II

111TH CONGRESS
1ST SESSION

S. 2843

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, Mr. WYDEN, and Mr. NELSON of Florida) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

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A BILL

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

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the ''Advanced Vehicle Technology Act of 2009''.

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

SEC. 2. FINDINGS AND PURPOSES.

(a) FINDINGS.—Congress finds that—

(1) according to the Energy Information Administration, the transportation sector accounts for approximately 28 percent of the United States primary energy demand and greenhouse gas emissions, and 24 percent of global oil demand;

(2) the United States transportation sector is over 95 percent dependent on petroleum, and over 60 percent of petroleum demand is met by imported supplies;

(3) United States heavy truck fuel consumption will increase 23 percent by 2030, while overall transportation energy use will decline by 1 percent;

(4) the domestic automotive and commercial vehicle manufacturing sectors have increasingly limited

resources for research, development, and engineering of advanced technologies;

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

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

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

(8) the Federal Government should balance the role of the Federal Government in researching longer-term exploratory concepts and developing nearer-term transformational technologies for domestic-made vehicles.

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

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

(A) improve the fuel efficiency and emissions of all vehicles produced in the United States; and

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

(2) to support domestic research, development, demonstration, deployment, engineering, and commercial application and domestic manufacturing of advanced vehicles, engines, and components;

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

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

(5) to allow for greater consumer choice of domestic-made vehicle technologies and fuels;

(6) to shorten technology development and integration cycles in the domestic vehicle industry;

(7) to ensure a proper balance and diversity of Federal investment in domestic-made vehicle technologies;

(8) to promote the integration of intelligent vehicle technologies with infrastructure-based informa-

tion and communications systems and the electrical grid; and

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

SEC. 3. DEFINITIONS.

In this Act:

(1) DEPARTMENT.—The term ''Department'' means the Department of Energy.

(2) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

TITLE I—VEHICLE RESEARCH AND DEVELOPMENT

SEC. 101. PROGRAM.

(a) ACTIVITIES.—The Secretary shall conduct a program of basic and applied research, development, engineering, demonstration, and commercial application activities on materials, technologies, and processes with the potential to substantially reduce or eliminate petroleum use by, and emissions from, passenger and commercial vehicles of the United States, including activities in the areas of—

(1) hybridization or full electrification of vehicle systems;

(2) batteries and other energy storage devices;

(3) power electronics;

(4) vehicle, component, and subsystem manufacturing technologies and processes;

(5) engine efficiency and combustion optimization;

(6) waste heat recovery;

(7) transmission and drivetrains;

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

(9) aerodynamics, rolling resistance, and accessory power loads of vehicles and associated equipment;

(10) vehicle weight reduction, including lightweight materials;

(11) friction and wear reduction;

(12) engine and component durability;

(13) innovative propulsion systems;

(14) advanced boosting systems;

(15) hydraulic hybrid technologies;

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

(17) predictive engineering, modeling, and simulation of vehicle and transportation systems;

(18) refueling and charging infrastructure for alternative fueled and electric or plug-in electric hybrid vehicles, including the unique challenges facing rural areas;

(19) gaseous fuels storage system integration and optimization;

(20) sensing, communications, and actuation technologies for vehicle, electrical grid, and infrastructure;

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

(22) aftertreatment technologies;

(23) thermal management of battery systems;

(24) retrofitting advanced vehicle technologies to existing vehicles;

(25) development of common standards, specifications, and architectures for both transportation and stationary battery applications;

(26) development of innovative materials, including constructive, connective, and reinforcing vehicle components; and

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

(b) TRANSFORMATIONAL TECHNOLOGY.—The Secretary, in coordination with the Secretary of Transportation (if appropriate), shall ensure that the Department continues to support domestic research, development, engineering, demonstration, and commercial application activities and maintains competency in mid- to long-term transformational vehicle technologies with the potential to achieve deep reductions in petroleum use and emissions, including activities in the areas of—

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

(2) multiple battery chemistries and novel energy storage devices, including nonchemical batteries and electromechanical storage technologies such as hydraulics, flywheels, bipolar design, and compressed air storage;

