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116TH CONGRESS
2D SESSION

H. R. 5685

To invest in basic scientific research and support technology innovation for the economic and national security of the United States, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 28, 2020

Mr. LUCAS (for himself, Mr. WEBER of Texas, Mr. BABIN, Mr. MARSHALL, Mr. BAIRD, Mr. GONZALEZ of Ohio, Mr. WALTZ, Mr. OLSON, Mr. MURPHY of North Carolina, Mr. BALDERSON, Mr. POSEY, and Mr. ROONEY of Florida) introduced the following bill; which was referred to the Committee on Science, Space, and Technology, and in addition to the Committees on the Judiciary, Small Business, Natural Resources, and Foreign Affairs, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

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A BILL

To invest in basic scientific research and support technology innovation for the economic and national security of the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Securing American Leadership in Science and Technology Act of 2020''.

SEC. 2. TABLE OF CONTENTS.

The table of contents for this Act is as follows:

SEC. 3. PURPOSES.

The purpose of this Act is to ensure the continued leadership of the United States in science and technology by—

(1) providing for a coordinated national science and technology strategy for the economic and national security of the United States;

(2) prioritizing investment in Federal basic research by authorizing a doubling of basic research funding over the next 10 years at the Department of Energy, the National Science Foundation, the National Institute of Standards and Technology, and the National Oceanic and Atmospheric Administration;

(3) providing for investment in key areas necessary for the competitiveness of the United States, including computing, cybersecurity, artificial intel-

ligence and autonomous technology, materials and advanced manufacturing, energy and climate, and the biosciences;

(4) providing for investment in critical science and technology infrastructure to maintain world-class research and user facilities;

(5) expanding the STEM workforce at all levels to meet the demands of a 21st century economy;

(6) promoting regional innovation to support local economic growth across all regions of the United States;

(7) maximizing the effectiveness of the Federal Government's research and development activities;

(8) promoting collaboration among the Federal Government, Federal laboratories, universities, and industry; and

(9) improving technology transfer from the Federal Government and Federal laboratories to the private sector for commercialization.

TITLE I—NATIONAL SCIENCE AND TECHNOLOGY STRATEGY AND OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Subtitle A—National Science and Technology Strategy

SEC. 101. NATIONAL SCIENCE AND TECHNOLOGY STRATEGY.

Section 206 of the National Science and Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6615) is amended to read as follows:

"SEC. 206. NATIONAL SCIENCE AND TECHNOLOGY STRATEGY.

''(a) IN GENERAL.—Not later than the end of each calendar year immediately after the calendar year in which a review under section 206b is completed, the Director of the Office of Science and Technology Policy, in consultation with the National Science and Technology Council, shall develop and submit to Congress a comprehensive national science and technology strategy of the United States to meet national research and development objectives for the following 4-year period (in this Act referred to as 'the national science and technology strategy').

''(b) REQUIREMENTS.—Each national science and technology strategy required by subsection (a) shall delin-

eate a national science and technology strategy consistent with—

''(1) the recommendations and priorities developed by the review established in section 206b;

''(2) the most recent national security strategy report submitted pursuant to section 1032 of the National Defense Authorization Act for Fiscal Year 2012 (50 U.S.C. 3043);

''(3) other relevant national plans; and

''(4) the strategic plans of relevant Federal departments and agencies.

''(c) CONSULTATION.—The Director shall consult as necessary with the Office of Management and Budget and other appropriate elements of the Executive Office of the President to ensure that the recommendations and priorities delineated in the science and technology strategy are incorporated in the development of annual budget requests.

''(d) REPORT.—The President shall submit to Congress each year a comprehensive report on the national science and technology strategy of the United States. Each report on the national science and technology strategy of the United States shall include a description of—

''(1) strategic objectives and priorities necessary to maintain the leadership of the United States in

science and technology, including near-term, medium-term, and long-term research priorities;

''(2) programs, policies, and activities that the President recommends across all Federal agencies to achieve the strategic objectives in paragraph (1); and

''(3) global trends in science and technology, including potential threats to the leadership of the United States in science and technology.

''(e) PUBLICATION.—The Director shall, consistent with the protection of national security and other sensitive matters to the maximum extent practicable, make each report submitted under subsection (e) publicly available on an internet website of the Office of Science and Technology Policy.''.

SEC. 102. QUADRENNIAL SCIENCE AND TECHNOLOGY REVIEW.

The National Science and Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6601 et seq.) is amended by inserting after section 206:

''SEC. 206b. QUADRENNIAL SCIENCE AND TECHNOLOGY REVIEW.

''(a) REQUIREMENTS.—

''(1) QUADRENNIAL REVIEWS REQUIRED.—Not later than December 31, 2020, and every 4 years

thereafter, the Director of the Office of Science and Technology Policy shall complete a review of the science and technology enterprise of the United States (in this section referred to as the 'quadrennial science and technology review').

''(2) SCOPE.—The quadrennial science and technology review shall be a comprehensive examination of the science and technology strategy of the United States, including recommendations for maintaining global leadership in science and technology and guidance on the coordination of programs, assets, capabilities, budget, policies, and authorities across all Federal research and development programs.

''(3) CONSULTATION.—The Director of the Office of Science and Technology shall conduct each quadrennial science and technology review under this subsection in consultation with—

''(A) the National Science and Technology Council;

''(B) the heads of other relevant Federal agencies;

''(C) the President's Council of Advisors on Science and Technology;

''(D) the National Science Board;

''(E) the National Security Council; and

''(F) other relevant governmental and non-governmental entities, including representatives from industry, institutions of higher education, nonprofit institutions, Members of Congress, and other policy experts.

''(4) COORDINATION.—The Director shall ensure that each quadrennial science and technology review conducted under this section is coordinated with other relevant statutorily required reviews, and to the maximum extent practicable incorporates information and recommendations from existing reviews to avoid duplication.

''(b) CONTENTS.—In each quadrennial science and technology review, the Director shall—

''(1) provide an integrated view of, and recommendations for, science and technology policy across the Federal Government, while considering economic and national security;

''(2) assess and recommend priorities for research, development and demonstration programs to maintain American leadership in science and technology;

''(3) assess the global competition in science and technology and identify potential threats to the

leadership of the United States in science and technology;

''(4) assess and make recommendations on the science, technology, engineering, mathematics and computer science workforce in the United States;

''(5) assess and make recommendations to improve regional innovation across the United States;

''(6) assess and identify the infrastructure and tools needed to maintain the leadership of the United States in science and technology; and

''(7) review administrative or legislative policies that affect the science and technology enterprise and identify and make recommendations on policies that hinder research and development in the United States.

''(c) REPORTING.—

''(1) IN GENERAL.—Not later than December 31 of the year in which a quadrennial science and technology review is conducted, the Director shall submit a report of the review to Congress.

''(2) PUBLICATION.—The Director shall, consistent with the protection of national security and other sensitive matters to the maximum extent possible, make each report submitted under paragraph

(1) publicly available on an internet website of the Office of Science and Technology Policy.''.

Subtitle B—Office of Science and Technology Policy

SEC. 111. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated for the Office of Science and Technology Policy—

(1) $5,544,000 for fiscal year 2020;

(2) $6,100,000 for fiscal year 2021;

(3) $6,500,000 for fiscal year 2022;

(4) $6,500,000 for fiscal year 2023;

(5) $6,500,000 for fiscal year 2024;

(6) $6,500,000 for fiscal year 2025;

(7) $6,500,000 for fiscal year 2026;

(8) $6,500,000 for fiscal year 2027;

(9) $6,500,000 for fiscal year 2028; and

(10) $6,500,000 for fiscal year 2029.

SEC. 112. GAO STUDY ON FEDERAL RESEARCH SECURITY.

Not later than 1 year after the date of enactment of this Act, the Comptroller General shall transmit to the Congress a report detailing the results of a study on Federal science agency efforts to protect federally funded research and development from foreign interference, theft, or espionage. Such study shall include—

(1) an inventory of current policies, procedures, and guidance for protecting federally funded intramural and extramural research from foreign interference, theft, or espionage;

(2) an inventory of policies and procedures for foreign scientists participating in research or research administration at Federal facilities, including Federal laboratories;

(3) an inventory of known security breaches and other similar incidents of foreign interference, theft, or espionage of intramural research, merit-review panels, or other Federal grant administration activities;

(4) an assessment of the best practices at Federal agencies for protecting federally funded research;

(5) an assessment of interagency coordination efforts on policies and procedures on research security;

(6) an assessment of any potential consequences that any agency practice would have on international collaboration and United States leadership in science and technology; and

(7) recommendations for further steps that agencies should take to protect federally funded research from foreign interference, theft or espionage.

TITLE II—DEPARTMENT OF ENERGY

Subtitle A—Office of Science

SEC. 201. DEFINITIONS.

In this Act:

(1) DEPARTMENT.—The term ''Department'' means the Department of Energy.

(2) DIRECTOR.—The term ''Director'' means the Director of the Office of Science of the Department.

(3) NATIONAL LABORATORY.—The term ''National Laboratory'' has the meaning given that term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(4) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

SEC. 202. BASIC ENERGY SCIENCES.

(a) PROGRAM.—The Director shall carry out a fundamental research program in basic energy sciences, including materials sciences and engineering, chemical sciences, physical biosciences, and geosciences, in order to provide the foundations for new energy technologies and to sup-

port Department missions in energy, environment, and national security.

(b) BASIC ENERGY SCIENCES USER FACILITIES.—Section 303(b)(3) of the Department of Energy Research and Innovation Act (42 U.S.C. 18641) is amended—

(1) in subparagraph (C), by striking ''and'';

(2) by redesignating subparagraph (D) as subparagraph (E); and

(3) by inserting after subparagraph (C) the following:

''(D) autonomous chemistry and materials synthesis facilities that leverage advances in artificial intelligence; and''.

(c) BASIC ENERGY SCIENCES RESEARCH INFRASTRUCTURE.—

(1) ADVANCED PHOTON SOURCE UPGRADE.—

(A) IN GENERAL.—The Secretary shall provide for the upgrade to the Advanced Photon Source described in the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, titled ''Report on Facility Upgrades'', including the development of a multi-bend achromat lattice to produce a high flux of coherent x-rays within the hard x-

ray energy region and a suite of beamlines optimized for this source.

(B) DEFINITIONS.—In this paragraph:

(i) FLUX.—The term ''flux'' means the rate of flow of photons.

(ii) HARD X-RAY.—The term ''hard x-ray'' means a photon with energy greater than 20 kiloelectron volts.

(C) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the upgrade under this paragraph occurs before March 31, 2026.

(D) FUNDING.—Out of funds authorized to be appropriated under section 209 for Basic Energy Science, there shall be made available to the Secretary to carry out the upgrade under this paragraph—

(i) $170,000,000 for fiscal year 2020;

(ii) $159,800,000 for fiscal year 2021;

(iii) $106,200,000 for fiscal year 2022; and

(iv) $5,000,000 for fiscal year 2023.

(2) SPALLATION NEUTRON SOURCE PROTON POWER UPGRADE.—

(A) IN GENERAL.—The Secretary shall provide for a proton power upgrade to the Spallation Neutron Source.

(B) PROTON POWER UPGRADE DEFINED.—For the purposes of this paragraph, the term ''proton power upgrade'' means the Spallation Neutron Source power upgrade described in—

(i) the publication of the Office of Science of the Department of Energy titled ''Facilities for the Future of Science: A Twenty-Year Outlook'', published December 2003;

(ii) the publication of the Office of Science of the Department of Energy titled ''Four Years Later: An Interim Report on Facilities for the Future of Science: A Twenty-Year Outlook'', published August 2007; and

(iii) the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, titled ''Report on Facility Upgrades''.

(C) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the

upgrade under this paragraph occurs before December 31, 2025.

(D) FUNDING.—Out of funds authorized to be appropriated under section 209 for Basic Energy Science, there shall be made available to the Secretary to carry out the upgrade under this paragraph—

(i) $65,000,000 for fiscal year 2020;

(ii) $44,000,000 for fiscal year 2021; and

(iii) $35,000,000 for fiscal year 2022.

(3) SPALLATION NEUTRON SOURCE SECOND TARGET STATION.—

(A) IN GENERAL.—The Secretary shall provide for a second target station for the Spallation Neutron Source.

(B) DEFINITION OF SECOND TARGET STATION.—For the purposes of this paragraph, the term ''second target station'' means the Spallation Neutron Source second target station described in—

(i) the publication of the Office of Science of the Department of Energy titled ''Facilities for the Future of Science: A

Twenty-Year Outlook'', published December 2003;

(ii) the publication of the Office of Science of the Department of Energy titled ''Four Years Later: An Interim Report on Facilities for the Future of Science: A Twenty-Year Outlook'', published August 2007; and

(iii) the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, titled ''Report on Facility Upgrades''.

