

111TH CONGRESS
1ST SESSION

H. R. 3585

AN ACT

To guide and provide for United States research, development, and demonstration of solar energy technologies, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “Solar Technology
3 Roadmap Act”.

4 **SEC. 2. DEFINITIONS.**

5 In this Act:

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

8 (2) SOLAR TECHNOLOGY.—The term “solar
9 technology” means—

10 (A) photovoltaic technologies, including
11 technologies utilizing—

12 (i) crystalline silicon;

13 (ii) cadmium telluride;

14 (iii) semiconductor materials con-
15 taining copper, indium, and selenium;

16 (iv) thin film silicon;

17 (v) gallium arsenide alloy and multi-
18 junctions;

19 (vi) dye-sensitized and organic solar
20 cell technologies;

21 (vii) concentrating photovoltaics; and

22 (viii) other photovoltaic methods iden-
23 tified by the Secretary;

24 (B) solar thermal power technology, in-
25 cluding linear concentrator systems, dish/engine

1 systems, power tower systems, and other
2 means;

3 (C) solar thermal water heating tech-
4 nology;

5 (D) solar heating and air conditioning
6 technologies;

7 (E) passive solar design in architecture, in-
8 cluding both heating and lighting applications;
9 and

10 (F) related or enabling technologies, in-
11 cluding thin films, semiconducting materials,
12 transparent conductors, optics, and technologies
13 that increase durability or decrease cost or
14 weight.

15 **TITLE I—SOLAR TECHNOLOGY**
16 **RESEARCH, DEVELOPMENT,**
17 **AND DEMONSTRATION**

18 **SEC. 101. PROGRAM.**

19 (a) IN GENERAL.—The Secretary shall conduct a
20 program of research, development, and demonstration for
21 solar technology, including—

22 (1) photovoltaics and related electronic compo-
23 nents, including inverters, charge controllers, and
24 energy monitors;

1 (2) solar hot water and solar space heating and
2 cooling;

3 (3) concentrating solar power, including both
4 solar thermal and concentrating solar photovoltaic
5 technologies;

6 (4) lighting systems that integrate sunlight and
7 electrical lighting in complement to each other in
8 common lighting fixtures for the purpose of improv-
9 ing energy efficiency;

10 (5) manufacturability of low cost, high-quality
11 solar energy systems;

12 (6) development of solar technology products
13 that can be easily integrated into new and existing
14 buildings;

15 (7) development of solar technology products
16 that are water efficient;

17 (8) development of storage technologies that
18 can be used to increase the usefulness and value of
19 solar technologies; and

20 (9) other areas as the Secretary considers ap-
21 propriate.

22 (b) AWARDS.—The Secretary shall provide awards
23 under this section to promote a diversity of research, de-
24 velopment, and demonstration activities for solar tech-
25 nology on a merit-reviewed, competitive basis to—

1 (1) academic institutions, national laboratories,
2 Federally-Funded Research and Development Cen-
3 ters, Federal research agencies, State research agen-
4 cies, nonprofit research organizations, industrial en-
5 tities, or consortia thereof for research, development,
6 and demonstration activities; and

7 (2) industry-led consortia for research, develop-
8 ment, and demonstration of advanced techniques for
9 manufacturing a variety of solar energy products.

10 (c) SENSE OF CONGRESS.—It is the sense of Con-
11 gress that at least 75 percent of funding for solar tech-
12 nology research, development, and demonstration activi-
13 ties conducted by the Department of Energy after fiscal
14 year 2014 support a diversity of activities identified by
15 and recommended under the Solar Technology Roadmap
16 as described in section 102.

17 (d) SPECIAL CONSIDERATION.—As a criteria for pro-
18 viding awards under this Act, the Secretary shall consider
19 areas with high unemployment.

20 (e) LIMITATION.—The Department of Energy shall
21 provide awards to projects for research, development, and
22 demonstration of solar technologies and solar manufac-
23 turing in the United States.

