Calendar No. 150

112TH CONGRESS
1ST SESSION

S. 734

[Report No. 112–70]

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

APRIL 6 (legislative day, APRIL 5), 2011

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

SEPTEMBER 6, 2011

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.

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

~~**SECTION 1. SHORT TITLE.**~~

~~This Act may be cited as the "Advanced Vehicle Technology Act of 2011".~~

SEC. 2. FINDINGS.

Congress finds the following:

(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) 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 the Department of Energy's vehicle technologies research have shifted drastically in recent years among diesel hybrids, hydrogen fuel

cell vehicles, and plug-in electric hybrids, with little continuity among them.

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

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

SEC. 3. OBJECTIVES.

The objectives of this Act are to—

(1) develop United States 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) support domestic research, development, engineering, demonstration, and commercial application and manufacturing of advanced vehicles, engines, and components;

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

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

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

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

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

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

SEC. 4. DEFINITIONS.

For the purposes of this Act:

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

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

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary for United States research, development, engineering, demonstration, and commercial application of vehicles

and related technologies, including activities authorized under this Act, such sums as may be necessary for each of fiscal years 2012 through 2016.

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 and the emissions of the Nation's passenger and commercial vehicles, 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) compressed natural gas vehicle technologies;

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

(11) vehicle weight reduction, including lightweighting materials;

(12) friction and wear reduction;

(13) engine and component durability;

(14) innovative propulsion systems;

(15) advanced boosting systems;

(16) hydraulic hybrid technologies;

(17) engine compatibility with and optimization for a variety of transportation fuels including natural gas and other liquid and gaseous fuels;

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

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

(20) gaseous fuels storage systems and system integration and optimization;

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

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

(23) aftertreatment technologies;

(24) thermal management of battery systems;

(25) retrofitting advanced vehicle technologies to existing vehicles;

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

(27) advanced internal combustion engines; and

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

(b) TRANSFORMATIONAL TECHNOLOGY.—The Secretary shall ensure that the Department continues to support research, development, engineering, demonstration, and commercial application activities and maintains competency in mid- to long-term transformational vehicle technologies with 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, and compressed air storage;

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

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

(c) INDUSTRY PARTICIPATION.—To the maximum extent practicable, activities under this Act shall be carried out in partnership or collaboration with automotive manufacturers, heavy commercial, vocational, and transit vehicle manufacturers, qualified plug-in electric vehicle manufacturers, compressed natural gas vehicle manufacturers, vehicle and engine equipment and component manufacturers, manufacturing equipment manufacturers, advanced vehicle service providers, fuel producers and energy suppliers, electric utilities, universities, national laboratories, and independent research laboratories. In carrying out this Act the Secretary shall—

(1) 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 where possible, partner with such firms that conduct significant and relevant research and development activities in the United States;

(2) 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;

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

(4) give consideration to conversion of existing or former vehicle technology development or manufacturing facilities for the purposes of this Act;

(5) establish and support public-private partnerships, dedicated to overcoming barriers in commercial application of transformational vehicle tech-

nologies, that utilize such industry-led technology development facilities of entities with demonstrated expertise in successfully designing and engineering pre-commercial generations of such transformational technology; and

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

(d) INTERAGENCY AND INTRAAGENCY COORDINATION.—To the maximum extent practicable, the Secretary shall coordinate research, development, 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 other Federal agencies, as determined by the Secretary.

(c) COORDINATION AND NONDUPLICATION.—In coordinating activities the Secretary shall ensure, to the maximum extent practicable, that activities do not duplicate those 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.

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

(1) provide the greatest aggregate fuel savings based on the reasonable projected sales volumes of the technology, and

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

SEC. 102. SENSING AND COMMUNICATIONS TECHNOLOGIES.

The Secretary, in coordination with the relevant research programs of other Federal agencies, shall conduct research, development, engineering, and demonstration activities on connectivity of vehicle and transportation systems, including on sensing, computation, communication, and actuation technologies that allow for reduced fuel use, optimized traffic flow, 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; and

(4) vehicle integration with the electrical grid.

SEC. 103. MANUFACTURING.

The Secretary shall carry out a research, development, engineering, demonstration, and commercial application program of 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 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. REPORTING.

(a) TECHNOLOGIES DEVELOPED.—Not later than 18 months after the date of enactment of this Act and annually thereafter through 2017, the Secretary of Energy shall transmit to Congress a report regarding the technologies developed as a result of the activities authorized by this title, with a particular emphasis on whether the technologies were successfully adopted for commercial applications, and if so, whether products relying on those technologies are manufactured in the United States.

(b) ADDITIONAL MATTERS.—At the end of each fiscal year through 2017 the Secretary shall submit to the relevant Congressional committees of jurisdiction an annual report describing activities undertaken in the previous year under this title, active industry participants, efforts to recruit new participants committed to design, engineering, and manufacturing of advanced vehicle technologies in the United States, progress of the program in meeting goals and timelines, and a strategic plan for funding of activities across agencies.

