDINGS.**

7 Congress finds the following:

1 (1) According to the Energy Information Ad-
2 ministration, the transportation sector accounts for
3 approximately 28 percent of the United States pri-
4 mary energy demand and greenhouse gas emissions,
5 and 24 percent of global oil demand.

6 (2) The United States transportation sector is
7 over 95 percent dependent on petroleum, and over
8 60 percent of petroleum demand is met by imported
9 supplies.

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

13 (4) The domestic automotive and commercial
14 vehicle manufacturing sectors have increasingly lim-
15 ited resources for research, development, and engi-
16 neering of advanced technologies.

17 (5) Vehicle, engine, and component manufactur-
18 ers are playing a more important role in vehicle
19 technology development, and should be better inte-
20 grated into Federal research efforts.

21 (6) Priorities for the Department of Energy's
22 vehicle technologies research have shifted drastically
23 in recent years among diesel hybrids, hydrogen fuel
24 cell vehicles, and plug-in electric hybrids, with little
25 continuity among them.

1 (7) The integration of vehicle, communication,
2 and infrastructure technologies has great potential
3 for efficiency gains through better management of
4 the total transportation system.

5 (8) The Federal Government should balance its
6 role in researching longer-term exploratory concepts
7 and developing nearer-term transformational tech-
8 nologies for vehicles.

9 **SEC. 3. OBJECTIVES.**

10 The objectives of this Act are to—

11 (1) develop United States technologies and
12 practices that—

13 (A) improve the fuel efficiency and emis-
14 sions of all vehicles produced in the United
15 States; and

16 (B) reduce vehicle reliance on petroleum-
17 based fuels;

18 (2) support domestic research, development, en-
19 gineering, demonstration, and commercial applica-
20 tion and manufacturing of advanced vehicles, en-
21 gines, and components;

22 (3) enable vehicles to move larger volumes of
23 goods and more passengers with less energy and
24 emissions;

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

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

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

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

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

13 **SEC. 4. DEFINITIONS.**

14 For the purposes of this Act:

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

17 (2) SECRETARY.—The term “Secretary” means
18 the Secretary of Energy.

19 **SEC. 5. AUTHORIZATION OF APPROPRIATIONS.**

20 There are authorized to be appropriated to the Sec-
21 retary for United States research, development, engineer-
22 ing, demonstration, and commercial application of vehicles
23 and related technologies, including activities authorized
24 under this Act, such sums as may be necessary for each
25 of fiscal years 2012 through 2016.

1 **TITLE I—VEHICLE RESEARCH**
2 **AND DEVELOPMENT**

3 **SEC. 101. PROGRAM.**

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

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

13 (2) batteries and other energy storage devices;

14 (3) power electronics;

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

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

19 (6) waste heat recovery;

20 (7) transmission and drivetrains;

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

24 (9) compressed natural gas vehicle technologies;

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

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

5 (23) aftertreatment technologies;

6 (24) thermal management of battery systems;

7 (25) retrofitting advanced vehicle technologies
8 to existing vehicles;

9 (26) development of common standards, speci-
10 fications, and architectures for both transportation
11 and stationary battery applications;

12 (27) advanced internal combustion engines; and

13 (28) other research areas as determined by the
14 Secretary.

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

23 (1) hydrogen vehicle technologies, including fuel
24 cells, internal combustion engines, hydrogen storage,

1 infrastructure, and activities in hydrogen technology
2 validation and safety codes and standards;

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

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

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

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

23 (1) determine whether a wide range of compa-
24 nies that manufacture or assemble vehicles or com-
25 ponents in the United States are represented in on-

1 going public private partnership activities, including
2 firms that have not traditionally participated in fed-
3 erally sponsored research and development activities,
4 and where possible, partner with such firms that
5 conduct significant and relevant research and devel-
6 opment activities in the United States;

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

14 (3) develop more efficient processes for trans-
15 ferring research findings and technologies to indus-
16 try;

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

20 (5) establish and support public-private part-
21 nerships, dedicated to overcoming barriers in com-
22 mercial application of transformational vehicle tech-
23 nologies, that utilize such industry-led technology de-
24 velopment facilities of entities with demonstrated ex-
25 pertise in successfully designing and engineering

