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# TITLE VIII—HYDROGEN

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### 2 SEC. 801. HYDROGEN AND FUEL CELL PROGRAM.

3 This title may be cited as the “Spark M. Matsunaga  
4 Hydrogen Act of 2005”.

### 5 SEC. 802. PURPOSES.

6 The purposes of this title are—

7 (1) to enable and promote comprehensive devel-  
8 opment, demonstration, and commercialization of  
9 hydrogen and fuel cell technology in partnership  
10 with industry;

11 (2) to make critical public investments in build-  
12 ing strong links to private industry, institutions of  
13 higher education, National Laboratories, and re-



1       search institutions to expand innovation and indus-  
2       trial growth;

3               (3) to build a mature hydrogen economy that  
4       creates fuel diversity in the massive transportation  
5       sector of the United States;

6               (4) to sharply decrease the dependency of the  
7       United States on imported oil, eliminate most emis-  
8       sions from the transportation sector, and greatly en-  
9       hance our energy security; and

10              (5) to create, strengthen, and protect a sustain-  
11       able national energy economy.

12 **SEC. 803. DEFINITIONS.**

13       In this title:

14              (1) FUEL CELL.—The term “fuel cell” means a  
15       device that directly converts the chemical energy of  
16       a fuel, which is supplied from an external source,  
17       and an oxidant into electricity by electrochemical  
18       processes occurring at separate electrodes in the de-  
19       vice.

20              (2) HEAVY-DUTY VEHICLE.—The term “heavy-  
21       duty vehicle” means a motor vehicle that—

22                  (A) is rated at more than 8,500 pounds  
23       gross vehicle weight;

24                  (B) has a curb weight of more than 6,000  
25       pounds; or



(C) has a basic vehicle frontal area in excess of 45 square feet.

(4) LIGHT-DUTY VEHICLE.—The term “light-duty vehicle” means a motor vehicle that is rated at 8,500 or less pounds gross vehicle weight.

10                         (5) STATIONARY; PORTABLE.—The terms “sta-  
11                         tionary” and “portable”, when used in reference to  
12                         a fuel cell, include—

15                   (6) TASK FORCE.—The term “Task Force”  
16       means the Hydrogen and Fuel Cell Technical Task  
17       Force established under section 806.

22 SEC. 804. PLAN.

23 Not later than 6 months after the date of enactment  
24 of this Act, the Secretary shall transmit to Congress a  
25 coordinated plan for the programs described in this title



1 and any other programs of the Department that are di-  
2 rectly related to fuel cells or hydrogen. The plan shall de-  
3 scribe, at a minimum—

4 (1) the agenda for the next 5 years for the pro-  
5 grams authorized under this title, including the  
6 agenda for each activity enumerated in section

7 805(e);

8 (2) the types of entities that will carry out the  
9 activities under this title and what role each entity  
10 is expected to play;

11 (3) the milestones that will be used to evaluate  
12 the programs for the next 5 years;

13 (4) the most significant technical and nontech-  
14 nical hurdles that stand in the way of achieving the  
15 goals described in section 805, and how the pro-  
16 grams will address those hurdles; and

17 (5) the policy assumptions that are implicit in  
18 the plan, including any assumptions that would af-  
19 fect the sources of hydrogen or the marketability of  
20 hydrogen-related products.

21 **SEC. 805. PROGRAMS.**

22 (a) IN GENERAL.—The Secretary, in consultation  
23 with other Federal agencies and the private sector, shall  
24 conduct a research and development program on tech-  
25 nologies relating to the production, purification, distribu-



1 tion, storage, and use of hydrogen energy, fuel cells, and  
2 related infrastructure.

3 (b) GOAL.—The goal of the program shall be to dem-  
4 onstrate and commercialize the use of hydrogen for trans-  
5 portation (in light-duty vehicles and heavy-duty vehicles),  
6 utility, industrial, commercial, and residential applica-  
7 tions.

8 (c) FOCUS.—In carrying out activities under this sec-  
9 tion, the Secretary shall focus on factors that are common  
10 to the development of hydrogen infrastructure and the  
11 supply of vehicle and electric power for critical consumer  
12 and commercial applications, and that achieve continuous  
13 technical evolution and cost reduction, particularly for hy-  
14 drogen production, the supply of hydrogen, storage of hy-  
15 drogen, and end uses of hydrogen that—

16 (1) steadily increase production, distribution,  
17 and end use efficiency and reduce life-cycle emis-  
18 sions;

19 (2) resolve critical problems relating to cata-  
20 lysts, membranes, storage, lightweight materials,  
21 electronic controls, manufacturability, and other  
22 problems that emerge from the program of study;

23 (3) enhance sources of renewable fuels and  
24 biofuels for hydrogen production; and



1                             (4) enable widespread use of distributed elec-  
2                             tricity generation and storage.

