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SENATE

REPORT
112–70

ADVANCED VEHICLE TECHNOLOGY ACT

SEPTEMBER 6, 2011.—Ordered to be printed

Mr. BINGAMAN, from the Committee on Energy and Natural Resources, submitted the following

R E P O R T

[To accompany S. 734]

The Committee on Energy and Natural Resources, to which was referred the bill (S. 734) to provide for a program of research, development, demonstration, and commercial application in vehicle technologies at the Department of Energy, having considered the same, reports favorably thereon with an amendment and recommends that the bill, as amended, do pass.

The amendment is as follows:

Strike out all after the enacting clause and insert in lieu thereof the following:

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. 1. Short title; table of contents.
Sec. 2. Objectives.
Sec. 3. Definitions.
Sec. 4. Coordination and nonduplication.

TITLE I—VEHICLE RESEARCH AND DEVELOPMENT

Sec. 101. Program.
Sec. 102. Sensing and communications technologies.
Sec. 103. Manufacturing.
Sec. 104. Reporting.

TITLE II—MEDIUM AND HEAVY DUTY COMMERCIAL AND TRANSIT VEHICLES

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

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 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, 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)".

PURPOSE OF THE MEASURE

The purposes of S. 734 are—

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

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

(3) to develop United States technologies and practices that improve the fuel efficiency and emissions of all vehicles produced in the United States, and 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.

BACKGROUND AND NEED

Over the last two decades, federal research priorities in vehicle technology have shifted between passenger and heavy duty vehicles, as well as diesel-hybrids, hydrogen-fueled, and battery-powered drive systems. The variation in priority and funding may be one reason for unsteady progress in advancing any one technology. The Department of Energy's Vehicle Technologies Program, a division within the Office of Energy Efficiency and Renewable Energy (EERE), currently conducts cooperative research with private industry and academia in a number of areas including combustion efficiency, lightweight materials, alternative fuels, and technology integration. This research relies on various general research and grant authorizations in past energy laws, as well as the Department of Energy Organization Act of 1977.

Although this program has generally focused on technologies that reduce demand for oil-derived fuel, the specific programs and points of emphasis have shifted from Administration to Administration. Cooperative efforts with industry such as the FreedomCAR and Fuel Partnership and the 21st Century Truck Partnership have provided some of the research focus and helped determine objectives, but there is no overarching statutory authority structure for the Vehicle Technologies Program.

This illustrates the need for a comprehensive strategy and consistent funding in a broad range of areas, from near-commercial technologies to exploratory research on a variety of systems, and across vehicle size classes. S. 734 lays out a comprehensive research, development, demonstration, and commercial application

program, including several subprograms, in order to support a domestic vehicle manufacturing industry that retains international competitiveness in advanced vehicle technologies.

LEGISLATIVE HISTORY

Senator Stabenow introduced similar legislation in the 111th Congress (S. 2843) on December 7, 2009. The Subcommittee on Energy held a legislative hearing on the House companion bill, H.R. 3246, on December 8, 2009 (S. Hrg. 111–330). The Committee on Energy and Natural Resources considered S. 2843 and ordered it reported favorably with an amendment in the nature of a substitute on July 21, 2010. The bill did not receive floor consideration in the 111th Congress.

Senator Stabenow introduced S. 734 on April 6, 2011. It is cosponsored by Senators Levin and Wyden. The full Committee conducted a hearing on the bill on May 19, 2011 (S. Hrg. 112–38).

The Committee marked up the bill in open business meeting on July 14, 2011, and adopted an amendment in the nature of a substitute, as amended by an amendment by Senator Coats, and ordered the legislation, as amended, favorably reported.

COMMITTEE RECOMMENDATION

The Senate Committee on Energy and Natural Resources, in open business session on July 14, by majority voice vote of a quorum present, recommends that the Senate pass the bill, if amended as described herein.

COMMITTEE AMENDMENT

During its consideration of S. 734, the Committee adopted an amendment in the nature of a substitute. The substitute amendment adds a table of contents in section 1(b), omits the findings in section 2 of the bill as introduced, provides additional objectives in section 2 of the substitute, adds a new section 4 relating to program coordination, nonduplication, and cost sharing, adds a new section 102(b) relating to program coordination, omits section 104 of the bill as introduced relating to user testing facilities, adds a new section 205 to repeal certain existing authorities, and makes various conforming changes.

SECTION-BY-SECTION ANALYSIS

Section 1 provides a short title.