1 **SEC. 102. SOLAR TECHNOLOGY ROADMAP.**

2 (a) IN GENERAL.—Not later than 18 months after
3 the date of enactment of this Act, the Solar Technology
4 Roadmap Committee established under section 103 shall
5 develop and transmit to the Secretary of Energy and the
6 Congress a Solar Technology Roadmap that—

7 (1) presents the best current estimate of the
8 near-term (up to 2 years), mid-term (up to 7 years),
9 and long-term (up to 15 years) research, develop-
10 ment, and demonstration needs in solar technology;
11 and

12 (2) provides guidance to the solar technology
13 research, development, and demonstration activities
14 supported by the Federal Government for the pur-
15 poses of meeting national priorities in energy secu-
16 rity, United States competitiveness, mitigation of ad-
17 verse environmental impacts, and energy diversifica-
18 tion.

19 (b) CONTENTS.—The Solar Technology Roadmap
20 shall—

21 (1) identify research, development, and dem-
22 onstration needs for a diversity of solar technologies
23 to address—

24 (A) the key solar energy production chal-
25 lenges of intermittency, transience, storage, and
26 scaling, including determining—

1 (i) which solar-related technological
2 solutions are appropriate for various appli-
3 cations, locations, and seasons;

4 (ii) how to store excess solar energy in
5 batteries, supercapacitors, compressed air,
6 flywheels, hydrogen, synthetic fuels, ther-
7 mal storage, or superconductors, or
8 through other means;

9 (iii) how and when to integrate solar
10 energy into the electricity grid effectively,
11 including—

12 (I) the integration of solar tech-
13 nologies with a Smart Grid;

14 (II) electrical power smoothing;

15 (III) microgrid integration;

16 (IV) solar resource forecasting;

17 (V) long distance transmission
18 options, including direct current and
19 superconducting transmission; and

20 (VI) ways to address arbitrage
21 over minutes, hours, days, weeks, and
22 seasons with respect to the full range
23 of project scales;

24 (iv) how best to integrate solar tech-
25 nologies into buildings; and

- 1 (v) the technologies used to condition
2 solar energy, including inverters, DC/DC
3 converters, and battery chargers;
- 4 (B) modeling and simulation;
- 5 (C) the design, materials, and manufacture
6 of solar technologies, as well as related factory
7 sciences;
- 8 (D) the development of standards;
- 9 (E) the need for demonstration facilities;
- 10 (F) optimized packaging methods;
- 11 (G) environmental, safety, and health con-
12 cerns including reuse, recycling, hazardous ma-
13 terials disposal, and photovoltaic waste issues;
- 14 (H) the development of solar technology
15 products that are water efficient;
- 16 (I) ways to reduce regional disparity in the
17 use of solar technologies; and
- 18 (J) other areas identified by the Secretary;
- 19 (2) identify opportunities for coordination with
20 partner industries such as those for semiconductors,
21 lighting, energy storage, Smart Grid, and wind that
22 can benefit from similar advances;
- 23 (3) establish research, development, and dem-
24 onstration goals with recommended timeframes with
25 respect to solar technologies for—

1 (A) improving performance;

2 (B) decreasing cost of electricity generated;

3 (C) improving reliability;

4 (D) decreasing potential negative environ-
5 mental impacts and maximizing the environ-
6 mental benefits of solar technologies; and

7 (E) improving the cost effectiveness and
8 quality control of domestic manufacturing of
9 implements and devices used in the production
10 of solar energy;

11 (4) identify best practices for Department of
12 Energy national laboratories in their collaborations
13 with institutions of higher education and private in-
14 dustry to more efficiently and effectively bring new
15 solar technologies to the marketplace;

16 (5) include recommendations, as appropriate, to
17 guide solar technology research, development, and
18 demonstration activities;

19 (6) provide recommendations on the necessary
20 steps required to strengthen the link between solar
21 technology research and the commercialization of
22 those technologies into full scale manufacturing, in-
23 cluding the retooling and reworking of the Nation's
24 existing technological and manufacturing base, as

1 well as coordinating the national strategy in regions
2 where solar technology clusters currently exist;

3 (7) provide recommendations to Federal agen-
4 cies on corresponding strategies to accelerate domes-
5 tic commercialization of newly developed solar tech-
6 nologies; and

7 (8) outline the various technologies and prac-
8 tices considered by the Committee and the benefits
9 and shortcomings of each, as appropriate.