3                             (d) PUBLIC EDUCATION AND RESEARCH.—In car-  
4                             rying out this section, the Secretary shall support en-  
5                             hanced public education and research conducted at institu-  
6                             tions of higher education in fundamental sciences, applica-  
7                             tion design, and systems concepts (including education  
8                             and research relating to materials, subsystems,  
9                             manufacturability, maintenance, and safety) relating to  
10                           hydrogen and fuel cells.

11                           (e) ACTIVITIES.—The Secretary, in partnership with  
12                             the private sector, shall conduct programs to address—

13                             (1) production of hydrogen from diverse energy  
14                             sources, including—

15                                 (A) fossil fuels, which may include carbon  
16                             capture and sequestration;

17                                 (B) hydrogen-carrier fuels (including eth-  
18                             anol and methanol);

19                                 (C) renewable energy resources, including  
20                             biomass; and

21                                 (D) nuclear energy;

22                             (2) use of hydrogen for commercial, industrial,  
23                             and residential electric power generation;

24                             (3) safe delivery of hydrogen or hydrogen-car-  
25                             rier fuels, including—



- 1                             (A) transmission by pipeline and other dis-  
2                             tribution methods; and  
3                             (B) convenient and economic refueling of  
4                             vehicles either at central refueling stations or  
5                             through distributed onsite generation;  
6                             (4) advanced vehicle technologies, including—  
7                                 (A) engine and emission control systems;  
8                                 (B) energy storage, electric propulsion, and  
9                                 hybrid systems;  
10                                 (C) automotive materials; and  
11                                 (D) other advanced vehicle technologies;  
12                             (5) storage of hydrogen or hydrogen-carrier  
13                             fuels, including development of materials for safe  
14                             and economic storage in gaseous, liquid, or solid  
15                             form at refueling facilities and onboard vehicles;  
16                             (6) development of safe, durable, affordable,  
17                             and efficient fuel cells, including fuel-flexible fuel cell  
18                             power systems, improved manufacturing processes,  
19                             high-temperature membranes, cost-effective fuel  
20                             processing for natural gas, fuel cell stack and system  
21                             reliability, low temperature operation, and cold start  
22                             capability; and  
23                             (7) the ability of domestic automobile manufac-  
24                             turers to manufacture commercially available com-



1       petitive hybrid vehicle technologies in the United  
2       States.

3       (f) PROGRAM GOALS.—

4           (1) VEHICLES.—For vehicles, the goals of the  
5       program are—

6                  (A) to enable a commitment by auto-  
7       makers no later than year 2015 to offer safe,  
8       affordable, and technically viable hydrogen fuel  
9       cell vehicles in the mass consumer market; and

10                 (B) to enable production, delivery, and ac-  
11       ceptance by consumers of model year 2020 hy-  
12       drogen fuel cell and other hydrogen-powered ve-  
13       hicles that will have, when compared to light  
14       duty vehicles in model year 2005—

15                         (i) fuel economy that is substantially  
16       higher;

17                         (ii) substantially lower emissions of  
18       air pollutants; and

19                         (iii) equivalent or improved vehicle  
20       fuel system crash integrity and occupant  
21       protection.

22                 (2) HYDROGEN ENERGY AND ENERGY INFRA-  
23       STRUCTURE.—For hydrogen energy and energy in-  
24       frastructure, the goals of the program are to enable



1       a commitment not later than 2015 that will lead to  
2       infrastructure by 2020 that will provide—

3                     (A) safe and convenient refueling;  
4                     (B) improved overall efficiency;  
5                     (C) widespread availability of hydrogen  
6       from domestic energy sources through—

7                     (i) production, with consideration of  
8       emissions levels;

9                     (ii) delivery, including transmission by  
10      pipeline and other distribution methods for  
11      hydrogen; and

12                     (iii) storage, including storage in sur-  
13      face transportation vehicles;

14                     (D) hydrogen for fuel cells, internal com-  
15      bustion engines, and other energy conversion  
16      devices for portable, stationary, micro, critical  
17      needs facilities, and transportation applications;  
18      and

19                     (E) other technologies consistent with the  
20      Department's plan.