Section 2 describes the objectives of the bill.

Section 3 defines the terms used in the bill.

Section 4 instructs the Secretary to ensure activities carried out under the bill are not duplicative of other programs conducted at the Department or other relevant agencies. This section also establishes the cost sharing requirements of authorized programs.

TITLE I—VEHICLE RESEARCH AND DEVELOPMENT

Section 101 instructs the Secretary of Energy to carry out a program of basic and applied research, development, engineering, demonstration, and commercial application activities in a range of areas with the potential to substantially reduce or eliminate petro-

leum use. Subsection (a) includes a non-exclusive list of examples of technologies and activities. Subsection (b) directs the Secretary to ensure activities supporting "transformational technologies," such as using hydrogen as a fuel source, energy storage devices and alternative battery chemistries, and communication and connectivity among vehicles continue to be supported. Subsection (c) requires, to the maximum extent practicable, that the Secretary carry out activities under the Act in partnership or collaboration with manufacturers, service providers, electric utilities, and laboratories. Subsection (d) directs the Secretary to coordinate research, development, engineering, demonstration, and commercial application activities with related interagency groups to avoid duplication of work. Subsections (e) and (f) direct the Secretary to seek opportunities to demonstrate technologies, both by providing necessary information to federal procurement offices, and by working with state and local governments to enhance vehicle technology, manufacturing, and infrastructure incentives. Subsection (g) directs the Secretary, in awarding grants to give priority to technologies that save the greatest amount of fuel and create the most jobs.

Section 102 directs the Secretary to work with other relevant federal agencies (e.g., the Department of Transportation, which runs the Intelligent Transportation Systems Joint Program Office) to improve vehicle component sensing and communications capabilities.

Section 103 directs the Secretary to carry out a research, development, engineering, demonstration, and commercial application program in manufacturing technology and processes to produce advanced vehicle technologies and components.

Section 104 requires the Secretary to submit a report to Congress not later than 18 months after the enactment of this bill, and every year thereafter through 2017. Subsection (a) requires the report to outline the technologies developed under title I, particularly technologies that have exceeded the commercial stage and are manufactured domestically. Subsection (b) requires the report to detail active industry participants, efforts to recruit industry participants, program progress, and funding strategies.

TITLE II—MEDIUM AND HEAVY DUTY COMMERCIAL AND TRANSIT VEHICLES

Section 201 instructs the Secretary to conduct, in partnership with other Federal agencies and stakeholders a program of cooperative research, development, demonstration, and commercial application activities for advanced technologies in medium and heavy duty vehicles, including commercial, vocational, recreational, and transit vehicles. Subsection (b) requires the Secretary to appoint a full-time director to coordinate the program. It requires the Director to improve coordination between related agencies and industry partners to better align priorities and budgets, and to evaluate the program's productivity and recommend modifications as needed. Subsection (c) requires the Secretary to submit an annual report that describes the active industry participants, program successes, and funding priorities.

Section 202 establishes a competitive grant program for the purpose of integrating Class 8 trucks and trailers with advanced vehicle technologies and improved freight efficiency. Applicant teams

may be made up of truck, trailer, and engine manufacturers, fleet customers, higher education institutions, and other applicants.

Section 203 directs the Secretary to work with the participants outlined in section 201 to develop testing and evaluation capabilities to measure performance of technologies developed pursuant to this title.

Section 204 requires the Secretary to undertake a pilot program to improve total machine or system efficiency for non-road mobile equipment, including agriculture and construction equipment and to share the findings with nonroad and on-highway vehicle sectors.

Section 205 repeals a number of existing authorities that are considered duplicative of the programs authorized by this bill.

COST AND BUDGETARY CONSIDERATIONS

The following estimate of costs of this measure has been provided by the Congressional Budget Office:

S. 734—Advanced Vehicle Technology Act of 2011

Summary: S. 734 would direct the Secretary of Energy to expand existing activities aimed at developing alternative vehicles with the potential to significantly reduce or eliminate petroleum use and carbon emissions. Assuming appropriation of the necessary amounts, CBO estimates that implementing S. 734 would have a net discretionary cost of nearly $1.3 billion over the 2012–2016 period. Enacting S. 734 would not affect direct spending or revenues; therefore, pay-as-you-go procedures do not apply.

S. 734 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA).

Estimated cost to the Federal Government: The estimated budgetary impact of S. 734 is shown in the following table. The costs of this legislation fall within budget function 270 (energy).