(C) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the second target station under this paragraph occurs before December 31, 2030, with the option for early operation in 2028.

(D) FUNDING.—Out of funds authorized to be appropriated under section 209 for Basic Energy Science, there shall be made available to the Secretary to carry out activities, including construction, under this paragraph—

(i) $15,000,000 for fiscal year 2020;

(ii) $25,000,000 for fiscal year 2021;

(iii) $50,000,000 for fiscal year 2022;

(iv) $200,000,000 for fiscal year 2023;

(v) $275,000,000 for fiscal year 2024;

(vi) $275,000,000 for fiscal year 2025;

(vii) $275,000,000 for fiscal year 2026;

(viii) $250,000,000 for fiscal year 2027; and

(ix) $120,000,000 for fiscal year 2028.

(4) ADVANCED LIGHT SOURCE UPGRADE.—

(A) IN GENERAL.—The Secretary shall provide for the upgrade to the Advanced Light Source described in the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, titled ''Report on Facility Upgrades'', including the development of a multi-bend achromat lattice to produce a high flux of coherent x-rays within the soft x-ray energy region.

(B) DEFINITIONS.—In this paragraph:

(i) FLUX.—The term ''flux'' means the rate of flow of photons.

(ii) SOFT X-RAY.—The term ''soft x-ray'' means a photon with energy in the range from 50 to 2,000 electron volts.

(C) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the upgrade under this paragraph occurs before December 31, 2026.

(D) FUNDING.—Out of funds authorized to be appropriated under section 209 for Basic Energy Science, there shall be made available to the Secretary to carry out the upgrade under this paragraph—

(i) $53,000,000 for fiscal year 2020;

(ii) $67,000,000 for fiscal year 2021;

(iii) $67,000,000 for fiscal year 2022;

(iv) $60,000,000 for fiscal year 2023;

(v) $59,200,000 for fiscal year 2024; and

(vi) $2,000,000 for fiscal year 2025.

(5) LINAC COHERENT LIGHT SOURCE II HIGH ENERGY UPGRADE.—

(A) IN GENERAL.—The Secretary shall provide for the upgrade to the Linac Coherent Light Source II facility described in the publi-

cation approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, titled ''Report on Facility Upgrades'', including the development of experimental capabilities for high energy x-rays to reveal fundamental scientific discoveries. The Secretary shall ensure the upgrade under this paragraph enables the production and use of high energy, ultra-short pulse x-rays delivered at a high repetition rate.

(B) DEFINITIONS.—In this paragraph:

(i) HIGH ENERGY X-RAY.—The term ''high energy x-ray'' means a photon with an energy at or exceeding 12 kiloelectron volts.

(ii) HIGH REPETITION RATE.—The term ''high repetition rate'' means the delivery of x-ray pulses up to 1 million pulses per second.

(iii) ULTRA-SHORT PULSE X-RAYS.—The term ''ultra-short pulse x-rays'' means x-ray bursts capable of durations of less than 100 femtoseconds.

(C) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the

upgrade under this paragraph occurs before December 31, 2025.

(D) FUNDING.—Out of funds authorized to be appropriated under section 209 for Basic Energy Science, there shall be made available to the Secretary to carry out the upgrade under this paragraph—

(i) $54,000,000 for fiscal year 2020;

(ii) $64,000,000 for fiscal year 2021;

(iii) $70,000,000 for fiscal year 2022;

(iv) $80,000,000 for fiscal year 2023;

(v) $79,000,000 for fiscal year 2024; and

(vi) $37,000,000 for fiscal year 2025.

(d) ARTIFICIAL PHOTOSYNTHESIS.—Subtitle G of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16311 et seq.) is amended—

(1) in section 973(b), by striking paragraph (4) and inserting:

''(4)(A) FUNDING.—From within funds authorized to be appropriated under section 209 of the Securing American Leadership in Science and Technology Act of 2020 for Basic Energy Science, the Secretary shall make available for carrying out ac-

tivities under this subsection $50,000,000 for each of fiscal years 2020 through 2029.

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

(2) in section 975(c), by striking paragraph (4) and inserting:

''(4)(A) FUNDING.—From within funds authorized to be appropriated under section 209 of the Securing American Leadership in Science and Technology Act of 2020 for Basic Energy Science and Biological and Environmental Research, the Secretary shall make available for carrying out activities under this subsection $50,000,000 for each of fiscal years 2020 through 2029.

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

(e) ELECTRICITY STORAGE RESEARCH INITIATIVE.—Section 975 of the Energy Policy Act of 2005 (42 U.S.C. 16315) is amended—

(1) in subsection (b), by striking paragraph (4) and inserting:

''(4)(A) FUNDING.—From within funds authorized to be appropriated under section 209 of the Securing American Leadership in Science and Technology Act of 2020 for Basic Energy Science, the Secretary shall make available for carrying out activities under this subsection $50,000,000 for each of fiscal years 2020 through 2029.

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

(2) in subsection (c), by striking paragraph (4) and inserting:

''(4)(A) FUNDING.—From within funds authorized to be appropriated under section 209 of the Securing American Leadership in Science and Technology Act of 2020 for Basic Energy Science and Advanced Scientific Computing Research, the Secretary shall make available for carrying out activities under this subsection $30,000,000 for each of fiscal years 2020 through 2029.

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

(3) in subsection (d), by striking paragraph (4) and inserting:

''(4)(A) FUNDING.—From within funds authorized to be appropriated under section 209 of the Securing American Leadership in Science and Technology Act of 2020 for Basic Energy Science and Biological and Environmental Research, the Secretary shall make available for carrying out activities under this subsection $20,000,000 for each of fiscal years 2020 through 2029.

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

(f) COMPUTATIONAL MATERIALS AND CHEMISTRY.—

(1) IN GENERAL.—The Director shall support a program of fundamental research for the application of advanced computing practices to foundational and emerging research problems in chemistry and materials science.

(2) COMPUTATIONAL MATERIALS AND CHEMISTRY SCIENCE CENTERS.—

(A) IN GENERAL.—In carrying out the activities authorized under paragraph (1), the Director shall select and establish up to four com-

putational materials and chemistry science centers to develop open-source, robust, and validated computational codes and user-friendly software, coupled with innovative use of experimental and theoretical data, to enable the design, discovery, and development of new materials and chemical systems including chemical catalysis research and development. These centers shall also focus on overcoming challenges and maximizing the benefits of exascale and other high performance computing systems.

(B) SELECTION.—The Director shall select centers under paragraph (1) on a competitive, merit-reviewed basis. The Director shall consider applications from the National Laboratories, institutes of higher education, multi-institutional collaborations, and other appropriate entities.

(C) DURATION.—A center established under this subsection shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

(D) RENEWAL.—Upon the expiration of any period of support of a center under this subsection, the Director may renew support for

the center, on a merit-reviewed basis, for a period of not more than 5 years.

(E) TERMINATION.—Consistent with the existing authorities of the Department, the Director may terminate an underperforming center for cause during the performance period.

(3) MATERIALS RESEARCH DATABASE.—

(A) IN GENERAL.—The Director shall support the development of a web-based platform to provide access to a database of computed information on known and predicted materials properties and computational tools to accelerate breakthroughs in materials discovery and design.

(B) PROGRAM.—In carrying out this section, the Director shall—

(i) conduct cooperative research with industry, academia, and other research institutions to facilitate the design of novel materials;

(ii) leverage existing high performance computing systems to conduct high-throughput calculations, and develop computational and data mining algorithms for the prediction of material properties;

(iii) advance understanding, prediction, and manipulation of materials;

(iv) strengthen the foundation for new technologies and advanced manufacturing; and

(v) drive the development of advanced materials for applications that span the Department's missions in energy, environment, and national security.

(C) COORDINATION.—In carrying out this section, the Director shall leverage programs and activities across the Department.

SEC. 203. ADVANCED SCIENTIFIC COMPUTING RESEARCH.

(a) PROGRAM.—The Director shall carry out a research, development, and demonstration program to advance computational and networking capabilities to analyze, model, simulate, and predict complex phenomena relevant to the development of new energy technologies and the competitiveness of the United States.

(b) BEYOND EXASCALE COMPUTING PROGRAM.—

(1) IN GENERAL.—The Secretary shall establish a program to develop and implement a strategy for achieving computing systems with capabilities beyond exascale computing systems. In establishing this program, the Secretary shall—

(A) maintain foundational research programs in mathematical, computational, and computer sciences focused on new and emerging computing needs within the mission of the Department, including but not limited to post-Moore's law computing architectures, novel approaches to modeling and simulation, artificial intelligence and scientific machine learning, quantum computing, and extreme heterogeneity; and

(B) retain best practices and maintain support for essential hardware and software elements of the Exascale Computing Project that are necessary for sustaining the vitality of a long-term exascale ecosystem.

(2) REPORT.—Not later than one year after the date of the enactment of this Act, the Secretary shall submit 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 the development and implementation of the strategy outlined in paragraph (1).

(c) APPLIED MATHEMATICS AND SOFTWARE DEVELOPMENT FOR HIGH-END COMPUTING SYSTEMS, COMPUTATIONAL, AND COMPUTER SCIENCES RESEARCH.—

(1) IN GENERAL.—The Director shall carry out activities to develop, test, and support—

(A) mathematics, models, statistics, and algorithms for modeling complex systems on advanced computing architectures; and

(B) tools, languages, programming environments, and operations for high-end computing systems (as defined in section 2 of the American Super Computing Leadership Act (15 U.S.C. 5541), as renamed by this section).

(2) PORTFOLIO BALANCE.—The Director shall maintain a balanced portfolio within the advanced scientific computing research and development program established under section 976 of the Energy Policy Act of 2005 (42 U.S.C. 16316) that supports robust investment in—

(A) applied mathematical, computational, and computer sciences research needs relevant to the mission of the Department, including activities related to data science, artificial intelligence, scientific machine learning, quantum

information science, and other emerging areas; and

(B) associated high-performance computing hardware and facilities.

(d) ENERGY EFFICIENT COMPUTING PROGRAM.—

(1) IN GENERAL.—The Secretary shall support a program of fundamental research, development, and demonstration of energy efficient computing technologies relevant to advanced computing applications in high performance computing, artificial intelligence, and scientific machine learning.

(2) EXECUTION.—

(A) PROGRAM.—In carrying out the program, the Secretary shall—

(i) establish a partnership for National Laboratories, industry partners, and institutions of higher education for co-design of energy efficient hardware, technology, software, and applications across all applicable program offices of the Department;

(ii) develop hardware and software technologies that decrease the energy needs of advanced computing practices;

(iii) consider multiple heterogeneous computing architectures, including neuromorphic computing, persistent computing, and ultrafast networking; and

(iv) provide, as appropriate, on a competitive, merit-reviewed basis, access for researchers from institutions of higher education, National Laboratories, industry, and other Federal agencies to the energy efficient computing technologies developed pursuant to clause (i).

(B) SELECTION OF PARTNERS.—In selecting participants for the partnership established under subparagraph (A)(i), the Secretary shall select participants through a competitive, merit-review process.

(3) REPORT.—Not later than one year after the date of the enactment of this Act, the Secretary shall submit 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) the activities conducted under subparagraph (A); and

(B) the coordination and management of the Program to ensure an integrated research program across the Department.

(e) ARTIFICIAL INTELLIGENCE, DATA ANALYTICS, AND COMPUTATIONAL RESEARCH.—

(1) IN GENERAL.—The Secretary shall carry out a program to develop tools for big data analytics by utilizing data sets generated by Federal agencies, institutions of higher education, nonprofit research organizations, and industry in order to advance artificial intelligence technologies to solve complex, big data challenges. The Secretary shall carry out this program through a competitive, merit-reviewed process, and consider applications from National Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

(2) PROGRAM COMPONENTS.—In carrying out the program established under paragraph (1), the Secretary shall—

(A) establish a cross-cutting research initiative to prevent duplication and coordinate research efforts in artificial intelligence and data analytics across the Department;

(B) conduct basic research in modeling and simulation, artificial intelligence, machine

learning, large-scale data analytics, natural language processing, and predictive analysis in order to develop novel or optimized predictive algorithms suitable for high-performance computing systems and large biomedical data sets;

(C) develop multivariate optimization models to accommodate large data sets with variable quality and scale in order to visualize complex systems;

(D) establish multiple scientific computing user facilities to serve as data enclaves capable of securely storing data sets created by Federal agencies, institutions of higher education, nonprofit organizations, or industry at National Laboratories; and

(E) promote collaboration and data sharing between National Laboratories, research entities, and user facilities of the Department by providing the necessary access and secure data transfer capabilities.

(3) REPORT.—Not later than 2 years after the date of the enactment of this Act, the Secretary shall submit 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 evaluating the effectiveness of the pilot program under paragraph (1), including basic research discoveries achieved in the course of the program and potential opportunities to expand the technical capabilities of the Department through the development of artificial intelligence and data analytics technologies.