21                     (3) FUEL CELLS.—The goals for fuel cells and  
22      their portable, stationary, and transportation appli-  
23      cations are to enable—

24                     (A) safe, economical, and environmentally  
25      sound hydrogen fuel cells;



1                             (B) fuel cells for light duty and other vehicles; and

3                             (C) other technologies consistent with the  
4                             Department's plan.

5                             (g) FUNDING.—

6                             (1) IN GENERAL.—The Secretary shall carry  
7                             out the programs under this section using a competitive,  
8                             merit-based review process and consistent with  
9                             the generally applicable Federal laws and regulations  
10                            governing awards of financial assistance, contracts,  
11                            or other agreements.

12                            (2) RESEARCH CENTERS.—Activities under this  
13                             section may be carried out by funding nationally rec-  
14                             ognized university-based or Federal laboratory re-  
15                             search centers.

16                            (h) HYDROGEN SUPPLY.—There are authorized to be  
17                             appropriated to carry out projects and activities relating  
18                             to hydrogen production, storage, distribution and dis-  
19                             pensing, transport, education and coordination, and tech-  
20                             nology transfer under this section—

21                             (1) \$160,000,000 for fiscal year 2006;

22                             (2) \$200,000,000 for fiscal year 2007;

23                             (3) \$220,000,000 for fiscal year 2008;

24                             (4) \$230,000,000 for fiscal year 2009;

25                             (5) \$250,000,000 for fiscal year 2010; and



1                   (6) such sums as are necessary for each of fis-  
2                   cal years 2011 through 2020.

3                   (i) FUEL CELL TECHNOLOGIES.—There are author-  
4                   ized to be appropriated to carry out projects and activities  
5                   relating to fuel cell technologies under this section—

6                   (1) \$150,000,000 for fiscal year 2006;  
7                   (2) \$160,000,000 for fiscal year 2007;  
8                   (3) \$170,000,000 for fiscal year 2008;  
9                   (4) \$180,000,000 for fiscal year 2009;  
10                  (5) \$200,000,000 for fiscal year 2010; and

11                  (6) such sums as are necessary for each of fis-  
12                  cal years 2011 through 2020.

13 **SEC. 806. HYDROGEN AND FUEL CELL TECHNICAL TASK  
14                  FORCE.**

15                  (a) ESTABLISHMENT.—Not later than 120 days after  
16                  the date of enactment of this Act, the President shall es-  
17                  tablish an interagency task force chaired by the Secretary  
18                  with representatives from each of the following:

19                  (1) The Office of Science and Technology Pol-  
20                  icy within the Executive Office of the President.

21                  (2) The Department of Transportation.

22                  (3) The Department of Defense.

23                  (4) The Department of Commerce (including  
24                  the National Institute of Standards and Tech-  
25                  nology).



- 1                         (5) The Department of State.
- 2                         (6) The Environmental Protection Agency.
- 3                         (7) The National Aeronautics and Space Ad-
- 4                         ministration.
- 5                         (8) Other Federal agencies as the Secretary de-
- 6                         termines appropriate.
- 7                         (b) DUTIES.—
- 8                         (1) PLANNING.—The Task Force shall work
- 9                         toward—
- 10                         (A) a safe, economical, and environ-
- 11                         mentally sound fuel infrastructure for hydrogen
- 12                         and hydrogen-carrier fuels, including an infra-
- 13                         structure that supports buses and other fleet
- 14                         transportation;
- 15                         (B) fuel cells in government and other ap-
- 16                         plications, including portable, stationary, and
- 17                         transportation applications;
- 18                         (C) distributed power generation, including
- 19                         the generation of combined heat, power, and
- 20                         clean fuels including hydrogen;
- 21                         (D) uniform hydrogen codes, standards,
- 22                         and safety protocols; and
- 23                         (E) vehicle hydrogen fuel system integrity
- 24                         safety performance.



1                         (2) ACTIVITIES.—The Task Force may organize  
2                         workshops and conferences, may issue publications,  
3                         and may create databases to carry out its duties.