10 (c) PUBLIC INPUT.—The Committee shall release a
11 draft Roadmap to the public at least one month prior to
12 publication in order to receive input from the public.

13 (d) REVISIONS AND UPDATES.—

14 (1) REVISIONS.—Once every 3 years after com-
15 pletion of the first Solar Technology Roadmap under
16 this Act, the Solar Technology Roadmap Committee
17 shall conduct a comprehensive review and revision of
18 the Solar Technology Roadmap.

19 (2) UPDATES.—The Solar Technology Road-
20 map Committee shall update the Solar Technology
21 Roadmap annually as necessary.

22 (e) CONSULTATION.—The Solar Roadmap Committee
23 shall consult with the Department of the Interior, the Na-
24 tional Park Service, the Department of Defense, and the

1 General Services Administration on the potential for solar
2 demonstration projects on Federal lands.

3 **SEC. 103. SOLAR TECHNOLOGY ROADMAP COMMITTEE.**

4 (a) ESTABLISHMENT.—Not later than 4 months after
5 the date of enactment of this Act, the Secretary shall es-
6 tablish, and provide support for as necessary, a Solar
7 Technology Roadmap Committee.

8 (b) MEMBERSHIP.—

9 (1) IN GENERAL.—The Solar Technology Road-
10 map Committee shall consist of at least 11 members.
11 Each member shall be appointed by the Secretary
12 from among subject matter experts representing—

13 (A) different sectors of the domestic solar
14 technology industry, including manufacturers,
15 solar applications developers, and equipment
16 suppliers;

17 (B) national laboratories;

18 (C) academia;

19 (D) relevant Federal agencies;

20 (E) relevant State and local government
21 entities;

22 (F) private research institutions;

23 (G) minority-serving institutions; and

24 (H) other entities or organizations, as ap-
25 propriate.

1 (2) TERMS.—

2 (A) IN GENERAL.—Except as provided in
3 subparagraph (B), the term of a member of the
4 Solar Technology Roadmap Committee shall be
5 3 years.

6 (B) ORIGINAL TERMS.—Of the members
7 appointed originally to the Solar Technology
8 Roadmap Committee, approximately $\frac{1}{3}$ shall be
9 appointed for a 2-year term, approximately $\frac{1}{3}$
10 shall be appointed for a 3-year term, and ap-
11 proximately $\frac{1}{3}$ shall be appointed for a 4-year
12 term.

13 (3) LIMIT ON TERMS.—A member of the Solar
14 Technology Roadmap Committee may serve more
15 than 1 term, except that such member may not serve
16 a subsequent term unless 2 years have elapsed since
17 the end of a previous term.

18 (4) INDUSTRY PARTICIPATION.—At least $\frac{1}{3}$
19 and not more than $\frac{1}{2}$ of the members of the Solar
20 Technology Roadmap Committee shall be individuals
21 described in paragraph (1)(A).

22 (5) CHAIR.—The Secretary shall select a Chair
23 from among the members of the Committee. The
24 Chair shall not be an employee of the Federal Gov-
25 ernment.

1 (6) CONFLICTS OF INTEREST.—The Secretary,
2 in appointing members to the Committee, shall make
3 every effort to ensure that—

4 (A) no individual appointed to serve on the
5 Committee has a conflict of interest that is rel-
6 evant to the functions to be performed, unless
7 such conflict is promptly and publicly disclosed
8 and the Secretary determines that a waiver is
9 appropriate;

10 (B) the Committee membership is fairly
11 balanced as determined by the Secretary to be
12 appropriate for the functions to be performed;
13 and

14 (C) the final report of the Committee will
15 be the result of the Committee’s independent
16 judgment.

17 The Secretary shall require that individuals that are
18 appointed or intended to be to appointed to serve on
19 the Committee inform the Department of Energy of
20 any individual’s conflicts of interest that are relevant
21 to the functions to be performed.

22 (7) GEOGRAPHIC DISTRIBUTION.—The Sec-
23 retary shall consider individuals that represent di-
24 verse geographic regions of the United States for
25 membership of the Committee.