(3) communication and connectivity among vehicles, infrastructure, and the electrical grid;

(4) lightweight vehicles and materials; and

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

(c) INDUSTRY PARTICIPATION.—

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

(A) automotive manufacturers;

(B) heavy commercial and transit vehicle manufacturers;

(C) qualified plug-in electric vehicle manufacturers;

(D) vehicle and engine equipment and component manufacturers;

(E) manufacturing equipment manufacturers;

(F) advanced vehicle service providers;

(G) fuel producers and energy suppliers;

(H) electric utilities;

(I) institutions of higher education;

(J) National Laboratories; and

(K) independent research laboratories.

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

(A) determine whether a wide range of companies that manufacture or assemble vehicles or components in the United States are represented in ongoing public private partnership activities, including firms that have not

traditionally participated in federally sponsored research and development activities, and if practicable, partner with such firms that conduct a substantial portion of relevant research and development activities in the United States;

(B) leverage the capabilities and resources of, and formalize partnerships with, industry-led stakeholder organizations, nonprofit organizations, industry consortia, and trade associations with expertise in the research and development of, and education and outreach activities in, advanced automotive and commercial vehicle technologies;

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

(D) give consideration to conversion of existing or former vehicle technology development or manufacturing facilities for the purposes of this Act, and support public-private partnerships dedicated to overcoming barriers in commercial application of transformational vehicle technologies that use such industry-led facilities;

(E) promote efforts to ensure that technologies developed under this Act are produced in the United States; and

(F) establish public-private partnerships dedicated to overcoming barriers to the commercial application of transformational vehicle technologies, using existing industry-led domestic technology development facilities of entities with demonstrated expertise in successfully designing and engineering precommercial generations of such transformational technology.

(d) INTERAGENCY AND INTRAAGENCY COORDINATION.—To the maximum extent practicable, the Secretary shall coordinate research, development, engineering, demonstration, and commercial application activities among—

(1) relevant programs within the Department, including—

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

(B) the Office of Science;

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

(D) the Office of Fossil Energy;

(E) the Advanced Research Projects Agency—Energy; and

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

(2) relevant technology research and development programs within the Department of Transportation and other Federal agencies, as determined by the Secretary.

(e) COORDINATION AND NONDUPLICATION.—In coordinating activities, the Secretary shall ensure, to the maximum extent practicable, that activities do not duplicate activities of other programs within the Department or other relevant research agencies.

(f) FEDERAL DEMONSTRATION OF TECHNOLOGIES.—The Secretary shall make information available to procurement programs of Federal agencies regarding the potential to demonstrate technologies resulting from activities funded through programs under this Act.

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

SEC. 102. SENSING AND COMMUNICATIONS TECHNOLOGIES.

(a) IN GENERAL.—The Secretary, in coordination with the Secretary of Transportation and relevant re-

search programs of other Federal agencies, shall conduct research, development, engineering, and demonstration activities on connectivity of domestic vehicle and transportation systems, including on sensing, computation, communication, actuation, and information technologies that allow for reduced fuel use, optimized traffic flow, improved freight logistics, and vehicle electrification, including technologies for—

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

(2) vehicle-to-vehicle sensing and communication;

(3) vehicle-to-infrastructure sensing and communication;

(4) vehicle integration with the electrical grid; and

(5) driver-to-vehicle integration and communication.

(b) COORDINATION.—The activities carried out under this section should supplement, and not duplicate, activities under the intelligent transportation system research program of the Department of Transportation.

SEC. 103. MANUFACTURING.

The Secretary shall carry out a research, development, engineering, demonstration, and commercial appli-

cation program of domestic advanced vehicle manufacturing technologies and practices, including innovative processes to—

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

(2) vary the capability of individual manufacturing facilities to accommodate different battery chemistries and configurations;

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

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

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

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

(7) design and manufacture purpose-built hydrogen and fuel cell vehicles and components;

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

(9) produce permanent magnets for advanced vehicles.

SEC. 104. USER TESTING FACILITIES.