4                         The Task Force shall—

5                             (A) foster the exchange of generic, non-  
6                         proprietary information and technology among  
7                         industry, academia, and government;

8                             (B) develop and maintain an inventory and  
9                         assessment of hydrogen, fuel cells, and other  
10                         advanced technologies, including the commercial  
11                         capability of each technology for the economic  
12                         and environmentally safe production, distribu-  
13                         tion, delivery, storage, and use of hydrogen;

14                             (C) integrate technical and other informa-  
15                         tion made available as a result of the programs  
16                         and activities under this title;

17                             (D) promote the marketplace introduction  
18                         of infrastructure for hydrogen fuel vehicles; and

19                             (E) conduct an education program to pro-  
20                         vide hydrogen and fuel cell information to po-  
21                         tential end-users.

22                         (c) AGENCY COOPERATION.—The heads of all agen-  
23                         cies, including those whose agencies are not represented  
24                         on the Task Force, shall cooperate with and furnish infor-



1 mation to the Task Force, the Technical Advisory Com-  
2 mittee, and the Department.

3 **SEC. 807. TECHNICAL ADVISORY COMMITTEE.**

4 (a) ESTABLISHMENT.—The Hydrogen Technical and  
5 Fuel Cell Advisory Committee is established to advise the  
6 Secretary on the programs and activities under this title.

7 (b) MEMBERSHIP.—

8 (1) MEMBERS.—The Technical Advisory Com-  
9 mittee shall be comprised of not fewer than 12 nor  
10 more than 25 members. The members shall be ap-  
11 pointed by the Secretary to represent domestic in-  
12 dustry, academia, professional societies, government  
13 agencies, Federal laboratories, previous advisory  
14 panels, and financial, environmental, and other ap-  
15 propriate organizations based on the Department's  
16 assessment of the technical and other qualifications  
17 of Technical Advisory Committee members and the  
18 needs of the Technical Advisory Committee.

19 (2) TERMS.—The term of a member of the  
20 Technical Advisory Committee shall not be more  
21 than 3 years. The Secretary may appoint members  
22 of the Technical Advisory Committee in a manner  
23 that allows the terms of the members serving at any  
24 time to expire at spaced intervals so as to ensure  
25 continuity in the functioning of the Technical Advi-



1       sory Committee. A member of the Technical Advi-  
2       sory Committee whose term is expiring may be re-  
3       appointed.

4                 (3) CHAIRPERSON.—The Technical Advisory  
5       Committee shall have a chairperson, who shall be  
6       elected by the members from among their number.

7                 (c) REVIEW.—The Technical Advisory Committee  
8       shall review and make recommendations to the Secretary  
9       on—

10                 (1) the implementation of programs and activi-  
11       ties under this title;

12                 (2) the safety, economical, and environmental  
13       consequences of technologies for the production, dis-  
14       tribution, delivery, storage, or use of hydrogen en-  
15       ergy and fuel cells; and

16                 (3) the plan under section 804.

17                 (d) RESPONSE.—

18                 (1) CONSIDERATION OF RECOMMENDATIONS.—  
19       The Secretary shall consider, but need not adopt,  
20       any recommendations of the Technical Advisory  
21       Committee under subsection (c).

22                 (2) BIENNIAL REPORT.—The Secretary shall  
23       transmit a biennial report to Congress describing  
24       any recommendations made by the Technical Advi-  
25       sory Committee since the previous report. The re-



1 port shall include a description of how the Secretary  
2 has implemented or plans to implement the rec-  
3 ommendations, or an explanation of the reasons that  
4 a recommendation will not be implemented. The re-  
5 port shall be transmitted along with the President's  
6 budget proposal.

7 (e) SUPPORT.—The Secretary shall provide resources  
8 necessary in the judgment of the Secretary for the Tech-  
9 nical Advisory Committee to carry out its responsibilities  
10 under this title.

