(B) fusion science, technology, theory, advanced computation, modeling, and simulation are strengthened;

(C) new magnetic and inertial fusion research and development facilities are selected based on scientific innovation and cost effectiveness, and the potential of the facilities to advance the goal of practical fusion energy at the earliest date practicable;

(D) facilities that are selected are funded at a cost-effective rate;

(E) communication of scientific results and methods between the fusion energy science community and the broader scientific and technology communities is improved;

(F) inertial confinement fusion facilities are used to the extent practicable for the purpose of inertial fusion energy research and development;

(G) attractive alternative inertial and magnetic fusion energy approaches are more fully explored; and

(H) to the extent practicable, the recommendations of the Fusion Energy Sciences Advisory Committee in the report on workforce planning, dated March 2004, are carried out, including periodic reassessment of program needs.

(2) Costs and schedules

The plan shall also address the status of and, to the extent practicable, costs and schedules for—

(A) the design and implementation of international or national facilities for the testing of fusion materials; and

(B) the design and implementation of international or national facilities for the testing and development of key fusion technologies.

(c) United States participation in ITER

(1) In general

There is authorized United States participation in the construction and operations of the ITER project, as agreed to under the April 25, 2007 ''Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project''. The Director shall coordinate and carry out the responsibilities of the United States with respect to this Agreement.

(2) Report

Not later than 1 year after the date of enactment of this section, the Secretary shall submit to Congress a report providing an assessment of the most recent schedule for ITER that has been approved by the ITER Council.

(3) Authorization of appropriations

Out of funds authorized to be appropriated under section 18645(*o*) of this title, there shall be made available to the Secretary to carry out the construction of ITER—

(A) $374,000,000 for fiscal year 2021;
(B) $379,700,000 for fiscal year 2023;
(C) $419,250,000 for fiscal year 2024;
(D) $415,000,000 for fiscal year 2025;
(E) $370,500,000 for fiscal year 2026; and
(F) $411,078,000 for fiscal year 2027.

(Pub. L. 109–58, title IX, § 972, Aug. 8, 2005, 119 Stat. 899; Pub. L. 116–260, div. Z, title II, § 2008(b), Dec. 27, 2020, 134 Stat. 2478; Pub. L. 117–167, div. B, title I, § 10105(b), Aug. 9, 2022, 136 Stat. 1445.)

Editorial Notes

REFERENCES IN TEXT

The date of enactment of this section, referred to in subsec. (c)(2), probably means the date of enactment of Pub. L. 116–260, which enacted subsec. (c) of this section and was approved Dec. 27, 2020.

AMENDMENTS

2022—Subsec. (c)(3)(B) to (F). Pub. L. 117–167 added subpars. (B) to (F) and struck out former subpar. (B) which read as follows: ''$281,000,000 for each of fiscal years 2022 through 2025.''

2020—Subsec. (c). Pub. L. 116–260 amended subsec. (c) generally. Prior to amendment, subsec. (c) related to United States participation in ITER.

§ 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.

(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) Funds

Of the funds authorized to be appropriated for basic energy sciences in a fiscal year, there is authorized to be appropriated to the Secretary to carry out activities under this subsection $50,000,000 for each of fiscal years 2023 through 2027.

(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) Funds

Of the funds authorized to be appropriated for basic energy sciences in a fiscal year, there is authorized to be appropriated to the Secretary to carry out activities under this subsection $50,000,000 for each of fiscal years 2023 through 2027.

(Pub. L. 109–58, title IX, §973, Aug. 8, 2005, 119 Stat. 902; Pub. L. 115–246, title III, §303(f)(1), formerly §303(d)(1), Sept. 28, 2018, 132 Stat. 3141, renumbered §303(f)(1), Pub. L. 117–167, div. B, title I, §10102(a)(1), Aug. 9, 2022, 136 Stat. 1409; Pub. L. 117–167, div. B, title I, §10102(b), Aug. 9, 2022, 136 Stat. 1414.)

Editorial Notes

AMENDMENTS

2022—Subsec. (b)(4). Pub. L. 117–167, §10102(b)(1), added par. (4) and struck out former par. (4). Prior to amendment, text read as follows: ''No funds allocated to the program described in paragraph (1) may be obligated or expended for commercial application of energy technology.''

Subsec. (c)(4). Pub. L. 117–167, §10102(b)(2), added par. (4) and struck out former par. (4). Prior to amendment, text read as follows: ''No funds allocated to the program described in paragraph (1) may be obligated or expended for commercial application of energy technology.''

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;