

1 (H) a tribal organization;

2 (I) a Native Hawaiian community-based
3 organization;

4 (J) a nonprofit research organization;

5 (K) an industrial entity;

6 (L) any other entity, as determined by the
7 Secretary; and

8 (M) a consortium of 2 or more entities de-
9 scribed in subparagraphs (A) through (L).

10 (3) INDIAN TRIBE.—The term “Indian tribe”
11 has the meaning given the term in section 4 of the
12 Indian Self-Determination and Education Assistance
13 Act (25 U.S.C. 5304).

14 (4) INSTITUTION OF HIGHER EDUCATION.—The
15 term “institution of higher education” has the
16 meaning given the term in section 101 of the Higher
17 Education Act of 1965 (20 U.S.C. 1001).

18 (5) NATIONAL LABORATORY.—The term “Na-
19 tional Laboratory” has the meaning given the term
20 in section 2 of the Energy Policy Act of 2005 (42
21 U.S.C. 15801).

22 (6) NATIVE HAWAIIAN COMMUNITY-BASED OR-
23 GANIZATION.—The term “Native Hawaiian commu-
24 nity-based organization” has the meaning given the

1 term in section 6207 of the Elementary and Sec-
2 ondary Education Act of 1965 (20 U.S.C. 7517).

3 (7) PHOTOVOLTAIC DEVICE.—The term “photo-
4 voltaic device” means—

5 (A) a device that converts light directly
6 into electricity through a solid-state, semicon-
7 ductor process;

8 (B) the photovoltaic cells of a device de-
9 scribed in subparagraph (A); and

10 (C) the electronic and electrical compo-
11 nents of a device described in subparagraph
12 (A).

13 (8) PROGRAM.—The term “program” means
14 the program established under section 2502(a)(1).

15 (9) SECRETARY.—The term “Secretary” means
16 the Secretary of Energy.

17 (10) SOLAR ENERGY.—The term “solar energy”
18 means—

19 (A) thermal or electric energy derived from
20 radiation from the Sun; or

21 (B) energy resulting from a chemical reac-
22 tion caused by radiation recently originated in
23 the Sun.

24 (11) TERRITORY OR FREELY ASSOCIATED
25 STATE.—The term “territory or freely associated

1 state” has the meaning given the term “insular
2 area” in section 1404 of the Food and Agriculture
3 Act of 1977 (7 U.S.C. 3103).

4 (12) TRIBAL ENERGY DEVELOPMENT ORGANI-
5 ZATION.—The term “tribal energy development or-
6 ganization” has the meaning given the term in sec-
7 tion 2601 of the Energy Policy Act of 1992 (25
8 U.S.C. 3501).

9 (13) TRIBAL ORGANIZATION.—The term “tribal
10 organization” has the meaning given the term in
11 section 4 of the Indian Self-Determination and Edu-
12 cation Assistance Act (25 U.S.C. 5304).

13 **SEC. 2502. SOLAR ENERGY TECHNOLOGY PROGRAM.**

14 (a) ESTABLISHMENT.—

15 (1) IN GENERAL.—The Secretary shall establish
16 a program to conduct research, development, testing,
17 evaluation, demonstration, and commercialization of
18 solar energy technologies in accordance with this
19 section.

20 (2) PURPOSES.—The purposes of the program
21 are the following:

22 (A) To improve the energy efficiency, cost
23 effectiveness, reliability, resilience, security, in-
24 tegration, manufacturability, and recyclability
25 of solar energy technologies.

1 (B) To optimize the performance and oper-
2 ation of solar energy components, cells, and sys-
3 tems, and enabling technologies, including
4 through the development of new materials,
5 hardware, and software.

6 (C) To optimize the design and adapt-
7 ability of solar energy systems to the broadest
8 practical range of geographic and atmospheric
9 conditions.

10 (D) To support the integration of solar en-
11 ergy technologies with the electric grid and
12 complementary energy technologies.

13 (E) To create and improve the conversion
14 of solar energy to other useful forms of energy
15 or other products.

16 (F) To reduce and mitigate any potential
17 negative impacts of solar energy technologies on
18 humans, wildlife, and wildlife habitats.

19 (G) To address barriers to the commer-
20 cialization and export of solar energy tech-
21 nologies.

22 (H) To support the domestic solar indus-
23 try, workforce, and supply chain.