	By fiscal year, in millions of dollars—					
	2012	2013	2014	2015	2016	2012–2016
CHANGES IN SPENDING SUBJECT TO APPROPRIATION						
Spending for Advanced Vehicle Technologies						
Estimated Authorization Level	400	406	412	419	428	2,065
Estimated Outlays	120	240	297	338	373	1,368
Reduced Authorizations						
Authorization Level	−30	−30	−30	−30	−30	−150
Estimated Outlays	−4	−17	−26	−30	−30	−107
Total Proposed Changes:						
Estimated Authorization Level	370	376	382	389	398	1,915
Estimated Outlays	116	223	271	308	343	1,261

Basis of estimate: S. 734 would authorize a variety of activities to promote advanced vehicle technology. The bill also would repeal and modify certain provisions of the Energy Policy Act of 2005 (EPAct) and EISA 2007 that authorize similar activities. Taken as a whole, CBO estimates that implementing S. 734 would result in a net increase in discretionary spending of $1.3 billion over the 2012–2016 period.

Spending for advanced vehicle technologies

S. 734 would direct the Secretary of Energy to carry out, in collaboration with vehicle manufacturers and other nonfederal enti-

ties, activities to promote the development of vehicles with the potential to significantly reduce petroleum use and carbon emissions. The bill would authorize the Department of Energy (DOE) to expand existing research and development activities related to alternative vehicles. In addition, the bill would require the agency to establish new initiatives, particularly related to medium- and heavy-duty vehicles and mass transit vehicles.

S. 734 would not specify particular targets or goals for DOE to achieve related to advanced vehicle technologies. Research and development activities inherently involve trial and error, and the pace of incremental progress is directly related to the variety of experiments attempted and other factors. For this estimate, CBO assumes that the agency would increase its level of effort by expanding existing programs, launching new initiatives, and increasing the number of technologies tested in order to achieve appreciable progress in research areas addressed by S. 734. Based on information from the agency, CBO estimates that realizing recognizable gains from such efforts would require appropriations totaling $400 million in 2012. That amount is roughly double the average level of annual funding provided to DOE for vehicle technology development over the 2000–2010 period and includes:

- $200 million to expand general research and development efforts related to alternative passenger and light-duty commercial vehicles;
- $130 million to expand and establish research and development related to alternative medium- and heavy-duty commercial vehicles and mass transit vehicles;
- $40 million to improve the energy efficiency of manufacturing processes related to alternative vehicles; and
- $30 million to expand programs to develop vehicle-sensing and communication technologies.

Assuming that future annual appropriations would remain at that estimated 2012 level, adjusted for anticipated inflation, CBO estimates that fully funding S. 734 would require appropriations totaling $2.1 billion over the 2012–2016 period. Resulting outlays over that period would total about $1.4 billion, with nearly $0.7 billion of additional spending occurring in later years. CBO expects DOE would use those amounts to fund a wider variety of research activities aimed at achieving technical milestones. CBO estimates that significantly accelerating the time frame in which new technologies could become market ready would require even larger increases in funding.

Reduced Authorizations

To offset a portion of increased discretionary spending, S. 734 would amend and repeal certain provisions of EPAct that authorize a variety of activities related to vehicle technologies. In particular, S. 734 would eliminate an existing authorization to appropriate $30 million a year through 2018 to support collaborative efforts to develop and demonstrate novel and advanced energy storage systems for use in electric drive vehicles. Assuming future appropriations are reduced accordingly, CBO estimates that implementing that provision would result in $107 million less in discretionary spending over the 2012–2016 period and additional savings after 2016. CBO also estimates that repealing and modifying other provi-

sions of EPAct specified in the bill would not significantly affect discretionary spending.

Pay-As-You-Go considerations: None.

Intergovernmental and private-sector impact: S. 734 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no costs on state, local, or tribal governments.

Estimate prepared by: Federal Costs: Megan Carroll; Impact on State, Local, and Tribal Governments: Ryan Miller; Impact on the Private Sector: Amy Petz.

Estimate approved by: Theresa Gullo, Deputy Assistant Director for Budget Analysis.

REGULATORY IMPACT EVALUATION

In compliance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee makes the following evaluation of the regulatory impact which would be incurred in carrying out S. 734.

The bill is not a regulatory measure in the sense of imposing Government established standards or significant economic responsibilities on private individuals and businesses, but rather providing grants to private industry that may be voluntarily applied for.

No personal information would be collected in administering programs authorized under the bill. Therefore, there would be no impact on personal privacy.

