

tee, shall develop a plan for the participation of United States scientists in the ITER that shall include—

- (i) the United States research agenda for the ITER;
- (ii) methods to evaluate whether the ITER is promoting progress toward making fusion a reliable and affordable source of power; and
- (iii) a description of how work at the ITER will relate to other elements of the United States fusion program.

(B) Review

The Secretary shall request a review of the plan by the National Academy of Sciences.

(5) Limitation

No Federal funds shall be expended for the construction of the ITER until the Secretary has submitted to Congress—

- (A) the agreement negotiated in accordance with paragraph (3) and 120 days have elapsed since that submission;
- (B) a report describing the management structure of the ITER and providing a fixed dollar estimate of the cost of United States participation in the construction of the ITER, and 120 days have elapsed since that submission;
- (C) a report describing how United States participation in the ITER will be funded without reducing funding for other programs in the Office of Science (including other fusion programs), and 60 days have elapsed since that submission; and
- (D) the plan required by paragraph (4) (but not the National Academy of Sciences review of that plan), and 60 days have elapsed since that submission.

(6) Alternative to ITER

(A) In general

If at any time during the negotiations on the ITER, the Secretary determines that construction and operation of the ITER is unlikely or infeasible, the Secretary shall submit to Congress, along with the budget request of the President submitted to Congress for the following fiscal year, a plan for implementing a domestic burning plasma experiment such as the Fusion Ignition Research Experiment, including costs and schedules for the plan.

(B) Administration

The Secretary shall—

- (i) refine the plan in full consultation with the Fusion Energy Sciences Advisory Committee; and
- (ii) transmit the plan to the National Academy of Sciences for review.

(Pub. L. 109–58, title IX, §972, Aug. 8, 2005, 119 Stat. 899.)

§ 16313. Solar Fuels Research Initiative

(a) Initiative

(1) In general

The Secretary shall carry out a research initiative, to be known as the “Solar Fuels Research Initiative” (referred to in this section

as the “Initiative”) to expand theoretical and fundamental knowledge of photochemistry, electrochemistry, biochemistry, and materials science useful for the practical development of experimental systems to convert solar energy to chemical energy.

(2) Leveraging

In carrying out programs and activities under the Initiative, the Secretary shall leverage expertise and resources from—

- (A) the Basic Energy Sciences Program and the Biological and Environmental Research Program of the Office of Science; and
- (B) the Office of Energy Efficiency and Renewable Energy.

(3) Teams

(A) In general

In carrying out the Initiative, the Secretary shall organize activities among multidisciplinary teams to leverage, to the maximum extent practicable, expertise from the National Laboratories, institutions of higher education, and the private sector.

(B) Goals

The multidisciplinary teams described in subparagraph (A) shall pursue aggressive, milestone-driven, basic research goals.

(C) Resources

The Secretary shall provide sufficient resources to the multidisciplinary teams described in subparagraph (A) to achieve the goals described in subparagraph (B) over a period of time to be determined by the Secretary.

(4) Additional activities

The Secretary may organize additional activities under this subsection through Energy Frontier Research Centers, Energy Innovation Hubs, or other organizational structures.

(b) Artificial photosynthesis

(1) In general

The Secretary shall carry out under the Initiative a program to support research needed to bridge scientific barriers to, and discover knowledge relevant to, artificial photosynthetic systems.

(2) Activities

As part of the program described in paragraph (1)—

- (A) the Director of the Office of Basic Energy Sciences shall support basic research to pursue distinct lines of scientific inquiry, including—
 - (i) photoinduced production of hydrogen and oxygen from water; and
 - (ii) the sustainable photoinduced reduction of carbon dioxide to fuel products including hydrocarbons, alcohols, carbon monoxide, and natural gas; and
- (B) the Assistant Secretary for Energy Efficiency and Renewable Energy shall support translational research, development, and validation of physical concepts developed under the program.

