

(1) the Director should incorporate the findings and recommendations of the report of the Particle Physics Project Prioritization Panel entitled “Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context” into the planning process of the Department; and

(2) the nations that lead in particle physics by hosting international teams dedicated to a common scientific goal attract the world’s best talent and inspire future generations of physicists and technologists.

(b) International collaboration

The Director, as practicable and in coordination with other appropriate Federal agencies as necessary, shall ensure the access of United States researchers to the most advanced accelerator facilities and research capabilities in the world, including the Large Hadron Collider.

(c) Neutrino research

The Director shall carry out research activities on rare decay processes and the nature of the neutrino, which may include collaborations with the National Science Foundation or international collaborations.

(d) Dark energy and dark matter research

The Director shall carry out research activities on the nature of dark energy and dark matter, which may include collaborations with the National Aeronautics and Space Administration or the National Science Foundation; or international collaborations.

(Pub. L. 115–246, title III, § 305, Sept. 28, 2018, 132 Stat. 3147.)

§ 18644. Biological and environmental research

(a) Biological systems

The Director shall carry out research and development activities in fundamental, structural, computational, and systems biology to increase systems-level understanding of the complex biological systems, which may include activities—

(1) to accelerate breakthroughs and new knowledge that would enable the cost-effective, sustainable production of—

- (A) biomass-based liquid transportation fuels;
- (B) bioenergy; and
- (C) biobased materials;

(2) to improve understanding of the global carbon cycle, including processes for removing carbon dioxide from the atmosphere, through photosynthesis and other biological processes, for sequestration and storage; and

(3) to understand the biological mechanisms used to transform, immobilize, or remove contaminants from subsurface environments.

(b) Limitation for research funds

The Director shall not approve new climate science-related initiatives without making a determination that such work is well-coordinated with any relevant work carried out by other Federal agencies.

(c) Low-dose radiation research program

(1) In general

The Secretary shall carry out a research program on low-dose and low dose-rate radiation to—

(A) enhance the scientific understanding of, and reduce uncertainties associated with, the effects of exposure to low-dose and low dose-rate radiation; and

(B) inform improved risk-assessment and risk-management methods with respect to such radiation.

(2) Program components

In carrying out the program required under paragraph (1), the Secretary shall—

(A) support and carry out the directives under section 106(b) of the American Innovation and Competitiveness Act (42 U.S.C. 6601 note), except that such section shall be treated for purposes of this subsection as applying to low dose and low-dose rate radiation research, in coordination with the Physical Science Subcommittee of the National Science and Technology Council;

(B) identify and, to the extent possible, quantify, potential monetary and health-related impacts to Federal agencies, the general public, industry, research communities, and other users of information produced by such research program;

(C) leverage the collective body of knowledge from existing low-dose and low dose-rate radiation research;

(D) engage with other Federal agencies, research communities, and potential users of information produced under this section, including institutions performing or utilizing radiation research, medical physics, radiology, health physics, and emergency response measures; and

(E) support education and outreach activities to disseminate information and promote public understanding of low-dose radiation, with a focus on non-emergency situations such as medical physics, space exploration, and naturally occurring radiation.

(3) Research plan

(A) Not later than 90 days after December 27, 2020, the Secretary shall enter into an agreement with the National Academy of Sciences to develop a long-term strategic and prioritized research agenda for the program described in paragraph (2);

(B) Not later than one year after December 27, 2020, the Secretary shall transmit this research plan developed in subparagraph (A) to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

(4) GAO study

Not later than 3 years after December 27, 2020, the Comptroller General shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate, a report on:

(A) an evaluation of the program activities carried out under this section;

(B) the effectiveness of the coordination and management of the program; and

(C) the implementation of the research plan outlined in paragraph (3).

(6)¹ Definitions

In this subsection:

(A) Low-dose radiation

The term “low-dose radiation” means a radiation dose of less than 100 millisieverts.

(B) Low dose-rate radiation

The term “low dose-rate radiation” means a radiation dose rate of less than 5 millisieverts per hour.