While an applicant to the grant programs authorized in the measure will have to submit paperwork through the application process, little if any additional paperwork would be required of any entity or person that is not an applicant to a program.

CONGRESSIONALLY DIRECTED SPENDING

The bill, as reported, does not contain any congressionally directed spending items, limited tax benefits, or limited tariff benefits as defined in rule XLIV of the Standing Rules of the Senate.

EXECUTIVE COMMUNICATIONS

The testimony provided by the Department of Energy on May 19, 2011 follows:

STATEMENT OF MR. PATRICK DAVIS, PROGRAM DIRECTOR, VEHICLE TECHNOLOGIES PROGRAM, OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY, DEPARTMENT OF ENERGY

Chairman Bingaman, Ranking Member Murkowski and Members of the Committee, thank you for the opportunity to discuss the Department's advanced vehicles technology programs. The Administration is still reviewing S. 734 the Advanced Vehicles Technology Act and S. 948 Promoting Electric Vehicles Act of 2011 and does not have a position on either bill at this time and so this statement will provide only general DOE comments.

The transportation sector accounts for approximately two-thirds of the United States' oil consumption and con-

tributes to one-third of the Nation's greenhouse gas (GHG) emissions.[1] After housing, transportation is the second biggest monthly expense for most American families.[2] As the President said in his recent energy speech, "In an economy that relies so heavily on oil, rising prices at the pump affect everybody." Emphasizing that "there are no quick fixes," the President outlined a portfolio of actions which, taken together, could cut U.S. oil imports by a third by 2025. These include programs that would put one million electric vehicles on the road by 2015.

The Office of Energy Efficiency and Renewable Energy's (EERE's) Vehicle Technologies Program (VTP) develops and promotes energy-efficient, environmentally friendly transportation technologies that will reduce petroleum consumption and lower GHG emissions while meeting drivers' expectations of vehicle performance. VTP's activities promote energy security, environmental, and economic benefits in both the near- and long-term.

Few technologies hold greater promise for reducing our dependence on oil than electric vehicles. In his 2011 State of the Union address, the President spoke of his goal to have the United States become the first country with a million electric vehicles on the road by 2015. Meeting this goal will help the United States become a leader in the clean energy economy, while capitalizing on the ingenuity of American industry. Manufacturing products needed for the clean energy economy will generate long term economic strength in the U.S., creating jobs across the country while reducing air pollution and greenhouse gas emissions.

EERE investments past, present, and future are critical to achieving this goal. In 2009, the U.S. had only two, relatively small, factories manufacturing advanced vehicle batteries, and produced less than two percent of the world's hybrid vehicle batteries.[3] But over the next few years, thanks to investments from the American Recovery and Reinvestment Act of 2009 (Recovery Act) in battery and electric drive component manufacturing, and electric drive demonstration and infrastructure, the U.S. will be able to produce enough batteries and components to support 500,000 plug-in and electric vehicles per year. High volume manufacturing, coupled with battery technology advances, design optimization, and material cost reductions, could lead to a drop in battery costs of 50 percent by 2013 compared to 2009, which will lower the cost of electric vehicles, making them accessible to more consumers.

Further policies and research are needed to build on the work under the Recovery Act. That is why the President's FY 2012 Budget proposes a new effort to support electric vehicle manufacturing and adoption in the United States through new consumer rebates, investments in R&D, and

[1] *http://wwwl.eere.energy.go/vehiclesandfuels/pdfs/vehicles_fs.pdf*
[2] *http://www.bls.gov/news.release/cesan.nr0.htm*
[3] *http://www.whitehouse.gov/sites/default/files/blueprint_secure_energy_future.pdf*

competitive programs to encourage communities that invest in electric vehicle infrastructure and regulatory streamlining. Specifically, the Budget proposes to: transform the existing $7500 tax credit for electric vehicles into a rebate that will be available to all consumers immediately at the point of sale; advance innovative technologies through new R&D investments, building on Recovery Act investments, by investing $588 million for vehicle technologies at DOE; and reward communities that invest in electric vehicle infrastructure through a $200 million program which provides an incentive for communities to invest in electric vehicle infrastructure and remove regulatory barriers.