1 pre-commercial generations of such transformational
2 technology; and

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

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

11 (1) relevant programs within the Department,
12 including—

13 (A) the Office of Energy Efficiency and
14 Renewable Energy;

15 (B) the Office of Science;

16 (C) the Office of Electricity Delivery and
17 Energy Reliability;

18 (D) the Office of Fossil Energy;

19 (E) the Advanced Research Projects Agen-
20 cy—Energy; and

21 (F) other offices as determined by the Sec-
22 retary; and

23 (2) relevant technology research and develop-
24 ment programs within other Federal agencies, as de-
25 termined by the Secretary.

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

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

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

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

19 (1) provide the greatest aggregate fuel savings
20 based on the reasonable projected sales volumes of
21 the technology; and

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

1 **SEC. 102. SENSING AND COMMUNICATIONS TECH-**
2 **NOLOGIES.**

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

11 (1) onboard vehicle, engine, and component
12 sensing and actuation;

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

15 (3) vehicle-to-infrastructure sensing and com-
16 munication; and

17 (4) vehicle integration with the electrical grid.

18 **SEC. 103. MANUFACTURING.**

19 The Secretary shall carry out a research, develop-
20 ment, engineering, demonstration, and commercial appli-
21 cation program of advanced vehicle manufacturing tech-
22 nologies and practices, including innovative processes to—

23 (1) increase the production rate and decrease
24 the cost of advanced battery manufacturing;

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

4 (3) reduce waste streams, emissions, and energy
5 intensity of vehicle, engine, advanced battery and
6 component manufacturing processes;

7 (4) recycle and remanufacture used batteries
8 and other vehicle components for reuse in vehicles or
9 stationary applications;

10 (5) produce cost-effective lightweight materials
11 such as advanced metal alloys, polymeric composites,
12 and carbon fiber;

13 (6) produce lightweight high pressure storage
14 systems for gaseous fuels;

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

17 (8) improve the calendar life and cycle life of
18 advanced batteries; and

19 (9) produce permanent magnets for advanced
20 vehicles.

21 **SEC. 104. USER TESTING FACILITIES.**

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

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

3 (2) subjecting whole or partial vehicle platforms
4 to fully representative duty cycles and operating con-
5 ditions;

6 (3) developing and demonstrating a range of
7 chemistries and configurations for advanced vehicle
8 battery manufacturing; and

9 (4) developing and demonstrating test cycles for
10 new and alternative fuels, and other advanced vehi-
11 cle technologies.

12 **SEC. 105. REPORTING.**

13 (a) TECHNOLOGIES DEVELOPED.—Not later than 18
14 months after the date of enactment of this Act and annu-
15 ally thereafter through 2017, the Secretary of Energy
16 shall transmit to Congress a report regarding the tech-
17 nologies developed as a result of the activities authorized
18 by this title, with a particular emphasis on whether the
19 technologies were successfully adopted for commercial ap-
20 plications, and if so, whether products relying on those
21 technologies are manufactured in the United States.

22 (b) ADDITIONAL MATTERS.—At the end of each fis-
23 cal year through 2017 the Secretary shall submit to the
24 relevant congressional committees of jurisdiction an an-
25 nual report describing activities undertaken in the pre-

1 vious year under this title, active industry participants, ef-
2 forts to recruit new participants committed to design, en-
3 gineering, and manufacturing of advanced vehicle tech-
4 nologies in the United States, progress of the program in
5 meeting goals and timelines, and a strategic plan for fund-
6 ing of activities across agencies.