11 **SEC. 808. DEMONSTRATION.**

12 (a) IN GENERAL.—In carrying out the programs  
13 under this section, the Secretary shall fund a limited num-  
14 ber of demonstration projects, consistent with this title  
15 and a determination of the maturity, cost-effectiveness,  
16 and environmental impacts of technologies supporting  
17 each project. In selecting projects under this subsection,  
18 the Secretary shall, to the extent practicable and in the  
19 public interest, select projects that—

20 (1) involve using hydrogen and related products  
21 at existing facilities or installations, such as existing  
22 office buildings, military bases, vehicle fleet centers,  
23 transit bus authorities, or units of the National Park  
24 System;



- 1                   (2) depend on reliable power from hydrogen to  
2                   carry out essential activities;
- 3                   (3) lead to the replication of hydrogen tech-  
4                   nologies and draw such technologies into the market-  
5                   place;
- 6                   (4) include vehicle, portable, and stationary  
7                   demonstrations of fuel cell and hydrogen-based en-  
8                   ergy technologies;
- 9                   (5) address the interdependency of demand for  
10                  hydrogen fuel cell applications and hydrogen fuel in-  
11                  frastructure;
- 12                  (6) raise awareness of hydrogen technology  
13                  among the public;
- 14                  (7) facilitate identification of an optimum tech-  
15                  nology among competing alternatives;
- 16                  (8) address distributed generation using renew-  
17                  able sources;
- 18                  (9) carry out demonstrations of evolving hydro-  
19                  gen and fuel cell technologies in national parks, re-  
20                  mote island areas, and on Indian tribal land, as se-  
21                  lected by the Secretary;
- 22                  (10) carry out a program to demonstrate devel-  
23                  opmental hydrogen and fuel cell systems for mobile,  
24                  portable, and stationary uses, using improved ver-  
25                  sions of the learning demonstrations program con-



1       cept of the Department including demonstrations  
2       involving—

- 3                     (A) light-duty vehicles;  
4                     (B) heavy-duty vehicles;  
5                     (C) fleet vehicles;  
6                     (D) specialty industrial and farm vehicles;

7       and

8                     (E) commercial and residential portable,  
9       continuous, and backup electric power genera-  
10      tion;

11      (11) in accordance with any code or standards  
12      developed in a region, fund prototype, pilot fleet,  
13      and infrastructure regional hydrogen supply cor-  
14      ridors along the interstate highway system in varied  
15      climates across the United States; and

16      (12) fund demonstration programs that explore  
17      the use of hydrogen blends, hybrid hydrogen, and  
18      hydrogen reformed from renewable agricultural  
19      fuels, including the use of hydrogen in hybrid elec-  
20      tric, heavier duty, and advanced internal combus-  
21      tion-powered vehicles.

22     The Secretary shall give preference to projects which ad-  
23     dress multiple elements contained in paragraphs (1)  
24     through (12).

25     (b) SYSTEM DEMONSTRATIONS.—



1                   (1) IN GENERAL.—As a component of the dem-  
2 onstration program under this section, the Secretary  
3 shall provide grants, on a cost share basis as appro-  
4 priate, to eligible entities (as determined by the Sec-  
5 retary) for use in—

6                   (A) devising system design concepts that  
7 provide for the use of advanced composite vehi-  
8 cles in programs under section 782 that—

9                   (i) have as a primary goal the reduc-  
10 tion of drive energy requirements;

11                   (ii) after 2010, add another research  
12 and development phase, as defined in sub-  
13 section (c), including the vehicle and infra-  
14 structure partnerships developed under the  
15 learning demonstrations program concept  
16 of the Department; and

17                   (iii) are managed through an en-  
18 hanced FreedomCAR program within the  
19 Department that encourages involvement  
20 in cost-shared projects by manufacturers  
21 and governments; and

22                   (B) designing a local distributed energy  
23 system that—

24                   (i) incorporates renewable hydrogen  
25 production, off-grid electricity production,



1                   and fleet applications in industrial or com-  
2                   mercial service;

3                   (ii) integrates energy or applications  
4                   described in clause (i), such as stationary,  
5                   portable, micro, and mobile fuel cells, into  
6                   a high-density commercial or residential  
7                   building complex or agricultural commu-  
8                   nity; and

9                   (iii) is managed in cooperation with  
10                  industry, State, tribal, and local govern-  
11                  ments, agricultural organizations, and non-  
12                  profit generators and distributors of elec-  
13                  tricity.

14                 (c) IDENTIFICATION OF NEW PROGRAM REQUIRE-  
15                 MENTS.—In carrying out the demonstrations under sub-  
16                 section (a), the Secretary, in consultation with the Task  
17                 Force and the Technical Advisory Committee, shall—

18                 (1) after 2008 for stationary and portable ap-  
19                 plications, and after 2010 for vehicles, identify new  
20                 requirements that refine technological concepts,  
21                 planning, and applications; and

22                 (2) during the second phase of the learning  
23                 demonstrations under subsection (b)(1)(A)(ii), rede-  
24                 sign subsequent program work to incorporate those  
25                 requirements.