24 (3) TARGETS.—Not later than 180 days after
25 the date of enactment of this Act, the Secretary

1 shall establish targets for the program to address
2 near-term (up to 2 years), mid-term (up to 7 years),
3 and long-term (up to 15 years) challenges to the ad-
4 vancement of solar energy systems.

5 (b) ACTIVITIES.—

6 (1) TYPES OF ACTIVITIES.—In carrying out the
7 program, the Secretary shall carry out research, de-
8 velopment, demonstration, and commercialization ac-
9 tivities, including—

10 (A) awarding grants and awards, on a
11 competitive, merit-reviewed basis;

12 (B) performing precompetitive research
13 and development;

14 (C) establishing or maintaining demonstra-
15 tion facilities and projects, including through
16 stewardship of existing facilities;

17 (D) providing technical assistance;

18 (E) entering into contracts and cooperative
19 agreements;

20 (F) providing small business vouchers;

21 (G) establishing prize competitions;

22 (H) conducting education and outreach ac-
23 tivities; and

24 (I) conducting analyses, studies, and re-
25 ports.

1 (2) SUBJECT AREAS.—The Secretary shall
2 carry out research, development, testing, evaluation,
3 demonstration, and commercialization activities in
4 the following subject areas:

5 (A) Advanced solar energy technologies, in-
6 cluding—

7 (i) new materials, components, de-
8 signs, and systems, including perovskites;

9 (ii) advanced photovoltaic and thin-
10 film devices;

11 (iii) concentrated solar power;

12 (iv) solar heating and cooling; and

13 (v) enabling technologies for solar en-
14 ergy systems, including hardware and soft-
15 ware.

16 (B) Solar energy technology performance,
17 operations, and security.

18 (C) Integration of solar energy tech-
19 nologies with—

20 (i) the electric grid, including trans-
21 mission, distribution, microgrids, and dis-
22 tributed energy systems;

23 (ii) other energy technologies, includ-
24 ing—

25 (I) other generation sources;

1 (II) demand response tech-
2 nologies; and

3 (III) energy storage technologies;
4 and

5 (iii) other nonelectric applications,
6 such as in the agriculture, transportation,
7 industrial, and fuels sectors.

8 (D) Advanced solar energy manufacturing
9 technologies and practices, including materials,
10 processes, and design.

11 (E) Methods to improve the lifetime, main-
12 tenance, recycling, and reuse of solar energy
13 components and systems.

14 (F) Solar energy forecasting, modeling,
15 and atmospheric measurement systems, includ-
16 ing for small-scale, large-scale, and aggregated
17 systems.

18 (G) Hybrid solar energy systems that in-
19 corporate diverse—

20 (i) generation sources;

21 (ii) loads; and

22 (iii) storage technologies.

23 (H) Reducing market barriers to the adop-
24 tion of solar energy technologies, including im-
25 pacts on, or challenges relating to—

1 (i) distributed solar technologies, in-
2 cluding the development of best practices,
3 models, and voluntary streamlined proc-
4 esses for local permitting of distributed
5 solar energy systems to reduce costs;

6 (ii) local communities;

7 (iii) wildlife and wildlife habitats; and

8 (iv) any other appropriate matter, as
9 determined by the Secretary.

10 (I) Transformational technologies for har-
11 nassing solar energy.

12 (J) Other research areas that advance the
13 purposes of the program, as determined by the
14 Secretary.

15 (3) PRIORITIZATION.—In carrying out activities
16 under the program, the Secretary shall give priority
17 to projects that—

18 (A) are located in a geographically diverse
19 range of eligible entities;

20 (B) support the development or demonstra-
21 tion of projects—

22 (i) in collaboration with tribal energy
23 development organizations, Indian tribes,
24 tribal organizations, Native Hawaiian com-

1 community-based organizations, or territories
2 or freely associated states; or

3 (ii) in economically distressed areas;

4 (C) can be replicated in a variety of re-
5 gions and climates;

6 (D) include business commercialization
7 plans that have the potential for—

8 (i) domestic manufacturing and pro-
9 duction of solar energy technologies; or

10 (ii) exports of solar energy tech-
11 nologies; and

12 (E) satisfy any other priority that the Sec-
13 retary determines to be appropriate.

14 (4) COORDINATION.—To the maximum extent
15 practicable, the Secretary shall coordinate activities
16 under the program with other relevant programs and
17 capabilities of the Department of Energy and other
18 Federal research programs.