(f) ENERGY SCIENCES NETWORK.—

(1) IN GENERAL.—The Secretary shall provide for an upgrade to the Energy Sciences Network user facility in order to meet Federal research needs for highly reliable data transport capabilities optimized for the requirements of large-scale science.

(2) CAPABILITIES.—In carrying out paragraph (1), the Secretary shall ensure the following capabilities:

(A) To provide high bandwidth scientific networking across the continental United States and the Atlantic Ocean.

(B) To maximize network reliability.

(C) To protect the network and data from cyber-attacks.

(D) To support exponentially increasing levels of data from the Department's scientific user facilities, experiments, and sensors.

(E) To integrate heterogeneous computing frameworks and systems.

(g) QUANTUM SCIENCE NETWORK.—The Secretary shall provide for a program to support the research, development, and demonstration of a quantum computing network, which shall operate as a national user facility.

(h) WORKFORCE DEVELOPMENT.—The Director of the Office of Advanced Scientific Computing Research shall support the development of a computational science workforce through a program that—

(1) facilitates collaboration between university students and researchers at the National Laboratories; and

(2) endeavors to advance science in areas relevant to the mission of the Department through the application of computational science.

SEC. 204. HIGH ENERGY PHYSICS.

(a) PROGRAM.—The Director shall carry out a research program on the fundamental constituents of matter and energy and the nature of space and time in order to support theoretical and experimental research in both elementary particle physics and fundamental accelerator science and technology and understand fundamental properties of the universe.

(b) LONG-BASELINE NEUTRINO FACILITY FOR DEEP UNDERGROUND NEUTRINO EXPERIMENT.—

(1) IN GENERAL.—The Secretary shall provide for a Long-Baseline Neutrino Facility to facilitate the international Deep Underground Neutrino Experiment to enable a program in neutrino physics to measure the fundamental properties of neutrinos, explore physics beyond the Standard Model, and better clarify the nature of matter and antimatter.

(2) FACILITY CAPABILITIES.—The Secretary shall ensure that the facility described in paragraph (1) will provide, at a minimum, the following capabilities:

(A) A neutrino beam with wideband capability of 1.2 megawatts (MW) of beam power and upgradable to 2.4 MW of beam power.

(B) Four caverns excavated for a 70 kiloton fiducial detector mass and supporting surface buildings and utilities.

(C) Neutrino detector facilities at both the Far Site in South Dakota and the Near Site in Illinois to categorize and study neutrinos on their 800-mile journey between the two sites.

(D) Cryogenic systems to support neutrino detectors.

(3) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the facility under this subsection occurs before December 31, 2026.

(4) FUNDING.—Out of funds authorized to be appropriated under section 209 for High Energy Physics, there shall be made available to the Secretary to carry out activities, including construction of the facility, under this subsection—

(A) $175,000,000 for fiscal year 2020;

(B) $225,000,000 for fiscal year 2021;

(C) $250,000,000 for fiscal year 2022;

(D) $250,000,000 for fiscal year 2023;

(E) $250,000,000 for fiscal year 2024;

(F) $250,000,000 for fiscal year 2025;

(G) $250,000,000 for fiscal year 2026;

(H) $250,000,000 for fiscal year 2027;

(I) $194,000,000 for fiscal year 2028; and

(J) $82,000,000 for fiscal year 2029.

(c) PROTON IMPROVEMENT PLAN–II ACCELERATOR UPGRADE PROJECT.—

(1) IN GENERAL.—The Secretary of Energy shall provide for the Proton Improvement Plan II (PIP–II), an upgrade to the Fermilab accelerator complex identified in the 2014 Particle Physics

Project Prioritization Panel (P5) report titled ''Building for Discovery'', to provide the world's most intense beam of neutrinos to the international LBNF/DUNE experiment as well as a broad range of future high energy physics experiments. The Secretary of Energy shall work with international partners to provide key contributions.

(2) FACILITY CAPABILITIES.—The Secretary shall ensure that the facility described in paragraph (1) will provide, at a minimum, the following capabilities:

(A) A state-of-the-art 800 megaelectron volt (MeV) superconducting linear accelerator.

(B) Proton beam power of 1.2 MW at the start of LBNF/DUNE, upgradeable to 2.4 MW of beam power.

(C) A flexible design to enable high power beam delivery to multiple users simultaneously and customized beams tailored to specific scientific needs.

(D) Sustained high reliability operation of the Fermilab accelerator complex.

(3) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure

that the start of full operations of the facility under this section occurs before December 31, 2027.

(4) FUNDING.—Out of funds authorized to be appropriated under section 209 for High Energy Physics, there shall be made available to the Secretary to carry out activities, including construction of the facility, under this subsection—

(A) $60,000,000 for fiscal year 2020;

(B) $120,000,000 for fiscal year 2021;

(C) $120,000,000 for fiscal year 2022;

(D) $120,000,000 for fiscal year 2023;

(E) $120,000,000 for fiscal year 2024;

(F) $115,000,000 for fiscal year 2025;

(G) $85,000,000 for fiscal year 2026; and

(H) $45,000,000 for fiscal year 2027.

(d) INTERNATIONAL COLLABORATION.—Section 305(b) of the Department of Energy Research and Innovation Act (42 U.S.C. 18643(b)) is amended to read as follows:

''(b) INTERNATIONAL COLLABORATION.—The Director shall—

''(1) as practicable and in coordination with other appropriate Federal agencies as necessary, ensure the access of United States researchers to the most advanced accelerator facilities and research ca-

pabilities in the world, including the Large Hadron Collider;

''(2) to the maximum extent practicable, continue to leverage United States participation in the Large Hadron Collider, and prioritize expanding international partnerships and investments in the Long-Baseline Neutrino Facility/Deep Underground Neutrino Experiment; and

''(3) to the maximum extent practicable, prioritize engagement in collaborative efforts in support of future international facilities that would provide access to United States researchers of the most advanced accelerator facilities in the world.''.

(e) ACCELERATOR AND DETECTOR UPGRADES.—The Director shall upgrade accelerator facilities and detectors, as necessary and appropriate, to increase beam power, sustain high reliability, and improve precision measurement to advance the highest priority particle physics research programs. In carrying out facility upgrades, the Director shall continue to work with international partners, when appropriate and in the United States interest, to leverage investments and expertise in critical technologies to maintain leading facilities in the United States.

(f) ACCELERATOR AND DETECTOR RESEARCH AND DEVELOPMENT.—The Director shall carry out a program

in accelerator and detector research and development, in order to develop and deploy next generation technologies to support discovery science in particle physics.

(g) RESEARCH COLLABORATIONS.—In developing accelerator technologies under the program authorized in subsection (e), the Director shall—

(1) consider the requirements necessary to support translational research and development for medical, industrial, security, and defense applications; and

(2) leverage investments in accelerator technologies and basic research in particle physics by partnering with institutes of higher education, industry, and other Federal agencies to help commercialize technologies with promising applications.

SEC. 205. BIOLOGICAL AND ENVIRONMENTAL RESEARCH.

(a) PROGRAM.—The Director shall carry out a program of basic research in the areas of biological systems science and environmental science relevant to the development of new energy technologies and to support Department missions in energy, environment, and national security.

(b) BIOENERGY RESEARCH CENTERS.—

(1) IN GENERAL.—In carrying out activities under subsection (a), the Director shall select and

establish up to four bioenergy research centers to conduct basic and fundamental research in plant and microbial systems biology, bio imaging and analysis, and genomics to inform the production of fuels, chemicals from sustainable biomass resources, and to facilitate the translation of basic research results to industry.

(2) SELECTION.—The Director shall select centers under paragraph (1) on a competitive, merit-reviewed basis. The Director shall consider applications from National Laboratories, multi-institutional collaborations, and other appropriate entities.

(3) DURATION.—A center established under this subsection shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

(4) EXISTING CENTERS.—The Director may select a center for participation under this subsection that is in existence, or undergoing a renewal process, on the date of enactment of this Act. Such center shall be eligible to receive support for the duration the 5-year period beginning on the date of establishment of such center.

(5) RENEWAL.—Upon the expiration of any period of support of a center under this subsection, the

Director may renew support for the center, on a merit-reviewed basis, for a period of not more than 5 years.

(6) TERMINATION.—Consistent with the existing authorities of the Department, the Director may terminate an underperforming center for cause during the performance period.

(c) LOW-DOSE RADIATION RESEARCH PROGRAM.—

(1) IN GENERAL.—The Secretary shall carry out a basic 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) formulate scientific goals for low-dose radiation and low dose-rate radiation basic research in the United States;

(B) identify ongoing scientific challenges for understanding the long-term effects of ionizing radiation on biological systems;

(C) develop a long-term strategic and prioritized basic research agenda to address such scientific challenges in coordination with other research efforts;

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

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

(F) engage with other Federal agencies, research communities, and potential users of information produced under this section, including institutions concerning radiation research, medical physics, radiology, health physics, and emergency response.

(3) COORDINATION.—In carrying out the program required under paragraph (1), the Secretary, in coordination with the Physical Science Sub-

committee of the National Science and Technology Council, shall—

(A) support the directives under section 106 of the American Innovation and Competitiveness Act (42 U.S.C. 6601 note);

(B) ensure that the Office of Science of the Department of Energy consults and coordinates with the National Aeronautics and Space Administration, the National Institutes of Health, the Environmental Protection Agency, the Department of Defense, the Nuclear Regulatory Commission, and the Department of Homeland Security;

(C) advise and assist the National Science and Technology Council on policies and initiatives in radiation biology, including enhancing scientific knowledge of the effects of low-dose and low dose-rate radiation on biological systems to improve radiation risk-assessment and risk-management methods; and

(D) identify opportunities to stimulate international cooperation relating to low-dose and low dose-rate radiation and leverage research and knowledge from sources outside of the United States.

(4) RESEARCH PLAN.—Not later than 180 days after the date of enactment of this Act, the Secretary 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 4-year research plan that identifies and prioritizes basic research needs relating to low-dose and low dose-rate radiation. In developing such plan, the Secretary shall incorporate the components described in paragraph (2).

(5) LOW-DOSE RADIATION DEFINED.—In this section, the term ''low-dose radiation'' means a radiation dose of less than 100 millisieverts.

(6) LOW DOSE-RATE RADIATION DEFINED.—In this section, 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 section shall be construed to subject any research carried out by the Secretary for the program under this section to any limitations described in section 977(e).

(8) FUNDING.—For purposes of carrying out this section, the Secretary is authorized to make

available from funds provided to the Biological and Environmental Research Program—

(A) $20,000,000 for fiscal year 2020;

(B) $20,000,000 for fiscal year 2021;

(C) $30,000,000 for fiscal year 2022;

(D) $30,000,000 for fiscal year 2023;

(E) $40,000,000 for fiscal year 2024;

(F) $40,000,000 for fiscal year 2025;

(G) $50,000,000 for fiscal year 2026;

(H) $50,000,000 for fiscal year 2027;

(I) $60,000,000 for fiscal year 2028; and

(J) $60,000,000 for fiscal year 2029.

(d) EARTH AND ENVIRONMENTAL SYSTEMS RESEARCH.—

(1) IN GENERAL.—The Director shall carry out a program of fundamental research to develop high-resolution Earth system modeling, analysis, and intercomparison capabilities, in order to further the understanding of the biological, biogeochemical, and physical processes across the multiple scales that control the flux of environmentally relevant compounds between the terrestrial surface and the atmosphere.

(2) PRIORITIZATION.—In carrying out the program authorized under paragraph (1), the Director shall prioritize—

(A) the development of software and algorithms to enable the productive application of environmental systems models in high-performance computing systems; and

(B) capabilities that support the Department's mission needs for energy and infrastructure security, resilience, and reliability.

(3) USER FACILITIES.—

(A) IN GENERAL.—In carrying out the activities authorized under paragraph (1), the Director shall establish and operate user facilities to advance the collection, validation, and analysis of atmospheric data, including activities to advance knowledge and improve model representations and measure the impact of atmospheric gases, aerosols, and clouds on earth and environmental systems.

(B) EXISTING FACILITIES.—To the maximum extent practicable, the Director shall utilize existing facilities to carry out this subsection.

(C) SELECTION.—The Director shall select user facilities under paragraph (1) on a competitive, merit-reviewed basis. The Director shall consider applications from the National Laboratories, institutes of higher education, multi-institutional collaborations, and other appropriate entities.

(D) TERMINATION.—Consistent with the existing authorities of the Department, the Director may terminate an underperforming user facility for cause during the performance period.

(4) COORDINATION.—In carrying out the program authorized in paragraph (1), the Director shall ensure that the Office of Science—

(A) consults and coordinates with the National Oceanic Atmospheric Administration, the Environmental Protection Agency, and any other relevant Federal agency on the collection, validation, and analysis of atmospheric data; and

(B) coordinates with relevant stakeholders, including institutes of higher education, nonprofit research institutions, industry, State, local, and tribal governments, and other appro-

priate entities to ensure access to the best available relevant atmospheric and historical weather data.