GENERAL COMMENTS ON S. 948, THE PROMOTING ELECTRIC VEHICLES ACT OF 2011

The investments that we have made through the Recovery Act as well as those in the Budget align with many of the priorities that are reflected in the Promoting Electric Vehicles Act of 2011—though we do not take a position on the bill itself. Below, I will discuss some of the priorities included in this bill:

One of the main elements of the Promoting Electric Vehicles Act is a deployment program in which communities would be chosen on a competitive basis to receive grants that would be used to support integration of electric vehicles through means such as installing charging infrastructure, updating building codes. The Administration is supportive of this concept, which is why the President's Budget includes $200 million to reward communities for leadership in reducing regulatory barriers and developing comprehensive electric vehicle-friendly infrastructure.

Specifically, this funding will support a competitive program within the Department of Energy to help communities across the country become early adopters of electric vehicles through regulatory streamlining, infrastructure investments, vehicle fleet conversions, deployment of EV incentives (e.g., parking, HOV access) partnerships with major employers/retailers, and workforce training. The FY 2012 Budget includes a proposal that would allow up to 30 communities across the country to receive grants of up to $10 million each on the basis of their ability to demonstrate concrete reforms and to use the funds to help catalyze electric vehicle deployment. This approach builds on bi-partisan proposals and ideas including some developed by the sponsors of this bill.

The Promoting Electric Vehicles Act of 2011 includes provisions to promote near-term deployment of plug-in electric drive vehicles, many of which may complement and supplement the Department's ongoing activities, funded both through the Recovery Act and annual appropriations. However, as stated previously, the Administration is continuing to review this extensive bill and does not have a position on it at this time.

S. 948 includes provisions which would support technical assistance, workforce training, and a targeted communities program to facilitate the rapid deployment of plug-in vehicles. The bill's targeted deployment program would offer communities of different sizes in various parts of the country an opportunity to execute various deployment approaches and develop best practices that can be shared nationwide to address critical questions about planning and managing vehicle and charging infrastructure deployment.

The Department notes that the community selection criteria includes an emphasis on diversity of climate and type of electric utility. Such diversity in pilot programs, particularly across electricity-generation sources, would be crucial for estimating the environmental impacts of expanded adoption of plug-in electric drive vehicles.

DOE is already examining ways to work more closely with communities on vehicle electrification and infrastructure deployment, particularly in connection with our Clean Cities Program. The coalitions that comprise the Clean Cities network bring together state and local governments, early adopter fleets, local utilities, infrastructure developers, and other key stakeholders in a community to advance the deployment of alternative fuel vehicles. These public private partnerships are proven and effective resources for sharing information at the local level and are primed to support the rollout of electric drive vehicles and infrastructure. Our goal is to better understand how the Department can support local community efforts to deploy EVs and infrastructure.

To maximize the effectiveness of the targeted communities program, the Department would seek to coordinate this effort with related ongoing projects to deploy electric drive vehicles and infrastructure. Our Recovery Act projects for transportation electrification are building critical expertise through large-scale vehicle and infrastructure deployment, collecting data on vehicle-grid interaction and producing valuable lessons learned that can support and help to accelerate future deployments in other communities. We note that the deployment community selection criteria as outlined in the legislation, is crafted to help ensure that the selected communities stand up as models for deployment across the country.

We also believe that technical assistance is vital to the successful rollout of any proposed national deployment program for electric drive vehicles. The Department is well positioned to disseminate information and provide training and technical assistance to communities seeking to accelerate EV deployment. As an example, and as noted earlier, the Clean Cities network is primed to share best practices and lessons learned about permitting and inspection processes, as well as other local ordinances and opportunities for code official and first responder training. I would like to note, however, that the Department plays a supporting role in the development of model codes and standards. In regard to this provision, we can bring value to the process

because of our extensive experience working with code development organizations (CDOs) and standards development organizations (SDOs) to facilitate consensus around the development and adoption of vehicle- and infrastructure-related codes and standards. We are also working to enable the harmonization of codes and standards at an international level collaborating with the National Institute of Standards and Technology (NIST) and the Department of Transportation, as well as with the private sector. Standards and codes for electric vehicles must be consistent with the broader Smart Grid Interoperability Panel (SGIP) effort led by NIST.

The Promoting Electric Vehicles Act includes several other significant provisions in addition to the National Plug-in Electric Drive Deployment Program; I will briefly comment on several of them here.