1           (d) AUTHORIZATION OF APPROPRIATIONS.—There  
2 are authorized to be appropriated to carry out this  
3 section—  
4           (1) \$185,000,000 for fiscal year 2006;  
5           (2) \$200,000,000 for fiscal year 2007;  
6           (3) \$250,000,000 for fiscal year 2008;  
7           (4) \$300,000,000 for fiscal year 2009;  
8           (5) \$375,000,000 for fiscal year 2010; and  
9           (6) such sums as are necessary for each of fis-  
10          cal years 2011 through 2020.

11 **SEC. 809. CODES AND STANDARDS.**

12          (a) IN GENERAL.—The Secretary, in cooperation  
13 with the Task Force, shall provide grants to, or offer to  
14 enter into contracts with, such professional organizations,  
15 public service organizations, and government agencies as  
16 the Secretary determines appropriate to support timely  
17 and extensive development of safety codes and standards  
18 relating to fuel cell vehicles, hydrogen energy systems, and  
19 stationary, portable, and micro fuel cells.

20          (b) EDUCATIONAL EFFORTS.—The Secretary shall  
21 support educational efforts by organizations and agencies  
22 described in subsection (a) to share information, including  
23 information relating to best practices, among those organi-  
24 zations and agencies.



1           (c) AUTHORIZATION OF APPROPRIATIONS.—There  
2 are authorized to be appropriated to carry out this  
3 section—

4           (1) \$4,000,000 for fiscal year 2006;  
5           (2) \$7,000,000 for fiscal year 2007;  
6           (3) \$8,000,000 for fiscal year 2008;  
7           (4) \$10,000,000 for fiscal year 2009;  
8           (5) \$9,000,000 for fiscal year 2010; and  
9           (6) such sums as are necessary for each of fis-  
10          cal years 2011 through 2020.

11 **SEC. 810. DISCLOSURE.**

12          Section 623 of the Energy Policy Act of 1992 (42  
13 U.S.C. 13293) shall apply to any project carried out  
14 through a grant, cooperative agreement, or contract under  
15 this title.

16 **SEC. 811. REPORTS.**

17          (a) SECRETARY.—Subject to subsection (c), not later  
18 than 2 years after the date of enactment of this Act, and  
19 triennially thereafter, the Secretary shall submit to Con-  
20 gress a report describing—

21           (1) activities carried out by the Department  
22 under this title, for hydrogen and fuel cell tech-  
23 nology;  
24           (2) measures the Secretary has taken during  
25 the preceding 3 years to support the transition of



1 primary industry (or a related industry) to a fully  
2 commercialized hydrogen economy;

3 (3) any change made to the strategy relating to  
4 hydrogen and fuel cell technology to reflect the re-  
5 sults of a learning demonstrations;

6 (4) progress, including progress in infrastruc-  
7 ture, made toward achieving the goal of producing  
8 and deploying not less than—

9 (A) 100,000 hydrogen-fueled vehicles in  
10 the United States by 2010; and

11 (B) 2,500,000 hydrogen-fueled vehicles in  
12 the United States by 2020;

13 (5) progress made toward achieving the goal of  
14 supplying hydrogen at a sufficient number of fueling  
15 stations in the United States by 2010 including by  
16 integrating—

17 (A) hydrogen activities; and

18 (B) associated targets and timetables for  
19 the development of hydrogen technologies;

20 (6) any problem relating to the design, execu-  
21 tion, or funding of a program under this title;

22 (7) progress made toward and goals achieved in  
23 carrying out this title and updates to the develop-  
24 mental roadmap, including the results of the reviews  
25 conducted by the National Academy of Sciences



1       under subsection (b) for the fiscal years covered by  
2       the report; and

3               (8) any updates to strategic plans that are nec-  
4       essary to meet the goals described in paragraph (4).

5       (b) EXTERNAL REVIEW.—The Secretary shall enter  
6       into an arrangement with the National Academy of  
7       Sciences under which the Academy will review the pro-  
8       grams under sections 805 and 808 every fourth year fol-  
9       lowing the date of enactment of this Act. The Academy's  
10      review shall include the program priorities and technical  
11      milestones, and evaluate the progress toward achieving  
12      them. The first review shall be completed not later than  
13      5 years after the date of enactment of this Act. Not later  
14      than 45 days after receiving the review, the Secretary shall  
15      transmit the review to Congress along with a plan to im-  
16      plement the review's recommendations or an explanation  
17      for the reasons that a recommendation will not be imple-  
18      mented.