(e) COASTAL ZONE RESEARCH INITIATIVE.—

(1) IN GENERAL.—The Director shall carry out a basic research program to enhance the understanding of coastal ecosystems. In carrying out this program, the Director shall prioritize efforts to enhance the collection of observational data, and shall develop models to analyze the ecological, biogeochemical, hydrological and physical processes that interact in coastal zones.

(2) NATIONAL SYSTEM FOR COASTAL DATA COLLECTION.—The Director shall establish an integrated system of field research sites in order to improve the quantity and quality of observational data, and that encompass at least three of the major landwater interfaces of the United States, including—

(A) the Great Lakes region;

(B) the Pacific coast;

(C) the Atlantic coast;

(D) the Arctic; and

(E) the Gulf coast.

(3) EXISTING INFRASTRUCTURE.—In carrying out the programs and establishing the field research

sites under paragraph (1) and (2), the Secretary shall leverage existing Department of Energy R&D infrastructure, including the Department's existing marine sciences lab.

(4) COORDINATION.—For the purposes of carrying out the programs and establishing the field research sites under the Initiative, the Secretary may enter into agreements with Federal Departments and agencies with complementary capabilities.

(5) REPORT.—Not less than 2 years after the date of the enactment of this Act, the Director shall provide to the Committee on Science, Space, and Technology and the Committee on Appropriations of the House of Representatives and the Committee on Energy and Natural Resources and the Committee on Appropriations of the Senate a report examining whether the system described in this section should be established as a National User Facility.

(f) BIOLOGICAL AND ENVIRONMENTAL RESEARCH USER FACILITIES.—

(1) IN GENERAL.—The Director shall carry out a program for the development, construction, operation, and maintenance of user facilities to enhance the collection and analysis of observational data re-

lated to complex biological, earth, and environmental systems.

(2) FACILITY REQUIREMENTS.—To the maximum extent practicable, the user facilities developed, constructed, operated, or maintained under paragraph (1) shall include—

(A) distributed field research and observation platforms for understanding earth system processes;

(B) instruments and modeling resources for understanding the physical, chemical, and cellular processes of biological and environmental systems;

(C) integrated high-throughput sequencing, DNA design and synthesis, metabolomics and computational analysis; and

(D) such other facilities as the Director considers appropriate, consistent with section 209 of the Department of Energy Organization Act (42 U.S.C. 7139).

(3) EXISTING FACILITIES.—In carrying out the program established in paragraph (1), the Director is encouraged to evaluate the capabilities of existing user facilities and, to the maximum extent prac-

ticable, invest in modernization of those capabilities to address emerging research priorities.

SEC. 206. FUSION ENERGY.

(a) PROGRAM.—The Director shall carry out a fusion energy sciences research program to expand the understanding of plasmas and matter at very high temperatures and densities and build the science and engineering foundation needed to develop a fusion energy source.

(b) PUBLIC-PRIVATE PARTNERSHIPS.—

(1) IN GENERAL.—In carrying out the program authorized in subsection (a), the Secretary shall, to the maximum extent practicable, make available fusion energy science infrastructure to industry partners in order to achieve faster and cost-effective development of fusion energy technologies toward commercial readiness. In carrying out this subsection, the Secretary shall make available—

(A) experimental capabilities and testing facilities;

(B) computational capabilities, modeling and simulation tools;

(C) access to existing datasets and data validation tools; and

(D) land use and site information for demonstration facilities.

(2) SELECTION.—

(A) IN GENERAL.—The Secretary shall select industry partners for awards on a competitive, merit-reviewed basis.

(B) CONSIDERATIONS.—In selecting industry stakeholders under subparagraph (A), the Secretary shall consider—

(i) the information disclosed by the Department under this subsection; and

(ii) any existing facilities the Department will provide for public-private partnership activities.

(3) TERM.—An award made to an industry partner under this section shall be for a period of not more than 5 years, subject to the availability of appropriations, after which the award may be renewed, subject to a rigorous merit review.

(c) HIGH-PERFORMANCE COMPUTATION COLLABORATIVE RESEARCH PROGRAM.—

(1) IN GENERAL.—The Secretary shall carry out a program to conduct and support collaborative research, development, and demonstration of fusion energy technologies, through high-performance computation modeling and simulation techniques, in order to—

(A) support basic science research in plasmas and matter at very high temperatures and densities;

(B) inform the development of a broad range of fusion energy systems; and

(C) facilitate the translation of basic research results in fusion energy science to industry.

(2) COORDINATION.—In carrying out the program under paragraph (1), the Secretary shall coordinate with relevant Federal agencies, and prioritize the following objectives:

(A) Using expertise from the private sector, institutions of higher education, and the National Laboratories to develop computational software and capabilities that prospective users may accelerate research and development of fusion energy systems.

(B) Developing computational tools to simulate and predict fusion energy science phenomena that may be validated through physical experimentation.

(C) Increasing the utility of the research infrastructure of the Department by coordi-

nating with the Advanced Scientific Computing Research program within the Office of Science.

(D) Leveraging experience from existing modeling and simulation entities sponsored by the Department.

(E) Ensuring that new experimental and computational tools are accessible to relevant research communities, including private sector entities engaged in fusion energy technology development.

(3) DUPLICATION.—The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of this program with the activities of—

(A) other research entities of the Department, including the National Laboratories, the Advanced Research Projects Agency–Energy, the Advanced Scientific Computing Research program; and

(B) industry.

(4) HIGH-PERFORMANCE COMPUTING FOR FUSION INNOVATION HUB.—In carrying out the program under paragraph (1), the Secretary shall establish and operate a national High-Performance Computing for Fusion Innovation Hub (referred to

in this section as the ''Hub''), which shall focus on the early stage research and development activities described under paragraph (1).

(d) SELECTION.—The Secretary shall select the Hub under this subsection on a competitive, merit-reviewed basis. The Secretary shall consider applications from National Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

(e) DURATION.—The Hub established under this subsection shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

(f) RENEWAL.—Upon the expiration of any period of support of the Hub, the Secretary may renew support for the Hub, on a merit-reviewed basis, for a period of not more than 5 years.

(g) TERMINATION.—Consistent with the existing authorities of the Department, the Secretary may terminate the Hub for cause during the performance period.

(h) TOKAMAK RESEARCH AND DEVELOPMENT.—Section 307(b) of the Department of Energy Research and Innovation Act (42 U.S.C. 18645(b)) is amended to read as follows:

''(b) TOKAMAK RESEARCH AND DEVELOPMENT.—

''(1) IN GENERAL.—The Director shall support research and development activities and facility operations to optimize the tokamak approach to fusion energy.

''(2) INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR CONSTRUCTION.—

''(A) 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'.

''(B) FACILITY REQUIREMENTS.—The Secretary shall ensure that the mission-oriented user facility will enable the study of a burning plasma, and shall be built to have the following characteristics in its full configuration:

''(i) A tokamak device with a plasma radius of 6.2 meters and a magnetic field of 5.3 T.

''(ii) Capable of creating and sustaining a 15-million-Ampere plasma current for greater than 300 seconds.

"(C) AUTHORIZATION OF APPROPRIATIONS.—From within funds authorized to be appropriated under section 209 of the Securing American Leadership in Science and Technology Act of 2020 for Fusion Energy Sciences, there are authorized to carry out this paragraph—

"(i) $242,000,000 for fiscal year 2020;

"(ii) $290,400,000 for fiscal year 2021;

"(iii) $338,800,000 for fiscal year 2022;

"(iv) $387,200,000 for fiscal year 2023;

"(v) $435,600,000 for fiscal year 2024;

"(vi) $484,000,000 for fiscal year 2025;

"(vii) $435,600,000 for fiscal year 2026;

"(viii) $387,200,000 for fiscal year 2027;

"(ix) $338,800,000 for fiscal year 2028; and

''(x) $290,400,000 for fiscal year 2029.''.

(i) INERTIAL FUSION ENERGY RESEARCH AND DEVELOPMENT PROGRAM.—Section 307(c) of the Department of Energy Research and Innovation Act (42 U.S.C. 18645(c)) is amended to read as follows:

''(c) 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) LASER RESEARCH INITIATIVE.—The Director shall establish a high intensity laser research program consistent with the recommendations of the National Academy of Science Report, 'Opportunities in Intense Ultrafast Lasers: Reaching for the Brightest Light' and the Brightest Light Initiative workshop report. This program shall include research to develop petawatt-scale laser technologies necessary to facilitate discovery science and to advance energy technologies, and to restore U.S. leadership in high intensity laser facilities.''.

(j) ALTERNATIVE AND ENABLING CONCEPTS.—Section 307(d) of the Department of Energy Research and Innovation Act (42 U.S.C. 18645(d)) is amended as follows:

''(d) ALTERNATIVE AND ENABLING CONCEPTS.—

''(1) IN GENERAL.—As part of the program described in subsection (a), the Director shall support research and development activities and facility operations at United States universities, national laboratories, and private facilities 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 leadership role in the international fusion research community.

''(2) ACTIVITIES.—Fusion energy concepts and activities explored under this paragraph may include—

''(A) high magnetic field approaches facilitated by high temperature superconductors;

''(B) advanced stellarator concepts;

''(C) non-tokamak confinement configurations operating at low magnetic fields;

''(D) magnetized target fusion energy concepts;

''(E) liquid metals to address issues associated with fusion plasma interactions with the inner wall of the encasing device;

''(F) immersion blankets for heat management and fuel breeding;

''(G) advanced scientific computing activities; and

''(H) other promising fusion energy concepts identified by the Director.''.

SEC. 207. NUCLEAR PHYSICS.

Section 308 of the Department of Energy Research and Innovation Act (42 U.S.C. 18646) is amended by inserting at the end the following:

''(c) FACILITY FOR RARE ISOTOPE BEAMS.—

''(1) IN GENERAL.—The Secretary shall provide for a Facility for Rare Isotope Beams to advance the understanding of rare nuclear isotopes and the evolution of the cosmos.

''(2) FACILITY CAPABILITY.—In carrying out paragraph (1), the Secretary shall provide for, at a minimum, a rare isotope beam facility capable of 400 kW of beam power.

''(3) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the facility under this subsection occurs before June 30, 2022.

''(4) FUNDING.—Out of funds authorized to be appropriated under section 209 of the Securing American Leadership in Science and Technology Act of 2020 for Nuclear Physics, there shall be made available to the Secretary to carry out activities, including construction of the facility, under this subsection—

''(A) $64,000,000 for fiscal year 2020;

''(B) $36,300,000 for fiscal year 2021;

''(C) $24,000,000 for fiscal year 2022;

''(D) $15,000,000 for fiscal year 2023; and

''(E) $15,000,000 for fiscal year 2024.

''(d) ELECTRON-ION COLLIDER.—

''(1) IN GENERAL.—The Secretary shall provide for an Electron Ion Collider as described in the 2015 Nuclear Science Advisory Committee's Long Range Plan and endorsed by the report from the National Academies of Science, Engineering, and Medicine report titled 'An Assessment of U.S.-Based Electron-Ion Collider Science', in order to measure

the internal structure of the proton and the nucleus and answer fundamental questions about the nature of visible matter.

''(2) FACILITY CAPABILITY.—The Secretary shall ensure that the facility meets the requirements in the 2015 Long Range Plan, including—

''(A) at least 70 percent polarized beams of electrons and light ions;

''(B) ion beams from deuterium to the heaviest nuclei;

''(C) variable center of mass energy from 20 to 140 GeV; high luminosity of 1033–1034 cm–2s–1; and

''(D) the possibility of more than one interaction region.

''(3) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the facility under this section occurs before December 31, 2030.''.

SEC. 208. SCIENCE LABORATORIES INFRASTRUCTURE PROGRAM.

Section 309 of the Department of Energy Research and Innovation Act of 2018 (42 U.S.C. 18647) is amended by adding at the end the following:

''(c) USE OF AVAILABLE APPROACHES AND MECHANISMS.—In carrying out this section, the Director shall utilize all available approaches and mechanisms, including capital line items, minor construction projects, energy savings performance contracts, utility energy service contracts, alternative financing, and expense funding, as appropriate.

''(d) MID-SCALE INSTRUMENTATION PROGRAM.—The Director shall establish a mid-scale instrumentation program to enable the development and acquisition of novel, state-of-the-art instruments that would significantly accelerate scientific breakthroughs at national laboratory user facilities.''.