1 (c) EXPERT ADVICE.—In developing the Solar Tech-
2 nology Roadmap, the Solar Technology Roadmap Com-
3 mittee may establish subcommittees, working groups com-
4 prised of experts outside the membership of the Solar
5 Technology Roadmap Committee, and other means of
6 gathering expert advice on—

7 (1) particular solar technologies, applications,
8 or technological challenges;

9 (2) crosscutting issues or activities relating to
10 more than 1 particular solar technology or techno-
11 logical challenge; or

12 (3) any other area the Solar Technology Road-
13 map Committee considers appropriate.

14 (d) REPORTING.—Not later than 1 year after the
15 date of enactment of this Act, and annually thereafter,
16 the Committee shall submit a report to the Secretary and
17 the Congress on its activities over the prior 12-month pe-
18 riod.

19 (e) COMPENSATION AND EXPENSES.—A member of
20 the Solar Technology Roadmap Committee shall not be
21 compensated for service on the Committee, but may be
22 allowed travel expenses, including per diem in lieu of sub-
23 sistence, in accordance with subchapter I of chapter 57
24 of title 5, United States Code.

1 (f) LIMITATION.—The Committee shall provide guid-
2 ance on technological goals and activities but, consistent
3 with requirements for the selection of recipients of funding
4 on a merit-reviewed, competitive basis under section
5 101(b), shall not recommend or select specific recipients
6 of funds.

7 (g) FEDERAL ADVISORY COMMITTEE ACT.—The
8 Federal Advisory Committee Act (5 U.S.C. App.) shall not
9 apply to the Solar Technology Roadmap Committee.

10 **SEC. 104. INTERAGENCY COORDINATION.**

11 The Director of the Office of Science and Technology
12 Policy shall review and coordinate Federal interagency ac-
13 tivities identified in and related to the Solar Technology
14 Roadmap as appropriate.

15 **SEC. 105. SOLAR TECHNOLOGY DEMONSTRATION**
16 **PROJECTS.**

17 (a) ESTABLISHMENT OF PROGRAM.—The Secretary
18 shall establish a program to provide grants for demonstra-
19 tion projects to support the development of solar energy
20 production, consistent with the Solar Technology Road-
21 map as available.

22 (b) IMPLEMENTATION.—In carrying out the dem-
23 onstration program under this section, to the extent prac-
24 ticable, the Secretary shall—

1 (1) include at least 10 photovoltaic technology
2 projects that generate between 1 and 3 megawatts;

3 (2) include at least 3 but not more than 5 solar
4 technology projects that generate greater than 30
5 megawatts;

6 (3) include at least 2 solar thermal technology
7 projects, with thermal storage, that generate be-
8 tween 1 and 3 megawatts continuously for a 24-hour
9 period from energy provided entirely by the sun; and

10 (4) make awards for projects that—

11 (A) are located in geographically dispersed
12 regions of the country and are not concentrated
13 in any single geographical region of the coun-
14 try;

15 (B) are located and can be replicated in a
16 variety of regions and climates;

17 (C) demonstrate technologies that address
18 intermittency, transience, storage challenges,
19 and independent operational capability;

20 (D) facilitate identification of optimum
21 techniques among competing alternatives;

22 (E) include business commercialization
23 plans that have the potential for production of
24 equipment at high volumes;

1 (F) improve United States competitiveness
2 and lead to development of manufacturing tech-
3 nology;

4 (G) demonstrate positive environmental
5 performance through life-cycle analysis;

6 (H) provide the greatest potential to re-
7 duce energy costs, as well as promote accessi-
8 bility and community implementation of dem-
9 onstrated technologies, for consumers;

10 (I) promote overall electric infrastructure
11 reliability and sustainability should grid func-
12 tions be disrupted or damaged; and

13 (J) satisfy other criteria that the Secretary
14 considers necessary to carry out the program;
15 and

16 (5) evaluate the potential to establish large pho-
17 tovoltaic facilities that produce at least 100
18 gigawatts, including an evaluation of the electrical
19 grid, current, voltage, and energy storage require-
20 ments associated with large photovoltaic facilities.