Activities under this Act may include domestic construction, expansion, or modification of new and existing vehicle, engine, and component research and testing facilities for—

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

(2) subjecting whole or partial vehicle platforms to fully representative duty cycles and operating conditions;

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

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

SEC. 105. REPORTS.

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

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

(2) if so, whether those technologies are manufactured in the United States.

(b) ACTIVITIES.—At the end of each fiscal year the Secretary shall submit to the relevant Congressional committees of jurisdiction an annual report on activities undertaken during the fiscal year under this title, including—

(1) active industry participants;

(2) efforts to recruit new participants;

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

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

SEC. 106. INNOVATIVE AUTOMOTIVE DEMONSTRATION PROGRAM.

(a) IN GENERAL.—The Secretary shall establish an Innovative Automotive Demonstration Program, within the Vehicle Technologies Program, to encourage the introduction of new domestic-made advanced technology vehicles into the marketplace that are designed in their entirety to achieve very high energy efficiency but still provide the capabilities required by consumers in the United States.

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

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

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

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

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

(2) meet all Federal safety requirements;

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

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

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

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

(7) meet all Federal and State emission requirements; and

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

TITLE II—MEDIUM AND HEAVY DUTY COMMERCIAL AND TRANSIT VEHICLES

SEC. 201. PROGRAM.

(a) IN GENERAL.—The Secretary, in partnership with relevant research and development programs in other Federal agencies and a range of appropriate industry stakeholders, shall carry out a program of cooperative research, development, demonstration, and commercial application activities on advanced technologies for medium- to heavy-duty commercial, recreational, and transit vehicles, including activities in the areas of—

(1) engine efficiency and combustion research;

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

(3) development and integration of engine technologies designed for natural gas operation of a variety of vehicle platforms;

(4) waste heat recovery and conversion;

(5) improved aerodynamics and tire rolling resistance;

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

(7) heavy hybrid, hybrid hydraulic, plug-in hybrid, and electric platforms, and energy storage technologies;

(8) drivetrain optimization;

(9) friction and wear reduction;

(10) engine idle and parasitic energy loss reduction;

(11) electrification of accessory loads;

(12) onboard sensing and communications technologies;

(13) advanced lightweight materials and vehicle designs;

(14) increasing load capacity per vehicle;

(15) thermal management of battery systems;

(16) recharging infrastructure;

(17) complete vehicle modeling and simulation;

(18) hydrogen vehicle technologies, including fuel cells and internal combustion engines, and hydrogen infrastructure;

(19) retrofitting advanced technologies onto existing truck fleets; and

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

(b) DIRECTOR.—

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

(2) DUTIES.—The Director shall—

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

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

(C) develop a budget for activities of the Department regarding the interagency program established under this title, and provide consultation and guidance on vehicle technology funding priorities across agencies;

(D) determine a process for reviewing program technical goals, targets, and timetables and, if applicable, aided by life-cycle impact and

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

(E) evaluate ongoing activities of the program and recommend project modifications, including the termination of projects, if applicable;

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

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

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

(1) active industry participants;

(2) efforts to recruit new participants;

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

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

SEC. 202. CLASS 8 TRUCK AND TRAILER SYSTEMS DEMONSTRATION.

(a) IN GENERAL.—The Secretary shall conduct a competitive grant program to demonstrate the integration of multiple advanced technologies on Class 8 truck and trailer platforms with a goal of improving overall freight efficiency, as measured in tons and volume of freight hauled or other work performance-based metrics, by 50 percent, through a combination of technologies described in section 201(a).

(b) APPLICANT TEAMS.—Applicant teams may be comprised of truck and trailer manufacturers, engine and component manufacturers, fleet customers, information and communications technology manufacturers and providers, researchers of institutions of higher education, and other applicants, as appropriate, for the development and demonstration of integrated Class 8 truck and trailer systems.

SEC. 203. TECHNOLOGY TESTING AND METRICS.

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

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

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

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

(B) appropriate metrics based on performance on nonroad systems; and

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

SEC. 204. NONROAD SYSTEMS PILOT PROGRAM.

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

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

TITLE III—AUTHORIZATION OF APPROPRIATIONS

SEC. 301. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary such sums as are necessary to carry out this Act.

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