SEC. 209. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2020.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2020 $7,000,000,000, of which—

(1) $2,213,000,000 shall be for Basic Energy Science;

(2) $1,045,000,000 shall be for High Energy Physics;

(3) $750,000,000 shall be for Biological and Environmental Research;

(4) $713,000,000 shall be for Nuclear Physics;

(5) $980,000,000 shall be for Advanced Scientific Computing Research;

(6) $671,000,000 shall be for Fusion Energy Sciences;

(7) $301,000,000 shall be for Science Laboratories Infrastructure;

(8) $186,300,000 shall be for Science Program Direction;

(9) $112,700,000 shall be for Safeguards and Security; and

(10) $28,000,000 shall be for Workforce Development for Teachers and Scientists.

(b) FISCAL YEAR 2021.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2021 $7,900,940,874, of which—

(1) $2,685,840,000 shall be for Basic Energy Science;

(2) $1,135,584,317 shall be for High Energy Physics;

(3) $816,925,453 shall be for Biological and Environmental Research;

(4) $799,544,060 shall be for Nuclear Physics;

(5) $1,160,020,000 shall be for Advanced Scientific Computing Research;

(6) $699,360,000 shall be for Fusion Energy Sciences;

(7) $279,468,000 shall be for Science Laboratories Infrastructure;

(8) $190,393,200 shall be for Science Program Direction;

(9) $110,396,844 shall be for Safeguards and Security; and

(10) $23,409,000 shall be for Workforce Development for Teachers and Scientists.

(c) FISCAL YEAR 2022.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2022 $8,559,100,770, of which—

(1) $2,945,760,000 shall be for Basic Energy Science;

(2) $1,213,376,476 shall be for High Energy Physics;

(3) $872,888,179 shall be for Biological and Environmental Research;

(4) $854,316,090 shall be for Nuclear Physics;

(5) $1,272,280,000 shall be for Advanced Scientific Computing Research;

(6) $767,040,000 shall be for Fusion Energy Sciences;

(7) $302,757,000 shall be for Science Laboratories Infrastructure;

(8) $194,201,064 shall be for Science Program Direction;

(9) $112,604,781 shall be for Safeguards and Security; and

(10) $23,877,180 shall be for Workforce Development for Teachers and Scientists.

(d) FISCAL YEAR 2023.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2023 $9,217,390,345, of which—

(1) $3,205,680,000 shall be for Basic Energy Science;

(2) $1,291,168,634 shall be for High Energy Physics;

(3) $928,850,905 shall be for Biological and Environmental Research;

(4) $909,088,120 shall be for Nuclear Physics;

(5) $1,384,540,000 shall be for Advanced Scientific Computing Research;

(6) $834,720,000 shall be for Fusion Energy Sciences;

(7) $326,046,000 shall be for Science Laboratories Infrastructure;

(8) $198,085,085 shall be for Science Program Direction;

(9) $114,856,876 shall be for Safeguards and Security; and

(10) $24,354,724 shall be for Workforce Development for Teachers and Scientists.

(e) FISCAL YEAR 2024.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2024 $9,875,812,193, of which—

(1) $3,465,600,000 shall be for Basic Energy Science;

(2) $1,368,960,793 shall be for High Energy Physics;

(3) $984,813,632 shall be for Biological and Environmental Research;

(4) $963,860,150 shall be for Nuclear Physics;

(5) $1,496,800,000 shall be for Advanced Scientific Computing Research;

(6) $902,400,000 shall be for Fusion Energy Sciences;

(7) $349,335,000 shall be for Science Laboratories Infrastructure;

(8) $202,046,787 shall be for Science Program Direction;

(9) $117,154,014 shall be for Safeguards and Security; and

(10) $24,841,818 shall be for Workforce Development for Teachers and Scientists.

(f) FISCAL YEAR 2025.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2025 $10,534,368,961, of which—

(1) $3,725,520,000 shall be for Basic Energy Science;

(2) $1,446,752,951 shall be for High Energy Physics;

(3) $1,040,776,358 shall be for Biological and Environmental Research;

(4) $1,018,632,180 shall be for Nuclear Physics;

(5) $1,609,060,000 shall be for Advanced Scientific Computing Research;

(6) $970,080,000 shall be for Fusion Energy Sciences;

(7) $372,624,000 shall be for Science Laboratories Infrastructure;

(8) $206,087,723 shall be for Science Program Direction;

(9) $119,497,094 shall be for Safeguards and Security; and

(10) $25,338,654 shall be for Workforce Development for Teachers and Scientists.

(g) FISCAL YEAR 2026.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2026 $11,193,063,345, of which—

(1) $3,985,440,000 shall be for Basic Energy Science;

(2) $1,524,545,110 shall be for High Energy Physics;

(3) $1,096,739,084 shall be for Biological and Environmental Research;

(4) $1,073,404,210 shall be for Nuclear Physics;

(5) $1,721,320,000 shall be for Advanced Scientific Computing Research;

(6) $1,037,760,000 shall be for Fusion Energy Sciences;

(7) $395,913,000 shall be for Science Laboratories Infrastructure;

(8) $210,209,477 shall be for Science Program Direction;

(9) $121,887,036 shall be for Safeguards and Security; and

(10) $25,845,428 shall be for Workforce Development for Teachers and Scientists.

(h) FISCAL YEAR 2027.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2027 $11,851,898,099, of which—

(1) $4,245,360,000 shall be for Basic Energy Science;

(2) $1,602,337,268 shall be for High Energy Physics;

(3) $1,152,701,810 shall be for Biological and Environmental Research;

(4) $1,128,176,240 shall be for Nuclear Physics;

(5) $1,833,580,000 shall be for Advanced Scientific Computing Research;

(6) $1,105,440,000 shall be for Fusion Energy Sciences;

(7) $419,202,000 shall be for Science Laboratories Infrastructure;

(8) $214,413,667 shall be for Science Program Direction;

(9) $124,324,777 shall be for Safeguards and Security; and

(10) $26,362,336 shall be for Workforce Development for Teachers and Scientists.

(i) FISCAL YEAR 2028.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2028 $12,510,876,029, of which—

(1) $4,505,280,000 shall be for Basic Energy Science;

(2) $1,680,129,427 shall be for High Energy Physics;

(3) $1,208,664,537 shall be for Biological and Environmental Research;

(4) $1,182,948,270 shall be for Nuclear Physics;

(5) $1,945,840,000 shall be for Advanced Scientific Computing Research;

(6) $1,173,120,000 shall be for Fusion Energy Sciences;

(7) $442,491,000 shall be for Science Laboratories Infrastructure;

(8) $218,701,940 shall be for Science Program Direction;

(9) $126,811,272 shall be for Safeguards and Security; and

(10) $26,889,583 shall be for Workforce Development for Teachers and Scientists.

(j) FISCAL YEAR 2029.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2029 $13,170,000,000, of which—

(1) $4,765,200,000 shall be for Basic Energy Science;

(2) $1,757,921,586 shall be for High Energy Physics;

(3) $1,264,627,263 shall be for Biological and Environmental Research;

(4) $1,237,720,300 shall be for Nuclear Physics;

(5) $2,058,100,000 shall be for Advanced Scientific Computing Research;

(6) $1,240,800,000 shall be for Fusion Energy Sciences;

(7) $465,780,000 shall be for Science Laboratories Infrastructure;

(8) $223,075,979 shall be for Science Program Direction;

(9) $129,347,498 shall be for Safeguards and Security; and

(10) $27,427,374 shall be for Workforce Development for Teachers and Scientists.

Subtitle B—Advanced Research Projects Agency–Energy

SEC. 211. ADVANCED RESEARCH PROJECTS AGENCY–ENERGY.

(a) ESTABLISHMENT.—Section 5012(b) of the America COMPETES Act (42 U.S.C. 16538(b)) is amended by striking ''development of energy technologies'' and inserting ''development of transformative science and technology solutions to address energy, environmental, economic, and national security challenges''.

(b) GOALS.—Section 5012(c) of the America COMPETES Act (42 U.S.C. 16538(c)) is amended—

(1) by striking paragraph (1)(A) and inserting the following:

''(A) to enhance the economic and energy security of the United States through the development of energy technologies that—

''(i) reduce imports of energy from foreign sources;

''(ii) reduce energy-related emissions, including greenhouse gases;

''(iii) improve the energy efficiency of all economic sectors;

''(iv) provide transformative solutions to improve the management, clean-up, and disposal of—

''(I) low-level radioactive waste;

''(II) spent nuclear fuel; and

''(III) high-level radioactive waste;

''(v) improve efficiency and reduce the environmental impact of all forms of energy production;

''(vi) improve the resiliency, reliability, and security of the electric grid; and

''(vii) address other challenges within the mission of the Department as determined by the Secretary; and''; and

(2) in paragraph (2), in the matter preceding subparagraph (A), by striking ''energy technology projects'' and inserting ''advanced technology projects''.

(c) RESPONSIBILITIES.—Section 5012(e)(3)(A) of the America COMPETES Act (42 U.S.C. 16538(e)(3)(A)) is amended by striking ''energy''.

(d) REPORTS AND ROADMAPS.—Section 5012(h) of the America COMPETES Act (42 U.S.C. 16538(h)) is amended to read as follows:

''(h) ANNUAL REPORT.—

''(1) IN GENERAL.—As part of the annual budget request submitted for each fiscal year, the Director shall provide to the relevant authorizing and appropriations committees of Congress a report that—

''(A) describes projects supported by ARPA–E during the previous fiscal year;

''(B) identifies and includes an analysis of projects supported by ARPA–E during the previous fiscal year that demonstrate duplication of other activities funded by the Department; and

''(C) describes current, proposed, and planned projects to be carried out pursuant to subsection (e)(3)(D).

''(2) STRATEGIC VISION ROADMAP.—Beginning with the report submitted with respect to fiscal year 2020, and every 4 fiscal years thereafter, the report required under paragraph (1) shall include a roadmap describing the strategic vision that ARPA–E will use to guide the choices of ARPA–E for future technology investments over the following 4 fiscal years.''.

(e) COORDINATION AND NONDUPLICATION.—Section 5012(i)(1) of the America COMPETES Act (42 U.S.C. 16538(i)(1)) is amended to read as follows:

''(1) IN GENERAL.—To the maximum extent practicable, the Director shall ensure that—

''(A) the activities of ARPA–E are coordinated with, and do not duplicate the efforts of, programs and laboratories within the Department and other relevant research agencies; and

''(B) ARPA–E does not provide funding for a project unless the prospective grantee demonstrates sufficient attempts to secure private financing or indicates that the project is not independently commercially viable.''.

(f) EVALUATION.—Section 5012(l) of the America COMPETES Act (42 U.S.C. 16538(l)) is amended—

(1) by striking paragraph (1) and inserting the following:

''(1) IN GENERAL.—Not later than 3 years after the date of enactment of the Securing American Leadership in Science and Technology Act of 2020, the Secretary is authorized to enter into a contract with a third-party entity to conduct an evaluation of how well ARPA–E is achieving the goals and mission of ARPA–E.''; and

(2) in paragraph (2)—

(A) by striking ''shall'' and inserting ''may''; and

(B) by striking ''the recommendation of the National Academy of Sciences'' and inserting ''a recommendation''.

(g) AUTHORIZATION OF APPROPRIATIONS.—Paragraph (2) of section 5012(o) of the America COMPETES Act (42 U.S.C. 16538(o)) is amended to read as follows:

''(2) AUTHORIZATION OF APPROPRIATIONS.—Subject to paragraph (4), there are authorized to be appropriated to the Director for deposit in the Fund without fiscal year limitation—

''(A) $392,800,000 for fiscal year 2020;

''(B) $419,600,000 for fiscal year 2021;

''(C) $446,400,000 for fiscal year 2022;

''(D) $473,200,000 for fiscal year 2023;

''(E) $500,000,000 for fiscal year 2024;

''(F) $600,000,000 for fiscal year 2025;

''(G) $700,000,000 for fiscal year 2026;

''(H) $800,000,000 for fiscal year 2027;

''(I) $900,000,000 for fiscal year 2028; and

''(J) $1,000,000,000 for fiscal year 2029.''.

(h) TECHNICAL AMENDMENTS.—Section 5012(g)(3)(A)(iii) of the America COMPETES Act (42 U.S.C. 16538(g)(3)(A)(iii)) is amended by striking ''subpart'' each place it appears and inserting ''subparagraph''.

Subtitle C—DOE Clean Energy Infrastructure

SEC. 221. REGIONAL ENERGY INNOVATION CENTERS.

(a) DEFINITIONS.—In this section:

(1) ADVANCED ENERGY TECHNOLOGY.—The term ''advanced energy technology'' means—

(A) an innovative technology—

(i) that produces energy from solar, wind, geothermal, biomass, tidal, wave, ocean, or other renewable energy resources;

(ii) that produces nuclear energy;

(iii) for carbon capture and sequestration;

(iv) that enables advanced vehicles, vehicle components, and related technologies that result in significant energy savings;

(v) that generates, transmits, distributes, uses, or stores energy more efficiently than conventional technologies, including through Smart Grid technologies; or

(vi) that enhances the energy independence and security of the United States by enabling improved or expanded supply and production of domestic energy resources, including coal, oil, and natural gas;

(B) a research, development, demonstration, or commercial application activity necessary to ensure the long-term, secure, and sustainable supply of an energy critical element; or

(C) any other innovative energy technology area identified by the Secretary.