19 (5) USE OF FUNDS.—To the extent that fund-
20 ing is not otherwise available through other Federal
21 programs or power purchase agreements, funding
22 awarded under this subsection may be used for addi-
23 tional nontechnology costs, as determined to be ap-
24 propriate by the Secretary, such as engineering or
25 feasibility studies.

1 (c) ADVANCED SOLAR ENERGY MANUFACTURING
2 INITIATIVE.—

3 (1) GRANTS.—In addition to the program ac-
4 tivities described in subsection (b), in carrying out
5 the program, the Secretary shall award multiyear
6 grants to eligible entities for research, development,
7 and demonstration projects to advance new solar en-
8 ergy manufacturing technologies and techniques.

9 (2) PRIORITY.—In awarding grants under para-
10 graph (1), to the extent practicable, the Secretary
11 shall give priority to solar energy manufacturing
12 projects that—

13 (A) increase efficiency and cost effective-
14 ness in—

15 (i) the manufacturing process; and

16 (ii) the use of resources.

17 (B) support domestic supply chains for
18 materials and components;

19 (C) identify and incorporate nonhazardous
20 alternative materials for components and de-
21 vices;

22 (D) operate in partnership with tribal en-
23 ergy development organizations, Indian tribes,
24 tribal organizations, Native Hawaiian commu-

1 nity-based organizations, or territories or freely
2 associated states; or

3 (E) are located in economically distressed
4 areas.

5 (3) EVALUATION.—Not later than 3 years after
6 the date of enactment of this Act, and every 4 years
7 thereafter, the Secretary shall conduct, and make
8 available to the public and the relevant committees
9 of Congress, an independent review of the progress
10 of the grants awarded under paragraph (1).

11 (d) SOLAR ENERGY TECHNOLOGY RECYCLING RE-
12 SEARCH, DEVELOPMENT, AND DEMONSTRATION PRO-
13 GRAM.—

14 (1) IN GENERAL.—In addition to the program
15 activities described in subsection (b), in carrying out
16 the program, the Secretary shall award multiyear
17 grants to eligible entities for research, development,
18 and demonstration projects to create innovative and
19 practical approaches to increase the reuse and recy-
20 cling of solar energy technologies, including—

21 (A) by increasing the efficiency and cost
22 effectiveness of the recovery of raw materials
23 from solar energy technology components and
24 systems, including enabling technologies such as
25 inverters;

1 (B) by minimizing environmental impacts
2 from the recovery and disposal processes;

3 (C) by addressing any barriers to the re-
4 search, development, demonstration, and com-
5 mercialization of technologies and processes for
6 the disassembly and recycling of solar energy
7 devices;

8 (D) by developing alternative materials, de-
9 signs, manufacturing processes, and other as-
10 pects of solar energy technologies and the dis-
11 assembly and resource recovery process that en-
12 able efficient, cost effective, and environ-
13 mentally responsible disassembly of, and re-
14 source recovery from, solar energy technologies;
15 and

16 (E) strategies to increase consumer accept-
17 ance of, and participation in, the recycling of
18 photovoltaic devices.

19 (2) DISSEMINATION OF RESULTS.—The Sec-
20 retary shall make available to the public and the rel-
21 evant committees of Congress the results of the
22 projects carried out through grants awarded under
23 paragraph (1), including any educational and out-
24 reach materials.

1 (e) SOLAR ENERGY TECHNOLOGY MATERIALS PHYS-
2 ICAL PROPERTY DATABASE.—

3 (1) IN GENERAL.—Not later than September 1,
4 2021, the Secretary shall establish a comprehensive
5 physical property database of materials for use in
6 solar energy technologies, which shall identify the
7 type, quantity, country of origin, source, significant
8 uses, and physical properties of materials used in
9 solar energy technologies.

10 (2) COORDINATION.—In establishing the data-
11 base described in paragraph (1), the Secretary shall
12 coordinate with—

13 (A) the Director of the National Institute
14 of Standards and Technology;

15 (B) the Administrator of the Environ-
16 mental Protection Agency;

17 (C) the Secretary of the Interior; and

18 (D) relevant industry stakeholders, as de-
19 termined by the Secretary.