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, vocational, 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 lightweighting materials and vehicle designs;

(14) increasing load capacity per vehicle;

(15) thermal management of battery systems;

(16) recharging infrastructure;

(17) compressed natural gas infrastructure;

(18) advanced internal combustion engines;

(19) complete vehicle modeling and simulation;

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

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

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

(b) LEADERSHIP.—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. Responsibilities of the Director shall be to—

(1) 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;

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

(3) develop a budget for the Department's activities with regard to the interagency program, and provide consultation and guidance on vehicle technology funding priorities across agencies;

(4) determine a process for reviewing program technical goals, targets, and timetables and, where applicable, aided by life-cycle impact and cost analysis, propose revisions or elimination based on program progress, available funding, and rate of technology adoption;

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

(6) 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

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

(c) REPORTING.—At the end of each fiscal year, the Secretary shall submit to the Congress an annual report describing activities undertaken in the previous year, active industry participants, efforts to recruit new partici-

pants, progress of the program in meeting goals and timelines, and a strategic plan for funding of activities across agencies.

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

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, including a combination of technologies listed in section 201(a). Applicant teams may be comprised of truck and trailer manufacturers, engine and component manufacturers, fleet customers, university researchers, 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 for heavy hybrid propulsion systems;~~

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

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

~~SEC. 204. NONROAD SYSTEMS PILOT PROGRAM.~~

~~The Secretary shall undertake 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, and shall seek opportunities to transfer relevant research findings and technologies between the nonroad and on-highway equipment and vehicle sectors.~~

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Advanced Vehicle Technology Act of 2011".

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

SEC. 2. OBJECTIVES.

The objectives of this Act are—

(1) to reform and reorient the vehicle technologies programs of the Department;

(2) to establish a clear and consistent authority for vehicle technologies programs of the Department;

(3) to develop United States 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;

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

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

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

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

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

(9) to ensure a proper balance and diversity of Federal investment in vehicle technologies and among vehicle classes; and

(10) 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.

SEC. 4. COORDINATION AND NONDUPLICATION.

(a) COORDINATION.—The Secretary shall ensure that activities authorized by this Act do not duplicate activities

of other programs within the Department or other relevant agencies.

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

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 and the emissions of the Nation's passenger and commercial vehicles, including activities in the areas of—

(1) hybridization or full electrification of vehicle systems;

(2) batteries, ultracapacitors, 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) compressed natural gas and liquefied petroleum gas vehicle technologies;

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

(11) vehicle weight reduction, including lightweighting materials;

(12) friction and wear reduction;

(13) engine and component durability;

(14) innovative propulsion systems;

(15) advanced boosting systems;

(16) hydraulic hybrid technologies;

(17) engine compatibility with and optimization for a variety of transportation fuels including natural gas and other liquid and gaseous fuels;

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

(19) refueling and charging infrastructure for alternative fueled and electric or plug-in electric hybrid

vehicles, including the unique challenges facing rural areas;

(20) gaseous fuels storage systems and system integration and optimization;

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

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

(23) aftertreatment technologies;

(24) thermal management of battery systems;

(25) retrofitting advanced vehicle technologies to existing vehicles;

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

(27) advanced internal combustion engines; and

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

(b) TRANSFORMATIONAL TECHNOLOGY.—The Secretary shall ensure that the Department continues to support research, development, engineering, demonstration, and commercial application activities and maintains com-

petency in mid- to long-term transformational vehicle technologies with 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, ultracapacitors and electromechanical storage technologies such as hydraulics, flywheels, and compressed air storage;

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

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

(c) INDUSTRY PARTICIPATION.—To the maximum extent practicable, activities under this Act shall be carried out in partnership or collaboration with automotive manufacturers, heavy commercial, vocational, and transit vehicle manufacturers, qualified plug-in electric vehicle manufacturers, compressed natural gas and liquefied petroleum gas vehicle manufacturers, vehicle and engine equipment and

component manufacturers, manufacturing equipment manufacturers, advanced vehicle service providers, fuel producers and energy suppliers, electric utilities, universities, national laboratories, and independent research laboratories. In carrying out this Act the Secretary shall—

(1) 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 where possible, partner with such firms that conduct significant and relevant research and development activities in the United States;

(2) 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;

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

(4) give consideration to conversion of existing or former vehicle technology development or manufacturing facilities for the purposes of this Act;

(5) establish and support public-private partnerships, dedicated to overcoming barriers in commercial application of transformational vehicle technologies, that utilize such industry-led technology development facilities of entities with demonstrated expertise in successfully designing and engineering pre-commercial generations of such transformational technology; and

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

(d) INTERAGENCY AND INTRAAGENCY COORDINATION.—To the maximum extent practicable, the Secretary shall coordinate research, development, 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) 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.

(f) 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.