(2) QUALIFYING ENTITY.—The term ''qualifying entity'' means—

(A) an institution of higher education;

(B) an appropriate State or Federal entity, including a federally funded research and development center of the Department;

(C) a nonprofit research institution;

(D) a multi-institutional collaboration; or

(E) any other relevant entity the Secretary determines appropriate.

(b) AUTHORIZATION OF PROGRAM.—

(1) IN GENERAL.—

(A) The Secretary shall carry out a program to enhance the economic, environmental, and energy security of the United States by establishing and operating Regional Energy Innovation Centers in diverse regions of the United States, in order to provide, to the maximum extent practicable, one centralized location for multidisciplinary, collaborative research, development, and demonstration of advanced energy technologies most suited to commercial application in each region of the United States.

(B) In establishing the centers authorized in subparagraph (A), the Secretary shall consider the diverse natural resources available throughout the United States, and maximize the opportunities for cooperation between institutes of higher education, industry, State and local governments, and nonprofit research institutions with shared areas of energy expertise.

(2) TECHNOLOGY DEVELOPMENT FOCUS.—The Secretary shall designate for each center a unique advanced energy technology or basic research focus. In establishing focus areas for each center, the Secretary shall consider the energy needs, resources,

and expertise available in each region of the United States.

(3) COORDINATION.—The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of each center with the activities of—

(A) other research entities of the Department, including the National Laboratories, the Advanced Research Projects Agency–Energy, Energy Innovation Hubs, and Energy Frontier Research Centers; and

(B) industry.

(c) APPLICATION PROCESS.—

(1) ELIGIBILITY.—To be eligible to receive an award for the establishment and operation of a center established under subsection (b)(1)(A), a consortium shall—

(A) be composed of not fewer than two qualifying entities;

(B) operate subject to a binding agreement, entered into by each member of the consortium, that documents—

(i) the proposed partnership agreement, including the governance and management structure of the center;

(ii) measures the consortium will undertake to enable cost-effective implementation of activities under the program described in subsection (b)(1); and

(iii) a proposed budget, including financial contributions from non-Federal sources; and

(C) operate as a nonprofit organization.

(2) SELECTION.—The Secretary shall consider applications from qualifying entities, and select centers authorized under subsection (b)(1)(A) on a competitive, merit-reviewed basis.

(3) DURATION.—A center established under this section shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

(4) RENEWAL.—Upon the expiration of any period of support of a center under this section, the Director may renew support for the center, on a merit-reviewed basis, for a period of not more than 5 years.

(5) TERMINATION.—Consistent with the existing authorities of the Department, the Director may terminate an underperforming center for cause during the performance period.

(d) CENTER OPERATIONS.—

(1) IN GENERAL.—Each center shall conduct or provide for multidisciplinary, collaborative research, development, demonstration of advanced energy technologies within the technology development focus designated under subsection (b)(2).

(2) ACTIVITIES.—Each center shall—

(A) encourage collaboration and communication among the member qualifying entities of the consortium and awardees;

(B) develop and make publicly available proposed plans and programs; and

(C) submit an annual report to the Department summarizing the activities of the center, including—

(i) detailing organizational expenditures; and

(ii) describing each project undertaken by the center.

(3) CONFLICTS OF INTEREST.—Each center shall maintain conflict of interest procedures, consistent with the conflict of interest procedures of the Department.

(4) PROHIBITION ON CONSTRUCTION.—

(A) IN GENERAL.—Except as provided in subparagraph (B)—

(i) no funds provided under this section may be used for construction of new buildings or facilities for centers; and

(ii) construction of new buildings or facilities shall not be considered as part of the non-Federal share of a Hub cost-sharing agreement.

(B) TEST BED AND RENOVATION EXCEPTION.—Nothing in this paragraph prohibits the use of funds provided under this section or non-Federal cost share funds for the construction of a test bed or renovations to existing user facilities if the Secretary determines such facilities are necessary and applicable to conduct research within the focus areas identified for each center.

SEC. 222. VERSATILE NEUTRON SOURCE.

(a) IN GENERAL.—The Secretary of Energy shall construct a versatile reactor-based fast neutron source, which shall operate as a national user facility. The Secretary shall consult with the private sector, universities, National Laboratories, and relevant Federal agencies to ensure that the versatile neutron source is capable of

meeting Federal research needs for neutron irradiation services.

(b) FACILITY CAPABILITIES.—

(1) CAPABILITIES.—The Secretary shall ensure that the facility described in subsection (a) will provide, at a minimum, the following capabilities:

(A) Fast neutron spectrum irradiation capability.

(B) Capacity for upgrades to accommodate new or expanded research needs.

(2) CONSIDERATIONS.—In carrying out paragraph (1), the Secretary shall consider the following:

(A) Capabilities that support experimental high-temperature testing.

(B) Providing a source of fast neutrons at a neutron flux higher than that at which existing research facilities operate, sufficient to enable research for an optimal base of prospective users.

(C) Maximizing irradiation flexibility and irradiation volume to accommodate as many concurrent users as possible.

(D) Capabilities for irradiation with neutrons of a lower energy spectrum.

(E) Multiple loops for fuels and materials testing of different coolants.

(F) Capabilities that support irradiating and processing targets for isotope production.

(G) Additional pre-irradiation and post-irradiation examination capabilities.

(H) Lifetime operating costs and lifecycle costs.

(c) START OF OPERATIONS.—The Secretary shall, to the maximum extent practicable, ensure that the start of full operations of the facility under this section occurs before December 31, 2025.

(d) FUNDING.—There are authorized to be appropriated to the Secretary for the Office of Nuclear Energy to carry out to completion the construction of the facility under this section—

(1) $200,000,000 for fiscal year 2020;

(2) $260,000,000 for fiscal year 2021;

(3) $340,000,000 for fiscal year 2022;

(4) $350,000,000 for fiscal year 2023;

(5) $350,000,000 for fiscal year 2024;

(6) $350,000,000 for fiscal year 2025;

(7) $200,000,000 for fiscal year 2026;

(8) $150,000,000 for fiscal year 2027;

(9) $100,000,000 for fiscal year 2028; and

(10) $50,000,000 for fiscal year 2029.

SEC. 223. CARBON UTILIZATION RESEARCH AND DEVELOPMENT INFRASTRUCTURE.

(a) IN GENERAL.—The Secretary shall carry out a program to conduct basic and fundamental research in materials science, chemistry, subsurface instrumentation, and data analysis to inform the research, development, and demonstration of carbon capture, storage, and utilization technologies and techniques, and to facilitate the translation of basic research results to industry.

(b) COORDINATION.—In carrying out program under subsection (a), the Secretary shall leverage expertise and resources and facilitate collaboration and coordination between—

(1) the Office of Fossil Energy; and

(2) the Office of Science.

(c) CARBON UTILIZATION ENERGY INNOVATION HUB.—In carrying out the program under subsection (a), the Secretary shall establish and operate a national Carbon Utilization Energy Innovation Hub (referred to in this section as the ''Hub''), which shall focus on early stage research and development activities including—

(1) post-combustion and pre-combustion capture of carbon dioxide;

(2) advanced compression technologies for new and existing fossil fuel-fired power plants;

(3) technologies to convert carbon dioxide to valuable products and commodities; and

(4) advanced carbon dioxide storage technologies that consider a range of storage regimes.

(d) SELECTION.—The Secretary shall select the Hub under this section on a competitive, merit-reviewed basis. The Secretary shall consider applications from National Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

(e) DURATION.—The Hub established under this section shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

(f) RENEWAL.—Upon the expiration of any period of support of the Hub, the Secretary may renew support for the Hub, on a merit-reviewed basis, for a period of not more than 5 years.

(g) TERMINATION.—Consistent with the existing authorities of the Department, the Secretary may terminate the Hub for cause during the performance period.

SEC. 224. FRONTIER OBSERVATORY FOR RESEARCH IN GEOTHERMAL ENERGY.

(a) IN GENERAL.—The Secretary shall support the establishment and construction of up to 3 field research

sites operated by public or academic entities, which shall each be known as a ''Frontier Observatory for Research in Geothermal Energy'' or ''FORGE'' site to develop, test, and enhance techniques and tools for enhanced geothermal energy.

(b) DUTIES.—The Secretary shall—

(1) award grants in support of research and development projects focused on advanced monitoring technologies, new technologies and approaches for implementing multi-zone stimulations, and dynamic reservoir modeling that incorporates all available high-fidelity characterization data; and

(2) seek opportunities to coordinate efforts and share information with domestic and international partners engaged in research and development of geothermal systems and related technology.

(c) SITE SELECTION.—Of the FORGE sites referred to in subsection (a), the Secretary shall—

(1) consider applications through a competitive, merit-reviewed process, from National Laboratories, multi-institutional collaborations, institutes of higher education and other appropriate entities best suited to provide national leadership on geothermal related issues and perform the duties enumerated under subsection (b); and

(2) prioritize existing field sites and facilities with capabilities relevant to the duties enumerated under subsection (b).

(d) FUNDING.—There is authorized to be appropriated to the Secretary to carry out the FORGE activities under this section—

(1) $45,000,000 for fiscal year 2020;

(2) $55,000,000 for fiscal year 2021;

(3) $65,000,000 for fiscal year 2022;

(4) $70,000,000 for fiscal year 2023;

(5) $70,000,000 for fiscal year 2024;

(6) $70,000,000 for fiscal year 2025;

(7) $70,000,000 for fiscal year 2026;

(8) $70,000,000 for fiscal year 2027;

(9) $70,000,000 for fiscal year 2028; and

(10) $70,000,000 for fiscal year 2029.

(e) PORTFOLIO BALANCE.—In carrying out this section, the Secretary shall consider the balance between funds dedicated to construction and operations and research activities to reflect the state of site development.

SEC. 225. ADVANCED ENERGY STORAGE INITIATIVE.

(a) IN GENERAL.—The Secretary shall carry out a research initiative to be known as the ''Advanced Energy Storage Initiative'' (referred to in this section as the ''Initiative'') to support and accelerate the research, develop-

ment, and demonstration of advanced energy storage technologies, in order to—

(1) support basic research in capabilities that enable temporal flexibility in the conversion of energy resources to useful energy services;

(2) inform the development of a broad range of energy storage systems; and

(3) facilitate the translation of basic research results in energy storage to industry.

(b) LEVERAGING.—In carrying out programs and activities under the Initiative, the Secretary shall leverage expertise and resources and facilitate collaboration between—

(1) the Office of Electricity;

(2) the Office of Energy Efficiency and Renewable Energy;

(3) the Office of Fossil Energy;

(4) the Office of Nuclear Energy; and

(5) the Basic Energy Sciences Program and Advanced Scientific Computing Program of the Office of Science.

The Secretary may organize additional activities under this subsection through Energy Frontier Research Centers, Energy Innovation Hubs, or cross-cutting research programs.

(c) GRID SCALE ENERGY STORAGE USER FACILITIES.—Not later than 180 days after the date of enactment of this Act, the Secretary 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 4-year research plan that identifies and prioritizes basic research needs relating to the development, construction, operation, and maintenance of grid scale energy storage technology demonstration projects, which shall operate as national user facilities.

SEC. 226. CRITICAL INFRASTRUCTURE RESEARCH AND CONSTRUCTION.

(a) IN GENERAL.—The Secretary shall carry out a program of fundamental research, development, and early-stage demonstration of innovative engineered systems and tools to help ensure the resilience and security of critical integrated grid infrastructures.

(b) COORDINATION.—In carrying out the program under subsection (a), the Secretary shall leverage expertise and resources and facilitate collaboration and coordination between—

(1) the Office of Electricity;

(2) the Office of Cybersecurity, Energy Security, and Emergency Response;

(3) the Office of Science;

(4) the Department of Defense; and

(5) the Department of Homeland Security.

(c) CRITICAL INFRASTRUCTURE TEST RANGE.—In carrying out the program under subsection (a), the Secretary shall establish and operate a Critical Infrastructure Test Range (referred to in this section as the ''Test Range'') that allows for scalable physical and cyber performance testing to be conducted on industry-scale infrastructure systems. This facility shall include a focus on—

(1) cyber security test beds; and

(2) electric grid test beds.

(d) SELECTION.—The Secretary shall select the Test Range under this section on a competitive, merit-reviewed basis. The Secretary shall consider applications from National Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

(e) DURATION.—The Test Range established under this section shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

(f) RENEWAL.—Upon the expiration of any period of support of the Test Range, the Secretary may renew support for the Test Range, on a merit-reviewed basis, for a period of not more than 5 years.