21 (c) GRANT AWARDS.—Funding provided under this
22 section may be used, to the extent that funding is not oth-
23 erwise available through other Federal programs or power
24 purchase agreements, for—

1 (1) a necessary and appropriate site engineering
2 study;

3 (2) a detailed economic assessment of site-spe-
4 cific conditions;

5 (3) appropriate feasibility studies to determine
6 whether the demonstration can be replicated;

7 (4) installation of equipment, service, and sup-
8 port;

9 (5) operation for a minimum of 3 years, using
10 a monitoring methodology approved by Secretary;
11 and

12 (6) validation of technical, economic, and envi-
13 ronmental assumptions and documentation of les-
14 sons learned.

15 (d) GRANT SELECTION.—Not later than 90 days
16 after the date of enactment of this Act and annually there-
17 after, the Secretary shall conduct a national solicitation
18 for applications for grants under this section. Grant re-
19 cipients shall be selected on a merit-reviewed, competitive
20 basis. The Secretary shall give preference to proposals
21 that address multiple elements described in subsection (b).

22 (e) LIMITATIONS.—Funding shall not be provided
23 under this section for more than 50 percent of the costs
24 of the project for which assistance is provided. Not more
25 than a total of \$300,000,000 shall be provided under this

1 section for the period encompassing fiscal years 2011
2 through 2015.

3 (f) ORGANIC PHOTOVOLTAIC CELL TECH-
4 NOLOGIES.—At least 1 demonstration project awarded
5 under this section during fiscal year 2011 shall be for the
6 demonstration of organic photovoltaic cell technologies.

7 **SEC. 106. PHOTOVOLTAIC PERFORMANCE STUDY.**

8 (a) IN GENERAL.—Not later than one year after the
9 date of enactment of this Act, the Secretary shall transmit
10 to the Congress and the Solar Technology Roadmap Com-
11 mittee the results of a study that analyzes the perform-
12 ance of photovoltaic installations in the United States. The
13 study shall assess the current performance of photovoltaic
14 installations and identify opportunities to improve the en-
15 ergy productivity of these systems. Such study shall in-
16 clude—

17 (1) identification of the average energy produc-
18 tivity of current commercial and residential installa-
19 tions;

20 (2) assessment of areas where energy produc-
21 tivity is reduced, including wire loss, module mis-
22 match, shading, dust, and other factors;

23 (3) identification of technology development and
24 technical standards that improve energy produc-
25 tivity;

1 (4) analysis of the potential cost savings and
2 energy productivity gains to the Federal, State, and
3 local governments, utilities, private enterprise, and
4 consumers available through the adoption, installa-
5 tion, and use of high-performance photovoltaic tech-
6 nologies and practices;

7 (5) an overview of current government incen-
8 tives at the Federal, State, and local levels that en-
9 courage the adoption of highly efficient photovoltaic
10 systems and practices; and

11 (6) assessment of current financing models
12 available to consumers used to offset high upfront
13 costs by accounting for the long term economic bene-
14 fits of solar energy.

15 (b) PUBLIC INPUT.—The Secretary shall ensure that
16 interested stakeholders, including affected industry stake-
17 holders and energy efficiency advocates, have a meaningful
18 opportunity to provide comments, data, and other infor-
19 mation on the scope, contents, and conclusions of the
20 study. All forums for the Department to receive this input
21 from interested stakeholders shall be announced in the
22 Federal Register.

23 **SEC. 107. REPORT.**

24 Not later than 180 days after the date of enactment
25 of this Act, the Secretary shall commence a study evalu-

1 ating potential applications of micro power stations using
2 solar power technology in underserved communities lack-
3 ing in basic electric or traditional power infrastructure,
4 and make recommendations to Congress for increasing ac-
5 cess to and implementation of solar energy technology in
6 such underserved communities.

7 **SEC. 108. SOLAR ENERGY PROGRAM REAUTHORIZATION.**

8 (a) IN GENERAL.—There are authorized to be appro-
9 priated to the Secretary to carry out section 101(a)—

- 10 (1) \$350,000,000 for fiscal year 2011;
- 11 (2) \$400,000,000 for fiscal year 2012;
- 12 (3) \$450,000,000 for fiscal year 2013;
- 13 (4) \$500,000,000 for fiscal year 2014; and
- 14 (5) \$550,000,000 for fiscal year 2015.

