

**AMENDMENT IN THE NATURE OF A SUBSTITUTE  
TO H.R. 3246  
OFFERED BY MR. PETERS OF MICHIGAN**

Strike all after the enacting clause and insert the following:

1 **SECTION 1. SHORT TITLE.**

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

4 **SEC. 2. FINDINGS.**

5       Congress finds the following:

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

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

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

1           (4) The domestic automotive and commercial  
2           vehicle manufacturing sectors have increasingly lim-  
3           ited resources for research and development of ad-  
4           vanced technologies.

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

9           (6) Priorities for the Department of Energy's  
10          vehicle technologies research have shifted drastically  
11          in recent years among diesel hybrids, hydrogen fuel  
12          cell vehicles, and plug-in electric hybrids, with little  
13          continuity among them.

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

18          (8) The Federal Government should balance its  
19          role in researching longer-term exploratory concepts  
20          and developing nearer-term transformational tech-  
21          nologies for vehicles.

22       **SEC. 3. OBJECTIVES.**

23       The objectives of this Act are to—

24           (1) develop technologies and practices that—

1 (A) improve the fuel efficiency and emis-  
2 sions of all vehicles produced in the United  
3 States; and

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

6 (2) support domestic research, development,  
7 demonstration, and commercial application and man-  
8 ufacturing of advanced vehicles, engines, and compo-  
9 nents;

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

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

15 (5) shorten technology development and inte-  
16 gration cycles in the vehicle industry;

17 (6) ensure a proper balance and diversity of  
18 Federal investment in vehicle technologies; and

19 (7) strengthen partnerships between Federal  
20 and State governmental agencies and the private  
21 and academic sectors.

22 **SEC. 4. DEFINITIONS.**

23 For the purposes of this Act:

24 (1) DEPARTMENT.—The term “Department”  
25 means the Department of Energy.

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

3 **SEC. 5. AUTHORIZATION OF APPROPRIATIONS.**

4           (a) IN GENERAL.—The following sums are author-  
5 ized to be appropriated to the Secretary for research, de-  
6 velopment, demonstration, and commercial application of  
7 vehicles and related technologies, including activities au-  
8 thorized under this Act:

9           (1) \$550,000,000 for fiscal year 2010.

10           (2) \$560,000,000 for fiscal year 2011.

11           (3) \$570,000,000 for fiscal year 2012.

12           (4) \$580,000,000 for fiscal year 2013.

13           (5) \$590,000,000 for fiscal year 2014.

14           (b) MEDIUM AND HEAVY DUTY COMMERCIAL VEHI-  
15 CLES.—From the amounts authorized under subsection  
16 (a), there are authorized to be appropriated for carrying  
17 out title II—

18           (1) \$200,000,000 for fiscal year 2010;

19           (2) \$210,000,000 for fiscal year 2011;

20           (3) \$220,000,000 for fiscal year 2012;

21           (4) \$230,000,000 for fiscal year 2013; and

22           (5) \$240,000,000 for fiscal year 2014.

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

- 1 (1) \$35,000,000 for fiscal year 2010;
- 2 (2) \$30,000,000 for fiscal year 2011;
- 3 (3) \$20,000,000 for fiscal year 2012;
- 4 (4) \$15,000,000 for fiscal year 2013; and
- 5 (5) \$15,000,000 for fiscal year 2014.

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

- 9 (1) \$20,000,000 for fiscal year 2010;
- 10 (2) \$20,000,000 for fiscal year 2011; and
- 11 (3) \$20,000,000 for fiscal year 2012.

## 12 **TITLE I—VEHICLE RESEARCH** 13 **AND DEVELOPMENT**

### 14 **SEC. 101. PROGRAM.**

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

- 22 (1) hybridization or full electrification of vehicle  
23 systems;
- 24 (2) batteries and other energy storage devices;
- 25 (3) power electronics;

- 1 (4) vehicle, component, and subsystem manu-
- 2 facturing technologies and processes;
- 3 (5) engine efficiency and combustion optimiza-
- 4 tion;
- 5 (6) waste heat recovery;
- 6 (7) transmission and drivetrains;
- 7 (8) hydrogen vehicle technologies, including fuel
- 8 cells and internal combustion engines, and hydrogen
- 9 infrastructure;
- 10 (9) aerodynamics, rolling resistance, and acces-
- 11 sory power loads of vehicles and associated equip-
- 12 ment;
- 13 (10) vehicle weight reduction;
- 14 (11) friction and wear reduction;
- 15 (12) engine and component durability;
- 16 (13) innovative propulsion systems;
- 17 (14) advanced boosting systems;
- 18 (15) hydraulic hybrid technologies;
- 19 (16) engine compatibility with and optimization
- 20 for a variety of transportation fuels including liquid
- 21 and gaseous fuels;
- 22 (17) predictive engineering, modeling, and sim-
- 23 ulation of vehicle and transportation systems;

1 (18) refueling and charging infrastructure for  
2 alternative fueled and electric or plug-in electric hy-  
3 brid vehicles;

4 (19) gaseous fuels storage system integration  
5 and optimization;

6 (20) sensing, communications, and actuation  
7 technologies for vehicle, electrical grid, and infra-  
8 structure;

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

12 (22) aftertreatment technologies;

13 (23) thermal management of battery systems;

14 (24) development of common standards, speci-  
15 fications, and architectures for both transportation  
16 and stationary battery applications; and

17 (25) other research areas as determined by the  
18 Secretary.