7 **TITLE II—MEDIUM- AND HEAVY-**
8 **DUTY COMMERCIAL AND**
9 **TRANSIT VEHICLES**

10 **SEC. 201. PROGRAM.**

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

19 (1) engine efficiency and combustion research;

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

22 (3) development and integration of engine tech-
23 nologies designed for natural gas operation of a vari-
24 ety of vehicle platforms;

25 (4) waste heat recovery and conversion;

- 1 (5) improved aerodynamics and tire rolling re-
- 2 sistance;
- 3 (6) energy and space-efficient emissions control
- 4 systems;
- 5 (7) heavy hybrid, hybrid hydraulic, plug-in hy-
- 6 brid, and electric platforms, and energy storage
- 7 technologies;
- 8 (8) drivetrain optimization;
- 9 (9) friction and wear reduction;
- 10 (10) engine idle and parasitic energy loss reduc-
- 11 tion;
- 12 (11) electrification of accessory loads;
- 13 (12) onboard sensing and communications tech-
- 14 nologies;
- 15 (13) advanced lightweighting materials and ve-
- 16 hicle designs;
- 17 (14) increasing load capacity per vehicle;
- 18 (15) thermal management of battery systems;
- 19 (16) recharging infrastructure;
- 20 (17) compressed natural gas infrastructure;
- 21 (18) advanced internal combustion engines;
- 22 (19) complete vehicle modeling and simulation;
- 23 (20) hydrogen vehicle technologies, including
- 24 fuel cells and internal combustion engines, and hy-
- 25 drogen infrastructure;

1 (21) retrofitting advanced technologies onto ex-
2 isting truck fleets; and

3 (22) integration of these and other advanced
4 systems onto a single truck and trailer platform.

5 (b) LEADERSHIP.—The Secretary shall appoint a
6 full-time Director to coordinate research, development,
7 demonstration, and commercial application activities in
8 medium- to heavy-duty commercial, recreational, and tran-
9 sit vehicle technologies. Responsibilities of the Director
10 shall be to—

11 (1) improve coordination and develop consensus
12 between government agency and industry partners,
13 and propose new processes for program management
14 and priority setting to better align activities and
15 budgets among partners;

16 (2) regularly convene workshops, site visits,
17 demonstrations, conferences, investor forums, and
18 other events in which information and research find-
19 ings are shared among program participants and in-
20 terested stakeholders;

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

1 (4) determine a process for reviewing program
2 technical goals, targets, and timetables and, where
3 applicable, aided by life-cycle impact and cost anal-
4 ysis, propose revisions or elimination based on pro-
5 gram progress, available funding, and rate of tech-
6 nology adoption;

7 (5) evaluate ongoing activities of the program
8 and recommend project modifications, including the
9 termination of projects, where applicable;

10 (6) recruit new industry participants to the
11 interagency program, including truck, trailer, and
12 component manufacturers who have not traditionally
13 participated in federally sponsored research and
14 technology development activities; and

15 (7) other responsibilities as determined by the
16 Secretary, in consultation with interagency and in-
17 dustry partners.

18 (c) REPORTING.—At the end of each fiscal year, the
19 Secretary shall submit to the Congress an annual report
20 describing activities undertaken in the previous year, ac-
21 tive industry participants, efforts to recruit new partici-
22 pants, progress of the program in meeting goals and
23 timelines, and a strategic plan for funding of activities
24 across agencies.

1 **SEC. 202. CLASS 8 TRUCK AND TRAILER SYSTEMS DEM-**
2 **ONSTRATION.**

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

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

16 The Secretary, in coordination with the partners of
17 the interagency research program described in section
18 201(a)—

19 (1) shall develop standard testing procedures
20 and technologies for evaluating the performance of
21 advanced heavy vehicle technologies under a range of
22 representative duty cycles and operating conditions,
23 including for heavy hybrid propulsion systems;

24 (2) shall evaluate heavy vehicle performance
25 using work performance-based metrics other than
26 those based on miles per gallon, including those

1 based on units of volume and weight transported for
2 freight applications, and appropriate metrics based
3 on the work performed by nonroad systems; and

4 (3) may construct heavy duty truck and bus
5 testing facilities.

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

7 The Secretary shall undertake a pilot program of re-
8 search, development, demonstration, and commercial ap-
9 plications of technologies to improve total machine or sys-
10 tem efficiency for nonroad mobile equipment including ag-
11 ricultural and construction equipment, and shall seek op-
12 portunities to transfer relevant research findings and tech-
13 nologies between the nonroad and on-highway equipment
14 and vehicle sectors.

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