15 (b) ROADMAP IDENTIFIED ACTIVITIES.—The Sec-
16 retary shall dedicate a percentage of funding received pur-
17 suant to subsection (a) for research, development, and
18 demonstration activities identified by and recommended
19 under the Solar Technology Roadmap in the following per-
20 centages:

- 21 (1) For fiscal year 2012, at least 30 percent.
- 22 (2) For fiscal year 2013, at least 45 percent.
- 23 (3) For fiscal year 2014, at least 60 percent.
- 24 (4) For fiscal year 2015, at least 75 percent.

1 (c) SOLAR TECHNOLOGY ROADMAP.—The Secretary
2 may use up to \$2,000,000 of the funds appropriated pur-
3 suant to subsection (a) for each fiscal year to support the
4 establishment and maintenance of the Solar Technology
5 Roadmap.

6 (d) EXTENSION OF AUTHORIZATIONS.—Of funds au-
7 thorized by subsection (a), there are authorized to be ap-
8 propriated to the Secretary to carry out—

9 (1) section 602 of the Energy Independence
10 and Security Act of 2007 (42 U.S.C. 17171)
11 \$12,000,000 for each of the fiscal years 2013
12 through 2015;

13 (2) section 604 of the Energy Independence
14 and Security Act of 2007 (42 U.S.C. 17172)
15 \$10,000,000 for each of the fiscal years 2013
16 through 2015;

17 (3) section 605 of the Energy Independence
18 and Security Act of 2007 (42 U.S.C. 17173)
19 \$3,500,000 for each of the fiscal years 2013 through
20 2015; and

21 (4) section 606 of the Energy Independence
22 and Security Act of 2007 (42 U.S.C. 17174)
23 \$2,500,000 for each of the fiscal years 2013 through
24 2015.

1 **SEC. 109. EXISTING PROGRAMS.**

2 Except as otherwise specified in this Act, this Act
3 shall supersede any duplicative solar research, develop-
4 ment, and demonstration programs within the Depart-
5 ment of Energy.

6 **SEC. 110. REPEALS.**

7 The following are hereby repealed:

8 (1) The Solar Energy Research, Development,
9 and Demonstration Act of 1974 (42 U.S.C. 5551 et
10 seq.), except for section 10.

11 (2) The Solar Photovoltaic Energy Research,
12 Development, and Demonstration Act of 1978 (42
13 U.S.C. 5581 et seq.).

14 (3) Section 4(a)(2) and (3) of the Renewable
15 Energy and Energy Efficiency Technology Competi-
16 tiveness Act of 1989 (42 U.S.C. 12003(a)(2) and
17 (3)).

18 **SEC. 111. SOLAR TECHNOLOGY EQUIPMENT THEFT.**

19 (a) PILOT PROGRAM.—Not later than 1 year after
20 the date of enactment of this Act, the Secretary of Energy
21 shall establish a pilot program to make grants for projects
22 to protect against solar technology equipment theft, in-
23 cluding projects for mapping of large-scale solar projects
24 and equipment serial number registries.

25 (b) REPORT TO CONGRESS.—Not later than 1 year
26 after the establishment of the pilot program under sub-

1 section (a), the Secretary of Energy shall transmit to the
2 Congress a report on the effectiveness of projects sup-
3 ported under this section, which shall include rec-
4 ommendations for the continuation or alteration of the
5 program under this section or any other appropriate Fed-
6 eral legislation.

7 **TITLE II—PHOTOVOLTAIC** 8 **RECYCLING**

9 **SEC. 201. PHOTOVOLTAIC DEVICE RECYCLING RESEARCH,** 10 **DEVELOPMENT, AND DEMONSTRATION.**

11 (a) DEFINITION.—In this section, the term “photo-
12 voltaic device” includes photovoltaic cells and the elec-
13 tronic and electrical components of such devices.