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

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

5           (2) multiple battery chemistries and novel en-  
6           ergy storage devices, including electromechanical  
7           batteries and other nonchemical batteries;

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

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

12          (c) INDUSTRY PARTICIPATION.—To the maximum  
13          extent practicable, activities under this Act shall be carried  
14          out in partnership or collaboration with automotive manu-  
15          facturers, heavy commercial and transit vehicle manufac-  
16          turers, vehicle and engine equipment and component man-  
17          ufacturers, manufacturing equipment manufacturers, ad-  
18          vanced vehicle service providers, fuel producers and energy  
19          suppliers, electric utilities, universities, national labora-  
20          tories, and independent research laboratories. In carrying  
21          out this Act the Secretary shall—

22                 (1) determine whether a wide range of compa-  
23                 nies that manufacture or assemble vehicles or com-  
24                 ponents in the United States are represented in on-  
25                 going public private partnership activities, including

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

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

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

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

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

22 (d) INTERAGENCY AND INTRAAGENCY COORDINA-  
23 TION.—To the maximum extent practicable, the Secretary  
24 shall coordinate research, development, demonstration,  
25 and commercial application activities among—

1 (1) relevant programs within the Department,  
2 including—

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

5 (B) the Office of Science;

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

8 (D) the Office of Fossil Energy;

9 (E) the Advanced Research Projects Agen-  
10 cy—Energy; and

11 (F) other offices as determined by the Sec-  
12 retary; and

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

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

21 (f) FEDERAL DEMONSTRATION OF TECH-  
22 NOLOGIES.—The Secretary shall make information avail-  
23 able to procurement programs of Federal agencies regard-  
24 ing the potential to demonstrate technologies resulting  
25 from activities funded through programs under this Act.

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

6 **SEC. 102. SENSING AND COMMUNICATIONS TECH-**  
7 **NOLOGIES.**

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

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

18 (2) vehicle-to-vehicle sensing and communica-  
19 tion;

20 (3) vehicle-to-infrastructure sensing and com-  
21 munication; and

22 (4) vehicle integration with the electrical grid.

23 **SEC. 103. MANUFACTURING.**

24 The Secretary shall carry out a research, develop-  
25 ment, demonstration, and commercial application program

1 of advanced vehicle manufacturing technologies and prac-  
2 tices, including innovative processes to—

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

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

8 (3) reduce waste streams, emissions, and en-  
9 ergy-intensity of vehicle, engine, and component  
10 manufacturing processes;

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

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

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

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

21 (8) produce permanent magnets for advanced  
22 vehicles.

1 **SEC. 104. USER TESTING FACILITIES.**

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

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

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

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

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

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

19 **SEC. 201. PROGRAM.**

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

1 to heavy-duty commercial and transit vehicles, including  
2 activities in the areas of—

3 (1) engine efficiency and combustion research;

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

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

9 (4) waste heat recovery and conversion;

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

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

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

17 (8) drivetrain optimization;

18 (9) friction and wear reduction;

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

21 (11) electrification of accessory loads;

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

24 (13) advanced lightweighting materials and ve-  
25 hicle designs;

- 1 (14) increasing load capacity per vehicle;
- 2 (15) thermal management of battery systems;
- 3 (16) recharging infrastructure;
- 4 (17) complete vehicle modeling and simulation;
- 5 (18) hydrogen vehicle technologies, including
- 6 fuel cells and internal combustion engines, and hy-
- 7 drogen infrastructure;
- 8 (19) retrofitting advanced technologies onto ex-
- 9 isting truck fleets; and
- 10 (20) integration of these and other advanced
- 11 systems onto a single truck and trailer platform.

12 (b) LEADERSHIP.—The Secretary shall appoint a  
13 full-time Director to coordinate research, development,  
14 demonstration, and commercial application activities in  
15 medium- to heavy-duty commercial and transit vehicle  
16 technologies. Responsibilities of the Director shall be to—

- 17 (1) improve coordination and develop consensus
- 18 between government agency and industry partners,
- 19 and propose new processes for program management
- 20 and priority setting to better align activities and
- 21 budgets among partners;
- 22 (2) regularly convene workshops, site visits,
- 23 demonstrations, conferences, investor forums, and
- 24 other events in which information and research find-

1        ings are shared among program participants and in-  
2        terested stakeholders;

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

7        (4) determine a process for reviewing program  
8        technical goals, targets, and timetables and, where  
9        applicable, aided by life-cycle impact and cost anal-  
10       ysis, propose revisions or elimination based on pro-  
11       gram progress, available funding, and rate of tech-  
12       nology adoption;

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

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

21       (7) other responsibilities as determined by the  
22       Secretary, in consultation with interagency and in-  
23       dustry partners.

24       (c) REPORTING.—At the end of each fiscal year the  
25       partnership shall submit to the Secretary and relevant

1 Congressional committees of jurisdiction an annual report  
2 describing activities undertaken in the previous year, ac-  
3 tive industry participants, efforts to recruit new partici-  
4 pants, progress of the program in meeting goals and  
5 timelines, and a strategic plan for funding of activities  
6 across agencies.

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

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

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

22 The Secretary, in coordination with the partners of  
23 the interagency research program described in section  
24 201(a)—

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

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

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

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

15          The Secretary shall undertake a pilot program of re-  
16          search, development, demonstration, and commercial ap-  
17          plications of technologies to improve total machine or sys-  
18          tem efficiency for heavy duty nonroad equipment, and  
19          shall seek opportunities to transfer relevant research find-  
20          ings and technologies between the nonroad and on-high-  
21          way equipment and vehicle sectors.



**AMENDMENT TO THE AMENDMENT IN THE  
NATURE OF A SUBSTITUTE  
OFFERED BY MS. EDDIE BERNICE JOHNSON OF  
TEXAS**

In section 3, after paragraph (3), insert the following new paragraph (and redesignate the subsequent paragraphs accordingly):

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