• The bill authorizes a R&D program focused on advanced batteries, electric drive components, and other technologies supporting the manufacture and deployment of electric drive vehicles and charging infrastructure. These priorities are aligned closely with ongoing activities in the Vehicle Technologies Program—specifically, our Batteries and Electric Drive Technology subprogram, which includes advanced battery R&D and advanced power electronics and electric machines, as well as our Vehicle and Systems Simulation and Testing subprogram, which includes work to examine vehicle and infrastructure interface issues through testing and evaluation. Notably, the President's FY 2012 Budget request will significantly broaden R&D investments in technologies like batteries and electric drives—including an over 30 per cent increase in support for vehicle technology R&D and a new Energy Innovation Hub devoted to improving batteries and energy storage for vehicles and beyond.

• The bill focuses on Federal electric vehicle upgrades. I note that the Administration shares your commitment to upgrading the federal fleet and is finalizing the procurement of 100 electric vehicles.

• The bill also discusses partnership with the private sector surrounding vehicle upgrades, an area where Administration policies are strong. Specifically, we recently announced the Clean Fleets partnership. This program is focused on working with private sector partnerships to help them become leaders in deploying advance vehicles—including electric vehicles—and technical assistance is a critical component of the program. In fact, DOE has developed a wide range of technical tools to help partner companies to navigate the world of alternative fuels and advanced vehicles. A diverse collection of cost calculators, interactive maps, customizable database searches, and mobile applications puts vital information and analysis at fleets' finger tips. This is just one example of our activities in this area—and shows how important we think it is to offer technical assistance.

• We also understand and appreciate the Committee's interest in a technical advisory committee focused on plug-in hybrid vehicles. We place great value in independent reviews and external input to our program. You may be aware that the National Academy of Sciences National Research Council conducts independent biennial reviews of both our light-duty and heavy-duty vehicle research programs.

• With respect to the new loan guarantee authorities included in the bill, we are continuing to evaluate these proposals. At a minimum, we would want any credit assistance to be the most efficient and effective means of achieving policy goals, and therefore any new authorities should comply with Federal credit policies to mitigate cost and risk to the taxpayer.

COMMENTS ON S. 734 THE ADVANCED VEHICLE TECHNOLOGY ACT OF 2011

While the Administration is still reviewing S. 734 and has no position on the bill at this time, it appears that the program authorized by the bill could complement several of the Department's current activities focused on increasing vehicle energy efficiency. The Vehicle Technologies Program is meeting the transportation challenge with an integrated portfolio of advanced vehicle and fuel research, development, demonstration, and deployment activities. We are accomplishing this work in collaboration with industry leaders, national laboratories, universities, state and local governments, and other stakeholders. S. 734 could further support the widespread commercialization of advanced vehicle and fuel technologies to reduce U.S. oil consumption, strengthen our economy, and reduce air pollution and greenhouse gas emissions. That being said, we suggest that the Director of the program be appointed by the Secretary within the Office of Vehicle Technologies itself to facilitate better coordination across activities with similar goals and work.

Further, it also appears that Section 102 "Sensing and Communications Technologies," would unnecessarily duplicate the existing research, development, and demonstration efforts of the Department of Transportation's National Intelligent Transportation Systems Program. We recommend against such duplicative Federal programs.

In sum, the Department's transportation portfolio will save consumers money, reduce our dependence on oil, lower our environmental impact, and keep America on the cutting edge of clean energy technologies, enabling us to build a 21st century clean energy economy. Thank you again for the opportunity to discuss these issues, and I welcome any questions you may have.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill S.

734, as ordered reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

ENERGY POLICY ACT OF 2005

Public Law 109–58, as amended

AN ACT To ensure jobs for our future with secure, affordable, and reliable energy.

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TITLE VII—VEHICLES AND FUELS

Subtitle A—Existing Programs

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[SEC. 706. JOINT FLEXIBLE FUEL/HYBRID VEHICLE COMMERCIALIZATION INITIATIVE.

[(a) DEFINITIONS.—In this section:

[(1) ELIGIBLE ENTITY.—The term "eligible entity" means—

[(A) a for profit corporation;

[(B) a nonprofit corporation; or

[(C) an institution of higher education.

[(2) PROGRAM.—The term "program" means a program established under subsection (b).

[(b) ESTABLISHMENT.—The Secretary shall establish a program to improve technologies for the commercialization of—

[(1) a combination hybrid/flexible fuel vehicle; or

[(2) a plug-in hybrid/flexible fuel vehicle.

[(c) GRANTS.—In carrying out the program, the Secretary shall provide grants that give preference to proposals that—

[(1) achieve the greatest reduction in miles per gallon of petroleum fuel consumption;

[(2) achieve not less than 250 miles per gallon of petroleum fuel consumption; and

[(3) have the greatest potential of commercialization to the general public within 5 years.