(B) the Assistant Secretary for Energy Efficiency and Renewable Energy shall support translational research, development, and validation of physical concepts developed under the program.

(3) Standard of review

The Secretary shall review activities carried out under the program described in paragraph

(1) to determine the achievement of technical milestones.

(4) Prohibition

No funds allocated to the program described in paragraph (1) may be obligated or expended for commercial application of energy technology.

(c) Biochemistry, replication of natural photosynthesis, and related processes

(1) In general

The Secretary shall carry out under the Initiative a program to support research needed to replicate natural photosynthetic processes by use of artificial photosynthetic components and materials.

(2) Activities

As part of the program described in paragraph (1)—

(A) the Director of the Office of Basic Energy Sciences shall support basic research to expand fundamental knowledge to replicate natural synthesis processes, including—

- (i) the photoinduced reduction of dinitrogen to ammonia;
- (ii) the absorption of carbon dioxide from ambient air;
- (iii) molecular-based charge separation and storage;
- (iv) photoinitiated electron transfer; and
- (v) catalysis in biological or biomimetic systems;

(B) the Associate Director of Biological and Environmental Research shall support systems biology and genomics approaches to understand genetic and physiological pathways connected to photosynthetic mechanisms; and

(C) the Assistant Secretary for Energy Efficiency and Renewable Energy shall support translational research, development, and validation of physical concepts developed under the program.

(3) Standard of review

The Secretary shall review activities carried out under the program described in paragraph (1) to determine the achievement of technical milestones.

(4) Prohibition

No funds allocated to the program described in paragraph (1) may be obligated or expended for commercial application of energy technology.

(Pub. L. 109–58, title IX, §973, Aug. 8, 2005, 119 Stat. 902; Pub. L. 115–246, title III, §303(d)(1), Sept. 28, 2018, 132 Stat. 3141.)

AMENDMENTS

2018—Pub. L. 115–246 amended section generally. Prior to amendment, section related to catalysis research program.

§ 16314. Hydrogen

(a) In general

The Secretary shall conduct a program of fundamental research and development in support of programs authorized under subchapter VIII.

(b) Methods

The program shall include support for methods of generating hydrogen without the use of natural gas.

(Pub. L. 109–58, title IX, §974, Aug. 8, 2005, 119 Stat. 903.)

§ 16315. Electricity Storage Research Initiative

(a) Initiative

(1) In general

The Secretary shall carry out a research initiative, to be known as the “Electricity Storage Research Initiative” (referred to in this section as the “Initiative”)—

(A) to expand theoretical and fundamental knowledge to control, store, and convert—

- (i) electrical energy to chemical energy; and
- (ii) chemical energy to electrical energy; and

(B) to support scientific inquiry into the practical understanding of chemical and physical processes that occur within systems involving crystalline and amorphous solids, polymers, and organic and aqueous liquids.

(2) Leveraging

In carrying out programs and activities under the Initiative, the Secretary shall leverage expertise and resources from—

(A) the Basic Energy Sciences Program, the Advanced Scientific Computing Research Program, and the Biological and Environmental Research Program of the Office of Science; and

(B) the Office of Energy Efficiency and Renewable Energy.

(3) Teams

(A) In general

In carrying out the Initiative, the Secretary shall organize activities among multidisciplinary teams to leverage, to the maximum extent practicable, expertise from the National Laboratories, institutions of higher education, and the private sector.

(B) Goals

The multidisciplinary teams described in subparagraph (A) shall pursue aggressive, milestone-driven, basic research goals.

(C) Resources

The Secretary shall provide sufficient resources to the multidisciplinary teams described in subparagraph (A) to achieve the goals described in subparagraph (B) over a period of time to be determined by the Secretary.

(4) Additional activities

The Secretary may organize additional activities under this subsection through Energy Frontier Research Centers, Energy Innovation Hubs, or other organizational structures.

(b) Multivalent systems

(1) In general

The Secretary shall carry out under the Initiative a program to support research needed