14 (b) IN GENERAL.—In order to address the issues de-
15 scribed in section 102(b)(1)(G), the Secretary shall award
16 multiyear grants for research, development, and dem-
17 onstration activities to create innovative and practical ap-
18 proaches to increase reuse and recycling of photovoltaic
19 devices and, through such activities, to contribute to the
20 professional development of scientists, engineers, and tech-
21 nicians in the fields of photovoltaic and electronic device
22 manufacturing, design, refurbishing, and recycling. The
23 activities supported under this section shall address—

24 (1) technology to increase the efficiency of pho-
25 tovoltaic device recycling and maximize the recovery

1 of valuable raw materials for use in new products
2 while minimizing the life-cycle environmental im-
3 pacts such as greenhouse gas emissions and water
4 usage;

5 (2) expanded uses for materials from recycled
6 photovoltaic devices;

7 (3) development and demonstration of environ-
8 mentally responsible alternatives to the use of haz-
9 ardous materials in photovoltaic devices and the pro-
10 duction of such devices;

11 (4) development of methods to separate and re-
12 move hazardous materials from photovoltaic devices
13 and to recycle or dispose of those materials in a safe
14 manner;

15 (5) product design and construction to facilitate
16 disassembly and recycling of photovoltaic devices;

17 (6) tools and methods to aid in assessing the
18 environmental impacts of the production of photo-
19 voltaic devices and photovoltaic device recycling and
20 disposal;

21 (7) product design and construction and other
22 tools and techniques to extend the life cycle of pho-
23 tovoltaic devices, including methods to promote their
24 safe reuse;

1 (8) strategies to increase consumer acceptance
2 and practice of recycling of photovoltaic devices; and

3 (9) processes to reduce the costs and environ-
4 mental impact of disposal of toxic materials used in
5 photovoltaic devices.

6 (c) MERIT REVIEW.—Grants shall be awarded under
7 this section on a merit-reviewed, competitive basis.

8 (d) APPLICATIONS.—Each application shall include a
9 description of—

10 (1) the project that will be undertaken and the
11 contributions of each participating entity;

12 (2) the applicability of the project to increasing
13 reuse and recycling of photovoltaic devices with the
14 least environmental impacts as measured by life-
15 cycle analyses, and the potential for incorporating
16 the research results into industry practice; and

17 (3) how the project will promote collaboration
18 among scientists and engineers from different dis-
19 ciplines, such as electrical engineering, materials
20 science, and social science.

21 (e) DISSEMINATION OF RESULTS.—The results of ac-
22 tivities supported under this section shall be made publicly
23 available through—

1 (1) development of best practices or training
2 materials for use in the photovoltaics manufacturing,
3 design, refurbishing, or recycling industries;

4 (2) dissemination at industry conferences;

5 (3) coordination with information dissemination
6 programs relating to recycling of electronic devices
7 in general;

8 (4) demonstration projects; and

9 (5) educational materials for the public pro-
10 duced in conjunction with State and local govern-
11 ments or nonprofit research organizations on the
12 problems and solutions related to reuse and recy-
13 cling of photovoltaic devices.

14 (f) PHOTOVOLTAIC MATERIALS PHYSICAL PROPERTY
15 DATABASE.—

16 (1) IN GENERAL.—The Secretary shall establish
17 a comprehensive physical property database of mate-
18 rials for use in photovoltaic devices. This database
19 shall include—

20 (A) identification of materials used in pho-
21 tovoltaic devices;

22 (B) a list of commercially available
23 amounts of these materials;

1 (C) amounts of these materials projected
2 to be available through mining or recycling of
3 photovoltaic and other electronic devices; and

4 (D) a list of other significant uses for each
5 of these materials.

6 (2) PRIORITIES.—The Secretary, working with
7 private industry, shall develop a plan to establish
8 priorities and requirements for the database under
9 this subsection, including the protection of propri-
10 etary information, trade secrets, and other confiden-
11 tial business information.

12 (3) COORDINATION.—The Secretary shall co-
13 ordinate with the Director of the National Institute
14 of Standards and Technology and the Administrator
15 of the Environmental Protection Agency to facilitate
16 the incorporation of the database under this sub-
17 section with any existing database for electronic
18 manufacturing and recycling.

Passed the House of Representatives October 22,
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Attest:

Clerk.

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To guide and provide for United States research, development, and demonstration of solar energy technologies, and for other purposes.