19       (c) AUTHORIZATION OF APPROPRIATIONS.—There is  
20      authorized to be appropriated to carry out this section  
21      \$1,500,000 for each of fiscal years 2006 through 2020.

22      **SEC. 812. SOLAR AND WIND TECHNOLOGIES.**

23       (a) SOLAR ENERGY TECHNOLOGIES.—The Secretary  
24      shall—



- 1                         (1) prepare a detailed roadmap for carrying out  
2                         the provisions in this title related to solar energy  
3                         technologies and for implementing the recommenda-  
4                         tions related to solar energy technologies that are in-  
5                         cluded in the report transmitted under subsection  
6                         (e);
- 7                         (2) provide for the establishment of 5 projects  
8                         in geographic areas that are regionally and climati-  
9                         cally diverse to demonstrate the production of hydro-  
10                         gen at solar energy facilities, including one dem-  
11                         onstration project at a National Laboratory or insti-  
12                         tution of higher education;
- 13                         (3) establish a program—  
14                             (A) to develop optimized concentrating  
15                         solar power devices that may be used for the  
16                         production of both electricity and hydrogen; and  
17                             (B) to evaluate the use of thermochemical  
18                         cycles for hydrogen production at the tempera-  
19                         tures attainable with concentrating solar power  
20                         devices;
- 21                         (4) coordinate with activities sponsored by the  
22                         Department's Office of Nuclear Energy, Science,  
23                         and Technology on high-temperature materials,  
24                         thermochemical cycles, and economic issues related  
25                         to solar energy;



1                         (5) provide for the construction and operation  
2                         of new concentrating solar power devices or solar  
3                         power cogeneration facilities that produce hydrogen  
4                         either concurrently with, or independently of, the  
5                         production of electricity;

6                         (6) support existing facilities and programs of  
7                         study related to concentrating solar power devices;  
8                         and

9                         (7) establish a program—

10                         (A) to develop methods that use electricity  
11                         from photovoltaic devices for the onsite produc-  
12                         tion of hydrogen, such that no intermediate  
13                         transmission or distribution infrastructure is re-  
14                         quired or used and future demand growth may  
15                         be accommodated;

16                         (B) to evaluate the economics of small-  
17                         scale electrolysis for hydrogen production; and

18                         (C) to study the potential of modular pho-  
19                         tovoltaic devices for the development of a hy-  
20                         drogen infrastructure, the security implications  
21                         of a hydrogen infrastructure, and the benefits  
22                         potentially derived from a hydrogen infrastruc-  
23                         ture.

24                         (b) WIND ENERGY TECHNOLOGIES.—The Secretary  
25                         shall—



1                             (1) prepare a detailed roadmap for carrying out  
2                             the provisions in this title related to wind energy  
3                             technologies and for implementing the recommenda-  
4                             tions related to wind energy technologies that are in-  
5                             cluded in the report transmitted under subsection  
6                             (e); and

7                             (2) provide for the establishment of 5 projects  
8                             in geographic areas that are regionally and climati-  
9                             cally diverse to demonstrate the production of hydro-  
10                             gen at existing wind energy facilities, including one  
11                             demonstration project at a National Laboratory or  
12                             institution of higher education.

13                             (c) PROGRAM SUPPORT.—The Secretary shall sup-  
14                             port programs at institutions of higher education for the  
15                             development of solar energy technologies and wind energy  
16                             technologies for the production of hydrogen. The programs  
17                             supported under this subsection shall—

18                             (1) enhance fellowship and faculty assistance  
19                             programs;

20                             (2) provide support for fundamental research;

21                             (3) encourage collaborative research among in-  
22                             dustry, National Laboratories, and institutions of  
23                             higher education;

24                             (4) support communication and outreach; and

25                             (5) to the greatest extent possible—



1                             (A) be located in geographic areas that are  
2                             regionally and climatically diverse; and

3                             (B) be located at part B institutions, mi-  
4                             nority institutions, and institutions of higher  
5                             education located in States participating in the  
6                             Experimental Program to Stimulate Compe-  
7                             titive Research of the Department.