(g) TERMINATION.—Consistent with the existing authorities of the Department, the Secretary may terminate the Test Range for cause during the performance period.

TITLE III—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

SEC. 301. FINDINGS.

Congress finds the following:

(1) The National Institute of Standards and Technology (NIST) promotes United States innovation and industrial competitiveness by advancing measurement science, standards and technology in ways that enhance economic security and improve Americans' quality of life.

(2) NIST's leadership in a broad range of cutting-edge scientific endeavors including but not limited to quantum science and engineering, cybersecurity, biologics, artificial intelligence (AI), machine learning, additive manufacturing, disaster resilience, and international standards development is critical to America's leadership in the industries of the future.

(3) NIST's role as the Nation's laboratory for industry is critical to maintaining the economic and national security of the United States.

SEC. 302. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2020.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,034,000,000 for the National Institute of Standards and Technology for fiscal year 2020.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $754,000,000 shall be for scientific and technical research and services laboratory activities, of which $9,000,000 may be transferred to the Working Capital Fund;

(B) $118,000,000 shall be for the construction and maintenance of facilities, of which $75,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs; and

(C) $162,000,000 shall be for industrial technology services activities, of which $146,000,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $16,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(b) FISCAL YEAR 2021.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,240,400,000 for the National Institute of Standards and Technology for fiscal year 2021.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $869,400,000 shall be for scientific and technical research and services laboratory activities, of which $10,800,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities, of which $120,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $171,000,000 shall be for industrial technology services activities, of which $146,000,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of

Standards and Technology Act (15 U.S.C. 278s).

(c) FISCAL YEAR 2022.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,315,250,000 for the National Institute of Standards and Technology for fiscal year 2022.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $941,850,000 shall be for scientific and technical research and services laboratory activities, of which $11,700,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities, of which $120,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $173,400,000 shall be for industrial technology services activities, of which $148,400,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $25,000,000 shall be for the Net-

work for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(d) FISCAL YEAR 2023.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,390,500,000 for the National Institute of Standards and Technology for fiscal year 2023.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,014,300,000 shall be for scientific and technical research and services laboratory activities, of which $12,600,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities of which $120,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $10,000,000 for IT infrastructure; and

(C) $176,200,000 shall be for industrial technology services activities, of which $151,200,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Stand-

ards and Technology Act (15 U.S.C. 278k and 278l) and $25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(e) FISCAL YEAR 2024.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,465,750,000 for the National Institute of Standards and Technology for fiscal year 2024.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,086,750,000 shall be for scientific and technical research and services laboratory activities, of which $13,500,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities, of which $120,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $10,000,000 for IT infrastructure; and

(C) $179,000,000 shall be for industrial technology services activities, of which $154,000,000 shall be for the Manufacturing

Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(f) FISCAL YEAR 2025.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,541,000,000 for the National Institute of Standards and Technology for fiscal year 2025.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,159,200,000 shall be for scientific and technical research and services laboratory activities, of which $14,400,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities, of which $120,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $10,000,000 for IT infrastructure; and

(C) $181,800,000 shall be for industrial technology services activities, of which $156,800,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(g) FISCAL YEAR 2026.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,616,250,000 for the National Institute of Standards and Technology for fiscal year 2026.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,213,650,000 shall be for scientific and technical research and services laboratory activities, of which $15,300,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities, of which $120,000,000 shall be for Safety, Capacity,

Maintenance, and Major Repairs, including $10,000,000 for IT infrastructure; and

(C) $184,600,000 shall be for industrial technology services activities, of which $159,600,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(h) FISCAL YEAR 2027.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,691,500,000 for the National Institute of Standards and Technology for fiscal year 2027.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,304,100,000 shall be for scientific and technical research and services laboratory activities, of which $16,200,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities, of which $120,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $10,000,000 for IT infrastructure; and

(C) $187,400,000 shall be for industrial technology services activities, of which $162,400,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278I) and $25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(i) FISCAL YEAR 2028.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,766,750,000 for the National Institute of Standards and Technology for fiscal year 2028.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,376,550,000 shall be for scientific and technical research and services laboratory

activities, of which $17,100,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities, of which $120,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $10,000,000 for IT infrastructure; and

(C) $190,200,000 shall be for industrial technology services activities, of which $165,200,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278I) and $25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(j) FISCAL YEAR 2029.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,842,000,000 for the National Institute of Standards and Technology for fiscal year 2029.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,449,000,000 shall be for scientific and technical research and services laboratory activities, of which $18,000,000 may be transferred to the Working Capital Fund;

(B) $200,000,000 shall be for the construction and maintenance of facilities, of which $120,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $10,000,000 for IT infrastructure; and

(C) $193,000,000 shall be for industrial technology services activities, of which $168,000,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278I) and $25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

SEC. 303. NIST FACILITIES MODERNIZATION FUND.

(a) ESTABLISHMENT.—There is established in the Treasury of the United States a fund to be known as the ''NIST Facilities Modernization Fund'' (hereafter in this section referred to as the ''Fund'').

(b) USE OF FUNDS.—Amounts in the Fund shall be available to Secretary, acting through the Director, for Capital Projects on the National Institute of Standards and Technology's campuses for the modernization and construction of research facilities needed to conduct leading edge scientific and technical research.

(c) CONTENTS OF FUND.—The Funds shall consist of the following amounts:

(1) Such amounts as may be appropriated by law.

(2) Interest earned on the balance of the Fund.

(d) AUTHORIZATION OF FUNDS.—Of the funds authorized to be appropriated in section 302 of this Act for the construction and maintenance of facilities, $80,000,000 for each of the fiscal years 2021 through 2029 shall be provided for the Fund established in subsection (a).

(e) CONTINUING AVAILABILITY OF FUNDS.—Amounts in the Fund are available without regard to fiscal year limitation.

(f) NOTIFICATION TO COMMITTEES.—Upon making any obligation or expenditure of any amount in the Fund, the Secretary, through the Director, shall notify the House of Representatives Science, Space, and Technology Committee, the Senate Committee on Commerce, Science, and

Transportation, the Committee on Appropriations of the House of Representatives and the Committee on Appropriations of the Senate of the amount and purpose of the obligation or expenditure.

(g) NIST FACILITIES MODERNIZATION AND MAINTENANCE PLAN.—

(1) IN GENERAL.—To carry out the program authorized in subsection (a), the Secretary, acting through the Director, shall develop and submit to Congress a 5-year modernization and maintenance plan for the National Institute of Standards and Technology's campuses.

(2) TIMING.—The modernization and maintenance plan required in paragraph (1) shall be submitted to Congress within 30 days of enactment of this Act, and updated on an annual basis.

(3) PLAN ELEMENTS.—The Plan required in paragraph (1) shall include the following:

(A) A list of Capitol Construction Projects expected to be undertaken in the next 5 years, the core capabilities these facilities will provide, anticipated schedule of construction, and anticipated funding requirements.

(B) A list of planned utility infrastructure projects expected to be undertaken in the next

5 years, anticipated schedule of construction, and anticipated funding requirements.

(C) A list of planned IT infrastructure projects expected to be undertaken in the next 5 years, anticipated schedule of construction, and anticipated funding requirements.

(D) A list of the deferred maintenance, a list of deferred maintenance projects expected to be undertaken in the next 5 years, anticipated schedule of construction, anticipated funding requirements, and an evaluation of progress made in reducing the deferred maintenance backlog.

SEC. 304. QUANTUM INFORMATION SCIENCE.

The Director shall—

(1) continue to support and expand basic quantum information science and technology research and development of measurement and standards infrastructure necessary to advance commercial development of quantum applications;

(2) use its existing programs, in collaboration with other agencies, as appropriate, to train scientists in quantum information science and technology to increase participation in the quantum fields; and

(3) establish or expand collaborative ventures or consortia with other public or private sector entities, including other Federal agencies engaged in quantum information science research and development, academia, National Laboratories, and industry for the purpose of advancing the field of quantum information science and engineering.

SEC. 305. CYBERSECURITY RESEARCH.

(a) RESEARCH.—The Secretary, acting through the Director, shall expand the fundamental and applied research carried out by the Institute to address key questions relating the measurement of privacy, security, and vulnerability of software tools and communications networks, including through—

(1) the development of research and engineering capabilities to provide practical solutions, including measurement techniques and engineering toolkits, to solve cybersecurity challenges such as human factors, identity management, network security, privacy, and software;

(2) investment in tools to help private and public sector organizations, including institutions of higher education and research organizations, measure and manage cybersecurity risks and ensure

workforce preparedness for new cybersecurity challenges; and

(3) investment in programs to prepare the United States with strong cybersecurity and encryption technologies to apply to emerging technologies such as artificial intelligence, the internet of things, and quantum computing.

(b) ASSISTANCE TO FEDERAL AGENCIES.—The Director shall enhance and expand the Institute's guidance and assistance to Federal agencies to help agencies effectively implement the Framework for Improving Critical Infrastructure Cybersecurity, including—

(1) technical guidance on the requirements in the Executive order;

(2) technical guidance and education and training of agency staff responsible for cyber security, consultative services, and other assistance at individual Federal agencies; and

(3) technical guidance and education and training of individual Federal agency Inspectors General and staff who are responsible for the annual independent evaluation they are required to perform of the information security program and practices of Federal agencies under section 3555 of title 44, United States Code.

(c) REPORT.—The Director shall provide the House Science, Space, and Technology Committee and the Senate Committee on Commerce, Science, and Transportation a report, not later than 12 months after the date of the enactment of this Act, describing how the National Institute of Standards and Technology carried out the activities described in subsection (b) in as much detail as possible, including identification of agencies assisted and the types of consultative services, education, guidance, assistance, and training provided to individual agencies and Inspectors General.

SEC. 306. ARTIFICIAL INTELLIGENCE AND DATA SCIENCE.

The Secretary, acting through the Director, shall continue to support the development of artificial intelligence and data science, including through—

(1) the expansion of the Institute's capabilities, including scientific staff and research infrastructure;

(2) the implementation of rigorous scientific testing to support the development of trustworthy and safe artificial intelligence and data systems;

(3) the development of machine learning and other artificial intelligence applications to support measurement science research programs and take steps to modernize the Institute's research infrastructure; and

(4) the development and publication of new cybersecurity tools, encryption methods, and best practices for artificial intelligence and data science.

SEC. 307. INTERNET OF THINGS.

The Secretary, acting through the Director, shall continue to conduct research with respect to and support the expanded connectivity, interoperability, and security of interconnected systems and other aspects of the internet of things, including through—

(1) the development of new tools and methodologies for cybersecurity of the internet of things;

(2) the development of technologies to address network congestion and device interference, such as the development of testing tools for next generation wireless communications, internet of things protocols, coexistence of wireless communications systems, and spectrum sharing;

(3) convening experts in the public and private sectors to develop recommendations for accelerating the adoption of sound interoperability standards, guidelines, and best practices for the internet of things; and

(4) the development and publication of new cybersecurity tools, encryption methods, and best practices for internet of things security.

SEC. 308. COMPOSITES RESEARCH.

(a) RESEARCH.—The Secretary, acting through the Director, shall implement the recommendations contained in the December 2017 report entitled ''Road Mapping Workshop Report on Overcoming Barriers to Adoption of Composites in Sustainable Infrastructure'', as appropriate, to help facilitate the adoption of composite technology in infrastructure in the United States. In implementing such recommendations, the Secretary, acting through the Director shall, with respect to the use of composite technology in infrastructure—

(1) not later than 6 months after the date of enactment of this Act, initiate the establishment of a design data clearinghouse to identify, gather, validate, and disseminate existing design criteria, tools, guidelines, and standards; and

(2) develop methods and resources required for testing an evaluation of safe and appropriate uses of composite materials for infrastructure, including—

(A) conditioning protocols, procedures and models;

(B) screening and acceptance tools; and

(C) minimum allowable design data sets that can be converted into design tools.

(b) STANDARDS COORDINATION.—The Secretary, acting through the Director, shall assure that the appro-

priate Institute staff consult regularly with standards developers, members of the composites industry, institutions of higher education, and other stakeholders in order to facilitate the adoption of standards for use of composite materials in infrastructure that are based on the research and testing results and other information developed by the Institute.

SEC. 309. ENABLING THE FUTURE BIOECONOMY.

The Secretary, acting through the Director, shall continue to support the research and development of engineering biology, including through—

(1) building up NIST's core capabilities in measurement science supporting synthetic biology by investing in foundational measurement tools;

(2) delivering the necessary measurement methods, standards and related services required to impart confidence in emerging engineering biology capabilities; and

(3) developing and evaluating computation tools in order to develop and deploy predictive models that will ink biological blueprints with biological outcomes.

SEC. 310. INTERNATIONAL STANDARDS DEVELOPMENT.

(a) FINDINGS.—Congress finds the following:

(1) Widespread use of standards facilitates technology advancement by defining and establishing common foundations for product differentiation, technological innovation, and other value-added services.