[(d) VERIFICATION.—Not later than 90 days after the date of enactment of this Act, the Secretary shall publish in the Federal Register procedures to verify—

[(1) the hybrid/flexible fuel vehicle technologies to be demonstrated; and

[(2) that grants are administered in accordance with this section.

[(e) REPORT.—Not later than 260 days after the date of enactment of this Act, and annually thereafter, the Secretary shall submit to Congress a report that—

[(1) identifies the grant recipients;

[(2) describes the technologies to be funded under the program;

[(3) assesses the feasibility of the technologies described in paragraph (2) in meeting the goals described in subsection (c);

[(4) identifies applications submitted for the program that were not funded; and

[(5) makes recommendations for Federal legislation to achieve commercialization of the technology demonstrated.

[(f) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section, to remain available until expended—

[(1) $3,000,000 for fiscal year 2006;

[(2) $7,000,000 for fiscal year 2007;

[(3) $10,000,000 for fiscal year 2008; and

[(4) $20,000,000 for fiscal year 2009.]

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Subtitle B—Hybrid Vehicles, Advanced Vehicles, and Fuel Cell Buses

PART I—HYBRID VEHICLES

[SEC. 711. HYBRID VEHICLES.

[The Secretary shall accelerate efforts directed toward the improvement of batteries and other rechargeable energy storage systems, power electronics, hybrid systems integration, and other technologies for use in hybrid vehicles.]

[SEC. 712. EFFICIENT HYBRID AND ADVANCED DIESEL VEHICLES.

[(a) PROGRAM.—

[(1) IN GENERAL.—The Secretary shall establish a program to encourage domestic production and sales of efficient hybrid and advanced diesel vehicles and components of those vehicles.

[(2) INCLUSIONS.—The program shall include grants to automobile manufacturers and suppliers and hybrid component manufacturers to encourage domestic production of efficient hybrid, plug-in electric hybrid, plug-in electric drive, and advanced diesel vehicles.

[(3) PRIORITY.—Priority shall be given to the refurbishment or retooling of manufacturing facilities that have recently ceased operation or will cease operation in the near future.

[(b) COOPERATION WITH STATE AND LOCAL PROGRAMS.—The Secretary may coordinate implementation of this section with State and local programs designed to accomplish similar goals, including the retention and retraining of skilled workers from the manufacturing facilities, including by establishing matching grant arrangements.

[(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section such sums as may be necessary to carry out this section.]

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TITLE IX—RESEARCH AND DEVELOPMENT

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Subtitle A—Energy Efficiency

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SEC. 911. ENERGY EFFICIENCY.

(a) IN GENERAL.—

(1) OBJECTIVES.—The Secretary shall conduct programs of energy efficiency research, development, demonstration, and commercial application, including activities described in this part. Such programs shall take into consideration the following objectives:

(A) Increasing the energy efficiency of [vehicles,]buildings, and industrial processes.

(B) Reducing the demand of the United States for energy, especially energy from foreign sources.

(C) Reducing the cost of energy and making the economy more efficient and competitive.

(D) Improving the energy security of the United States.

(E) Reducing the environmental impact of energy-related activities.

(2) PROGRAMS.—Programs under this subtitle shall include research, development, demonstration, and commercial application of—

[(A) advanced, cost-effective technologies to improve the energy efficiency and environmental performance of vehicles, including—

[(i) hybrid and electric propulsion systems;

[(ii) plug-in hybrid systems;

[(iii) advanced combustion engines;

[(iv) weight and drag reduction technologies;

[(v) whole-vehicle design optimization; and

[(vi) advanced drive trains;]

[(B)]*(A)* cost-effective technologies, for new construction and retrofit, to improve the energy efficiency and environmental performance of buildings, using a whole-buildings approach, including onsite renewable energy generation;

[(C)]*(B)* advanced technologies to improve the energy efficiency, environmental performance, and process efficiency of energy-intensive and waste-intensive industries;

[(D)]*(C)* advanced control devices to improve the energy efficiency of electric motors, including those used in industrial processes, heating, ventilation, and cooling; and

[(E)]*(D)* technologies to improve the energy efficiency of appliances and mechanical systems for buildings in cold climates, including combined heat and power units and increased use of renewable resources, including fuel.

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(c) ALLOCATIONS.—From amounts authorized under subsection (b), the following sums are authorized:

(1) For activities under section 16192 of this title, $50,000,000 for each of fiscal years 2007 through 2009.