(7) Rule of construction

Nothing in this subsection shall be construed to subject any research carried out by the Secretary for the program under this subsection to any limitations described in section 16317(e) of this title.

(8) Funding

For purposes of carrying out this subsection, the Secretary is authorized to make available from funds provided to the Biological and Environmental Research Program—

- (A) \$20,000,000 for fiscal year 2021;
- (B) \$20,000,000 for fiscal year 2022;
- (C) \$30,000,000 for fiscal year 2023; and
- (D) \$40,000,000 for fiscal year 2024.

(d) Space radiation research

The Secretary of Energy, shall continue and strengthen collaboration with the Administrator of the National Aeronautics and Space Administration on basic research to understand the effects and risks of human exposure to ionizing radiation in low Earth orbit, and in the space environment.

(Pub. L. 115–246, title III, § 306, Sept. 28, 2018, 132 Stat. 3148; Pub. L. 116–260, div. Z, title XI, § 11001, Dec. 27, 2020, 134 Stat. 2610.)

REFERENCES IN TEXT

Section 106(b) of the American Innovation and Competitiveness Act (42 U.S.C. 6601 note), referred to in subsec. (c)(2)(A), is section 106(b) of Pub. L. 114–329, title I, Jan. 6, 2017, 130 Stat. 2986, which is set out in a note under section 6601 of this title.

AMENDMENTS

2020—Subsec. (c). Pub. L. 116–260, § 11001(a), amended subsec. (c) generally. Prior to amendment, subsec. (c) related to the establishment and purpose of a low-dose radiation research program.

Subsec. (d). Pub. L. 116–260, § 11001(b), added subsec. (d).

§ 18645. Fusion energy**(a) Program**

As part of the activities authorized under section 7139 of this title and section 16312 of this title, the Director shall carry out a fusion energy sciences research and enabling technology development program to effectively address the scientific and engineering challenges to building a cost competitive fusion power plant and to support the development of a competitive fusion power industry in the United States. As part of this program, the Director shall carry out research activities to expand the fundamental understandings of plasma and matter at very high

temperatures and densities for fusion applications and for other engineering and plasma science applications.

(b) Fusion materials research and development

As part of the activities authorized in section 16318 of this title—

(1) the Director, in coordination with the Assistant Secretary for Nuclear Energy of the Department, shall carry out research and development activities to identify, characterize, and demonstrate materials that can endure the neutron, plasma, and heat fluxes expected in a fusion power system; and

(2) the Director shall provide an assessment of—

(A) the need for one or more facilities that can examine and test potential fusion and next generation fission materials and other enabling technologies relevant to the development of fusion power; and

(B) whether a single new facility that substantially addresses magnetic fusion and next generation fission materials research needs is feasible, in conjunction with the expected capabilities of facilities operational as of September 28, 2018.

(c) Tokamak research and development

The Director shall support research and development activities and facility operations to optimize the tokamak approach to fusion energy.

(d) Inertial fusion research and development**(1) In general**

The Director shall carry out a program of research and technology development in inertial fusion for energy applications, including ion beam, laser, and pulsed power fusion systems.

(2) Activities

As part of the program described in paragraph (1), the Director shall support activities at and partnerships with universities and the National Laboratories to—

(A) develop novel target designs;

(B) support modeling of various inertial fusion energy concepts and systems;

(C) develop diagnostic tools; and

(D) improve inertial fusion energy driver technologies.

(3) Authorization of appropriations

Out of funds authorized to be appropriated under subsection (o), there are authorized to be appropriated to the Secretary to carry out the activities described in subsection (d) \$25,000,000 for each of fiscal years 2021 through 2025.

(e) Alternative and enabling concepts**(1) In general**

The Director shall support research and development activities and facility operations at institutions of higher education, National Laboratories, and private facilities in the United States for a portfolio of alternative and enabling fusion energy concepts that may provide solutions to significant challenges to the establishment of a commercial magnetic fusion power plant, prioritized based on the ability of the United States to play a leader-

¹ So in original. No par. (5) has been enacted.