(g) CRITERIA.—When awarding cost-shared grants under this program, the Secretary shall give priority to those technologies (either individually or as part of a system) that—

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

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

SEC. 102. SENSING AND COMMUNICATIONS TECHNOLOGIES.

(a) IN GENERAL.—The Secretary, in coordination with the Secretary of Transportation and the relevant research programs of other Federal agencies, shall conduct research, development, engineering, and demonstration activities on connectivity of vehicle and transportation systems, including on sensing, computation, communication, and actuation technologies that allow for reduced fuel use, optimized traffic flow, 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; and

(4) vehicle integration with the electrical grid, including communications to provide grid services.

(b) COORDINATION.—The activities carried out under this section shall supplement (and not supplant) 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 application program of 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. REPORTING.

(a) TECHNOLOGIES DEVELOPED.—Not later than 18 months after the date of enactment of this Act and annually thereafter through 2017, the Secretary of Energy shall transmit to Congress a report regarding the technologies developed as a result of the activities authorized by this title, with a particular emphasis on whether the technologies were successfully adopted for commercial applications, and if so, whether products relying on those technologies are manufactured in the United States.

(b) ADDITIONAL MATTERS.—At the end of each fiscal year through 2017 the Secretary shall submit to the relevant Congressional committees of jurisdiction an annual report describing activities undertaken in the previous year under this title, active industry participants, efforts to recruit new participants committed to design, engineering, and manufacturing of advanced vehicle technologies in the United States, progress of the program in meeting goals and timelines, and a strategic plan for funding of activities across agencies.

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, vocational, recreational, and transit vehicles, including activities in the areas of—

(1) engine efficiency and combustion research;

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

(3) development and integration of engine technologies designed for compressed natural gas and liquefied petroleum 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 lightweighting materials and vehicle designs;

(14) increasing load capacity per vehicle;

(15) thermal management of battery systems;

(16) recharging infrastructure;

(17) compressed natural gas and liquefied petroleum gas infrastructure;

(18) advanced internal combustion engines;

(19) complete vehicle modeling and simulation;

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

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

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

(b) LEADERSHIP.—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. Responsibilities of the Director shall be to—

(1) 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;

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

(3) develop a budget for the Department's activities with regard to the interagency program, and provide consultation and guidance on vehicle technology funding priorities across agencies;

(4) determine a process for reviewing program technical goals, targets, and timetables and, where applicable, aided by life-cycle impact and cost analysis,

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

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

(6) 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

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

(c) REPORTING.—At the end of each fiscal year, the Secretary shall submit to the Congress an annual report describing activities undertaken in the previous year, active industry participants, efforts to recruit new participants, progress of the program in meeting goals and timelines, and a strategic plan for funding of activities across agencies.

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

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, including a combination of technologies listed in section 201(a). Applicant teams may be comprised of truck and trailer manufacturers, engine and component manufacturers, fleet customers, university researchers, 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 for heavy hybrid propulsion systems;

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

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

SEC. 204. NONROAD SYSTEMS PILOT PROGRAM.

The Secretary shall undertake 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, and shall seek opportunities to transfer relevant research findings and technologies between the nonroad and on-highway equipment and vehicle sectors.

SEC. 205. REPEAL OF EXISTING AUTHORITIES.

(a) IN GENERAL.—Sections 706, 711, 712, and 933 of the Energy Policy Act of 2005 (42 U.S.C. 16051, 16061, 16062, 16233) are repealed.

(b) ENERGY EFFICIENCY.—Section 911 of the Energy Policy Act of 2005 (42 U.S.C. 16191) is amended—

(1) in subsection (a)—

(A) in paragraph (1)(A), by striking "vehicles, buildings," and inserting "buildings"; and

(B) in paragraph (2)—

(i) by striking subparagraph (A); and

(ii) by redesignating subparagraphs (B) through (E) as subparagraphs (A) through (D), respectively; and

(2) in subsection (c)—

(A) by striking paragraph (3);

(B) by redesignating paragraph (4) as paragraph (3); and

(C) in paragraph (3) (as so redesignated), by striking "(a)(2)(D)" and inserting "(a)(2)(C)".

(c) ENERGY STORAGE COMPETITIVENESS.—Section 641 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17231) is amended—

(1) by striking subsection (j);

(2) by redesignating subsections (k) through (p) as subsections (j) through (o), respectively; and

(3) in subsection (o) (as so redesignated)—

(A) in paragraph (2), by striking "and;" after the semicolon at the end;

(B) in paragraph (4), by inserting "and" after the semicolon at the end;

(C) by striking paragraph (5);

(D) by redesignating paragraph (6) as paragraph (5); and

(E) in paragraph (5) (as so redesignated), by striking "subsection (k)" and inserting "subsection (j)".

Calendar No. 150

112TH CONGRESS
1ST SESSION

S. 734

[Report No. 112–70]

A BILL

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

SEPTEMBER 6, 2011

Reported with an amendment