8                             (d) INSTITUTIONS OF HIGHER EDUCATION AND NA-  
9                             TIONAL LABORATORY INTERACTIONS.—In conjunction  
10                             with the programs supported under this section, the Sec-  
11                             retary shall develop sabbatical, fellowship, and visiting sci-  
12                             entist programs to encourage National Laboratories and  
13                             institutions of higher education to share and exchange  
14                             personnel.

15                             (e) REPORT.—The Secretary shall transmit to the  
16                             Congress not later than 120 days after the date of enact-  
17                             ment of this Act a report containing detailed summaries  
18                             of the roadmaps prepared under subsections (a)(1) and  
19                             (b)(1), descriptions of the Secretary's progress in estab-  
20                             lishing the projects and other programs required under  
21                             this section, and recommendations for promoting the  
22                             availability of advanced solar and wind energy technologies  
23                             for the production of hydrogen.

24                             (f) DEFINITIONS.—For purposes of this section—



1                   (1) the term “concentrating solar power de-  
2       vices” means devices that concentrate the power of  
3       the sun by reflection or refraction to improve the ef-  
4       ficiency of a photovoltaic or thermal generation proc-  
5       ess;

6                   (2) the term “minority institution” has the  
7       meaning given to that term in section 365 of the  
8       Higher Education Act of 1965 (20 U.S.C. 1067k);

9                   (3) the term “part B institution” has the mean-  
10      ing given to that term in section 322 of the Higher  
11      Education Act of 1965 (20 U.S.C. 1061); and

12                  (4) the term “photovoltaic devices” means de-  
13      vices that convert light directly into electricity  
14      through a solid-state, semiconductor process.

15                  (g) AUTHORIZATION OF APPROPRIATIONS.—There is  
16      authorized to be appropriated such sums as are necessary  
17      for carrying out the activities under this section for each  
18      of fiscal years 2006 through 2020.

19      **SEC. 813. TECHNOLOGY TRANSFER.**

20                  In carrying out this title, the Secretary shall carry  
21      out programs that—

22                  (1) provide for the transfer of critical hydrogen  
23      and fuel cell technologies to the private sector;

24                  (2) accelerate wider application of those tech-  
25      nologies in the global market;



1                             (3) foster the exchange of generic, nonproprietary information; and

3                             (4) assess technical and commercial viability of  
4                                technologies relating to the production, distribution,  
5                                storage, and use of hydrogen energy and fuel cells.

6 **SEC. 814. MISCELLANEOUS PROVISIONS.**

7                             (a) REPRESENTATION.—The Secretary may represent the United States interests with respect to activities  
8                                and programs under this title, in coordination with the  
9                                Department of Transportation, the National Institute of  
10                              Standards and Technology, and other relevant Federal  
11                              agencies, before governments and nongovernmental organizations including—

14                             (1) other Federal, State, regional, and local  
15                              governments and their representatives;

16                             (2) industry and its representatives, including  
17                              members of the energy and transportation industries; and

19                             (3) in consultation with the Department of  
20                              State, foreign governments and their representatives  
21                              including international organizations.

22                             (b) REGULATORY AUTHORITY.—Nothing in this title  
23                              shall be construed to alter the regulatory authority of the  
24                              Department.



**1 SEC. 815. COST SHARING.**

2       The costs of carrying out projects and activities  
3 under this title shall be shared in accordance with section  
4 1002.

**5 SEC. 816. SAVINGS CLAUSE.**

6       Nothing in this title shall be construed to affect the  
7 authority of the Secretary of Transportation that may  
8 exist prior to the date of enactment of this Act with re-  
9 spect to—

10           (1) research into, and regulation of, hydrogen-  
11 powered vehicles fuel systems integrity, standards,  
12 and safety under subtitle VI of title 49, United  
13 States Code;

14           (2) regulation of hazardous materials transpor-  
15 tation under chapter 51 of title 49, United States  
16 Code;

17           (3) regulation of pipeline safety under chapter  
18 601 of title 49, United States Code;

19           (4) encouragement and promotion of research,  
20 development, and deployment activities relating to  
21 advanced vehicle technologies under section 5506 of  
22 title 49, United States Code;

23           (5) regulation of motor vehicle safety under  
24 chapter 301 of title 49, United States Code;

25           (6) automobile fuel economy under chapter 329  
26 of title 49, United States Code; or



1                   (7) representation of the interests of the United  
2                   States with respect to the activities and programs  
3                   under the authority of title 49, United States Code.