20 (f) SOLAR ENERGY TECHNOLOGY PROGRAM STRA-
21 TEGIC VISION.—

22 (1) IN GENERAL.—Not later than September 1,
23 2021, and every 6 years thereafter, the Secretary
24 shall submit to Congress a report on the strategic vi-
25 sion, progress, goals, and targets of the program, in-

1 cluding assessments of solar energy markets and
2 manufacturing.

3 (2) PREPARATION.—The Secretary shall coordi-
4 nate the preparation of the report under paragraph
5 (1) with—

6 (A) existing peer review processes;

7 (B) studies conducted by the National
8 Laboratories; and

9 (C) the multiyear program planning re-
10 quired under section 994 of the Energy Policy
11 Act of 2005 (42 U.S.C. 16358).

12 (g) AUTHORIZATION OF APPROPRIATIONS.—There is
13 authorized to be appropriated to the Secretary to carry
14 out the program \$270,000,000 for each of fiscal years
15 2020 through 2024.

16 **SEC. 2503. CONFORMING AMENDMENTS.**

17 (a) The Solar Energy Research, Development, and
18 Demonstration Act of 1974 (42 U.S.C. 5551 et seq.) is
19 repealed.

20 (b) Section 6(b)(3) of the Federal Nonnuclear En-
21 ergy Research and Development Act of 1974 (42 U.S.C.
22 5905(b)(3)) is amended—

23 (1) by striking subparagraph (L); and

1 (2) by redesignating subparagraphs (M)
2 through (S) as subparagraphs (L) through (R), re-
3 spectively.

4 (c) The Solar Photovoltaic Energy Research, Devel-
5 opment, and Demonstration Act of 1978 (42 U.S.C. 5581
6 et seq.) is repealed.

7 (d) Section 4 of the Renewable Energy and Energy
8 Efficiency Technology Competitiveness Act of 1989 (42
9 U.S.C. 12003) is amended—

10 (1) in the section heading, by striking
11 “**PHOTOVOLTAICS, AND SOLAR THERMAL**” and
12 inserting “**ALCOHOL FROM BIOMASS, AND**
13 **OTHER TECHNOLOGY**”;

14 (2) in subsection (a)—

15 (A) in the matter preceding paragraph (1),
16 by striking “photovoltaics, and solar thermal
17 energy” and inserting “alcohol from biomass,
18 and other energy technology”;

19 (B) by striking paragraphs (2) and (3);
20 and

21 (C) by redesignating paragraphs (4) and
22 (5) as paragraphs (2) and (3), respectively; and
23 (3) in subsection (c)—

24 (A) in the matter preceding paragraph (1),
25 by striking “the Photovoltaic Energy Systems

1 Program, the Solar Thermal Energy Systems
2 Program,”;

3 (B) in paragraph (1)—

4 (i) by striking subparagraph (A); and

5 (ii) by redesignating subparagraphs

6 (B) and (C) as subparagraphs (A) and

7 (B), respectively; and

8 (C) in paragraph (2)—

9 (i) by striking subparagraph (A); and

10 (ii) by redesignating subparagraphs

11 (B) and (C) as subparagraphs (A) and

12 (B), respectively.

13 (e) Section 931 of the Energy Policy Act of 2005 (42
14 U.S.C. 16231) is amended—

15 (1) in subsection (a)(2)—

16 (A) by striking subparagraph (A); and

17 (B) by redesignating subparagraphs (B)

18 through (E) as subparagraphs (A) through (D),

19 respectively;

20 (2) by striking subsection (d); and

21 (3) by redesignating subsections (e) through (g)

22 as subsections (d) through (f), respectively.

23 (f) Sections 606 and 607 of the Energy Independence
24 and Security Act of 2007 (42 U.S.C. 17174, 17175) are

25 repealed.

1 **SEC. 2504. SAVINGS PROVISION.**

2 The repeal of the Solar Energy Research, Develop-
3 ment, and Demonstration Act of 1974 (42 U.S.C. 5551
4 et seq.) under section 2503(a) shall not affect the author-
5 ity of the Secretary to conduct research and development
6 on solar energy.

Page 3, in the table of contents strike the matter re-
lated to section 2501 and all that follows through the
matter related to section 2506 and insert the following:

- Sec. 2501. Definitions
- Sec. 2502. Solar energy technology program
- Sec. 2503. Conforming amendments
- Sec. 2504. Savings provision