(2) For activities under section 16195 of this title, $7,000,000 for each of fiscal years 2007 through 2009.

[(3) For activities under subsection (A)(2)(A)—

[(A) $200,000,000 for fiscal year 2007;

[(B) $270,000,000 for fiscal year 2008; and

[(C) $310,000,000 for fiscal year 2009.]

[(4)] *(3)* For activities under subsection [(a)(2)(D)] *(a)(2)(C)*, $2,000,000 for each of fiscal years 2007 and 2008.

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Subtitle C—Renewable Energy

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[SEC. 933. LOW-COST RENEWABLE HYDROGEN AND INFRASTRUCTURE FOR VEHICLE PROPULSION.

[The Secretary shall—

[(1) establish a research, development, and demonstration program to determine the feasibility of using hydrogen propulsion in light-weight vehicles and the integration of the associated hydrogen production infrastructure using off-the-shelf components; and

[(2) identify universities and institutions that—

[(A) have expertise in researching and testing vehicles fueled by hydrogen, methane, and other fuels;

[(B) have expertise in integrating off-the-shelf components to minimize cost; and

[(C) within 2 years can test a vehicle based on an existing commercially available platform with a curb weight of not less than 2,000 pounds before modifications, that—

[(i) operates solely on hydrogen;

[(ii) qualifies as a light-duty passenger vehicle; and

[(iii) uses hydrogen produced from water using only solar energy.]

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ENERGY INDEPENDENCE AND SECURITY ACT OF 2007

Public Law 110–140, as amended

AN ACT To move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government, and for other purposes.

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TITLE VI—ACCELERATED RESEARCH AND DEVELOPMENT

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Subtitle D—Energy Storage for Transportation and Electric Power

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SEC. 641. ENERGY STORAGE COMPETITIVENESS.

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[(j) VEHICLE ENERGY STORAGE DEMONSTRATION.—

[(1) IN GENERAL.—The Secretary shall carry out a program of electric drive vehicle energy storage technology demonstrations.

[(2) CONSORTIA.—The technology demonstrations shall be conducted through consortia, which may include—

[(A) energy storage systems manufacturers and suppliers of the manufacturers;

[(B) electric drive vehicle manufacturers;

[(C) rural electric cooperatives;
[(D) investor owned utilities;
[(E) municipal and rural electric utilities;
[(F) State and local governments;
[(G) metropolitan transportation authorities; and
[(H) institutions of higher education.]

[(k)] *(j)* SECONDARY APPLICATIONS AND DISPOSAL OF ELECTRIC DRIVE VEHICLE BATTERIES.—The Secretary shall carry out a program of research, development, and demonstration of—

(1) secondary applications of energy storage devices following service in electric drive vehicles; and

(2) technologies and processes for final recycling and disposal of the devices.

[(l)] *(k)* COST SHARING.—The Secretary shall carry out the programs established under this section in accordance with section 16352 of this title.

[(m)] *(l)* MERIT REVIEW OF PROPOSALS.—The Secretary shall carry out the programs established under subsections (i), (j), and (k) in accordance with section 16353 of this title.

[(n)] *(m)* COORDINATION AND NONDUPLICATION.—To the maximum extent practicable, the Secretary shall coordinate activities under this section with other programs and laboratories of the Department and other Federal research programs.

[(o)] *(n)* REVIEW BY NATIONAL ACADEMY OF SCIENCES.—On the business day that is 5 years after the date of enactment of this Act, the Secretary shall offer to enter into an arrangement with the National Academy of Sciences to assess the performance of the Department in carrying out this section.

[(p)] *(o)* AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out—

(1) the basic research program under subsection (f) $50,000,000 for each of fiscal years 2009 through 2018;

(2) the applied research program under subsection (g) $80,000,000 for each of fiscal years 2009 through 2018; [and;]

(3) the energy storage research center program under subsection (h) $100,000,000 for each of fiscal years 2009 through 2018;

(4) the energy storage systems demonstration program under subsection (i) $30,000,000 for each of fiscal years 2009 through 2018; *and*

[(5) the vehicle energy storage demonstration program under subsection (j) $30,000,000 for each of fiscal years 2009 through 2018; and]

[(6)] *(5)* the secondary applications and disposal of electric drive vehicle batteries program under [subsection (k)] *subsection (j)* $5,000,000 for each of fiscal years 2009 through 2018.

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