(2) Standards also promote an expanded, more interoperable, and efficient marketplace.

(3) Global cooperation and coordination on standards for emerging technologies will be critical for having a consistent set of rules to enable market competition, preclude barriers to trade, and allow innovation to flourish.

(4) United States position on standardization in emerging technologies will be critical to United States economic competitiveness.

(5) NIST is in a unique position to strengthen United States leadership in standards development, particularly for emerging technologies, to ensure continuing United States economic competitiveness and national security.

(b) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) while United States experts have historically been leaders in international standards development

activities, there is concern that the United States is losing its edge;

(2) strengthening the unique United States public-private partnerships approach to standards development is critical to United States economic competitiveness; and

(3) the United States Government should ensure cooperation and coordination across Federal agencies and partner with private sector stakeholders to continue to shape international dialogues in regard to standards development for emerging technologies.

(c) RESEARCH ACTIVITIES AND ENGAGEMENT.—The Secretary, acting through the Director, shall—

(1) build capacity and training opportunities to help create a pipeline of talent and leadership in key standards development positions, including standards education and training related activities targeted at integrating standards content into undergraduate and graduate curricula in science, engineering, business, public policy, and law;

(2) partner with private sector entities to support strategically increased engagement and leadership in the development of international standards for digital economy technologies, including partner-

ing with industry to incentivize private sector partners to develop standards strategies and support engagement and participation in the relevant standards activities; and

(3) develop approaches to prioritize standardization for emerging technologies, identify organization in which to develop these standards, identify leadership positions of interest to the United States, and identify key contributors for technical and leadership expertise in these areas.

SEC. 311. REVIEW OF THE CENTER FOR NEUTRON RESEARCH.

Not later than 1 year after the date of enactment of this Act, the Comptroller of the United States shall conduct an evaluation of NIST's Center for Neutron Research, including the following:

(1) An assessment of what progress NIST has made in planning for the future of the Center for Neutron Research's nuclear reactor since the release of the 2018 National Academies report, and what steps NIST has taken to implement the Academies report.

(2) An analysis of the extent to which NIST's planning efforts align with leading practices.

(3) An assessment of the extent to which NIST has worked with the Department of Energy to identify the scientific community's long-term needs for neutron research facilities and discuss the coordination of future facilities, and how these agencies are factoring these needs into their decision-making process.

(4) Recommendations for NIST and the Department of Energy on how best to continue to support civilian nuclear research reactors.

SEC. 312. HIRING AND MANAGEMENT.

(a) DIRECT HIRE AUTHORITY.—The Secretary, acting through the Director, may—

(1) appoint, without regard to the provisions of subchapter I of chapter 33 of title 5, United States Code (other than sections 3303, 3328, and 3330e of such chapter), qualified candidates to scientific, engineering, and professional positions for carrying out research and development functions which require the services of specially qualified personnel relating to cybersecurity and quantum information science and technology and such other areas of national research priorities as the Secretary, acting through the Director, may determine; and

(2) fix the rate of basic pay of any individual appointed under paragraph (1), at a rate not in excess of the basic rate of pay of the Vice President under section 104 of title 3, United States Code, without regard to title 5, United States Code.

(b) LIMITATION.—The Director may appoint not more than 10 individuals under subsection (a).

(c) SUNSET.—The authority under subsection (a) shall expire on the date that is 10 years after the date of enactment of this Act.

(d) OTHER TRANSACTION AUTHORITY.—Section 2(b)(4) of the National Institute of Standards and Technology Act (15 U.S.C. 272(b)(4)) is amended to read as follows:

''(4) to enter into and perform such contracts, including cooperative research and development arrangements and grants and cooperative agreements or other transactions, as may be necessary in the conduct of its work and on such terms as it may deem appropriate, in furtherance of the purposes of this Act;''.

SEC. 313. NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY FOUNDATION.

(a) IN GENERAL.—The Secretary of Commerce, acting through the Director, may establish or enter into an

agreement with a nonprofit organization to establish a National Institute of Standards and Technology Foundation. The Foundation shall not be an agency or instrumentality of the United States Government.

(b) PURPOSE.—The purpose of the Foundation shall be to support the National Institute of Standards and Technology in its mission.

(c) ACTIVITIES.—Activities of the Foundation may include the solicitation and acceptance of funds—

(1) to support international metrology and standards engagement activities;

(2) to conduct education and outreach activities; and

(3) to offer direct support to NIST associates, including through activities such as the provision of fellowships, grants, and occupational safety and awareness training.

(d) TRANSFER OF FUNDS.—The Director may authorize, under the agreement under subsection (a), the transfer of funds from the National Institute of Standards and Technology to the nonprofit organization to offset any administrative costs of the Foundation.

(e) LIABILITY.—The United States shall not be liable for any debts, defaults, acts, or omissions of the Founda-

tion. The full faith and credit of the United States shall not extend to any obligations of the Foundation.

SEC. 314. MEP OUTREACH.

Section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) is amended—

(1) in subsection (c)—

(A) in paragraph (6), by striking ''community colleges and area career and technical education schools'' and inserting the following: ''secondary schools (as defined in section 8101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801)), community colleges, and area career and technical education schools, including those in underserved and rural communities,''; and

(B) in paragraph (7)—

(i) by striking ''and local colleges'' and inserting the following: ''local high schools and local colleges, including those in underserved and rural communities,''; and

(ii) by inserting ''or other applied learning opportunities'' after ''apprenticeships''; and

(2) in subsection (d)(3), by striking '', community colleges, and area career and technical education schools,'' and inserting the following: ''and local high schools, community colleges, and area career and technical education schools, including those in underserved and rural communities,''.

SEC. 315. DEFINITIONS.

In this title:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Institute of Standards and Technology.

(2) FRAMEWORK.—The term ''Framework'' means the Framework for Improving Critical Infrastructure Cybersecurity developed by the National Institute of Standards and Technology and referred to in Executive Order 13800 issued on May 11, 2017 (82 Fed. Reg. 22391 et seq.).

(3) INSTITUTE.—The term ''Institute'' means the National Institute of Standards and Technology.

(4) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given such term in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

(5) NIST ASSOCIATE.—The term ''NIST associate'' means any guest researcher, research asso-

ciate, facility user, or volunteer who conducts research at a National Institute of Standards and Technology facility, but is not an employee of the National Institute of Standards and Technology or of another Federal department or agency.

(6) SECRETARY.—The term ''Secretary'' means the Secretary of Commerce.

TITLE IV—NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

SEC. 401. ESTABLISHMENT OF A TECHNOLOGY TRANSFER OFFICE.

(a) TECHNOLOGY TRANSFER OFFICE.—The Administrator shall establish a technology transfer office at the corporate agency level.

(b) TECHNOLOGY TRANSFER COORDINATOR.—The Administrator shall appoint a Technology Transfer Coordinator to be the principal advisor to the Administrator on all matters relating to technology transfer and commercialization and will serve as director of the technology transfer office.

(c) QUALIFICATIONS.—The Coordinator shall be an individual who, by reason of professional background and experience, is specially qualified to advise the Adminis-

trator on matters pertaining to technology transfer at the Agency.

(d) DUTIES OF THE COORDINATOR.—The Coordinator shall oversee—

(1) the expenditure of funds allocated for technology transfer within the Agency;

(2) efforts to improve research to operations within the Office of Oceanic and Atmospheric Research and other Agency line offices;

(3) efforts to engage private sector entities, including venture capital companies;

(4) efforts to engage State and local governments;

(5) coordinate efforts across the Agency; and

(6) facilitate knowledge transfer from Agency/Federal standards to commercial, State, and local governments.

(e) TECHNOLOGY TRANSFER RESPONSIBILITY.—Nothing in this section affects the technology transfer responsibilities of Federal employees under the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.).

(f) PLANNING AND REPORTING.—

(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Adminis-

trator shall submit to Congress a technology transfer execution plan.

(2) UPDATES.—Each year after the submission of the plan under paragraph (1), the Administrator shall submit to Congress an updated execution plan and reports that describe progress toward meeting goals set forth in the execution plan and the funds expended under subsection (e).

SEC. 402. TECHNOLOGY TRANSFER AND TRANSITIONS ASSESSMENT.

Not later than 1 year after the date of enactment of this Act, and annually thereafter, the administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report which shall include—

(1) report on the Agency's research to operations activities during the previous fiscal year; and

(2) recommended agency policy changes to increase research to operations activities in the coming fiscal year.

SEC. 403. NATIONAL MESONET PROGRAM.

(a) FINDINGS.—Congress finds that—

(1) since the initial establishment of a private-public partnership demonstration program, the Na-

tional Mesonet Program has leveraged data collected by existing weather station networks to—

(A) provide accurate, real-time observation for weather forecasters and emergency response personnel in metropolitan areas across the United States;

(B) address persistent impediments, identified in a National Academy of Sciences Report released in 2009, to fulfill the need for broader and denser weather observation networks to improve severe weather lead-times;

(C) achieve major improvements for the National Oceanic and Atmospheric Administration and the broader American Weather Enterprise, despite some significant development issues and cost overruns, according to a National Academy of Sciences Report released in 2011;

(D) increase the amount of non-Federal weather data available to government by orders of magnitude; and

(E) improve understanding of the impact, the size and duration of mesoscale weather events; and

(2) as a joint collaboration between the National Oceanic and Atmospheric Administration and the National Weather Service, the National Mesonet Program is a critical component of agency operations and provides reliable, real-time prediction and observation capabilities for the physical environment that enhances response and prevention strategies to severe weather events.

(b) PROGRAM.—The National Weather Service shall carry out the National Mesonet Program under law to improve understanding of and forecast capabilities for atmospheric events, placing priority on leveraging available commercial and other non-Federal weather data to enhance coordination across the private, public, and academic sectors of the American weather enterprise.

(c) PROGRAM ELEMENTS.—The program described in subsection (b) shall focus on the following activities:

(1) Improving the National Oceanic and Atmospheric Administration and the National Weather Service's ability to provide the baseline forecasts and warnings that protect the Nation's citizens, businesses, military, and government agencies and enable them to operate and perform in safe, efficient, and orderly manners.

(2) Yielding significant amounts of boundary-layer data to result in dramatic improvements in numerical weather prediction performance.

(3) Providing the critical technical and administrative infrastructure needed to facilitate rapid integration of new and emerging surface, boundary layer, and space-based networks anticipated in coming years.

(4) Leveraging existing networks of environmental monitoring stations to dramatically increase the quantity and density of weather observations available to the National Weather Service at a highly cost-effective price.

(5) Supporting the National Weather Service in reaching its target of a 30-minute warning time for severe weather through better predictive algorithms driven by increasingly effective observations.

(d) AUTHORIZATION OF APPROPRIATIONS.—Of amounts otherwise made available to the National Weather Service, there are authorized to carry out this section $25,000,000 for fiscal year 2021, $26,000,000 for fiscal year 2022, $27,000,000 for fiscal year 2023, $28,000,000 for fiscal year 2024, $29,000,000 for fiscal year 2025, and $30,000,000 for fiscal year 2026.

SEC. 404. SEVERE WEATHER EXTRAMURAL TESTBEDS.

(a) FINDINGS.—Congress finds the following:

(1) The Weather Research and Forecasting Innovation Act of 2017 instructs NOAA to prioritize improving weather data, modeling, computing, forecasting and warnings for the protection of life and property and for the enhancement of the national economy.

(2) The Weather Research and Forecasting Innovation Act of 2017 has also mandated that the NOAA Office of Oceanic and Atmospheric Research prioritize involving extramural partners to leverage existing public and private resources to expand and improve weather forecasting and modeling as quickly and efficiently as possible.

(3) There is a need for additional weather research and forecasting innovation given the increasing number of severe weather events and their increasing effect on public health, safety, and national and regional economic well-being.

(b) PROGRAM.—Not later than 180 days after the enactment of this Act, the Assistant Administrator for the Office of Oceanic and Atmospheric Research shall establish a program to create one or more weather research testbeds, hosted by extramural university based partners, to develop improved understanding of and forecast capa-

bilities for atmospheric events and their impacts. Resources for such testbeds shall not be taken from the existing NOAA cooperative institutes.

(c) PROGRAM ELEMENTS.—The program described in subsection (b) shall focus on the following activities:

(1) Improving the fundamental understanding of weather, including the boundary layer and other processes affecting high impact weather events.

(2) Improving the understanding of how the public receives, interprets, and responds to warnings and forecasts of high impact weather events that endanger life and property.

(3) Research and development, and transfer of knowledge, technologies, and applications to the National Weather Service and other appropriate agencies and entities, including the United States weather industry and academic partners.

(d) EXTRAMURAL RESEARCH.—

(1) IN GENERAL.—In carrying out the program under this section, the Assistant Administrator for Oceanic and Atmospheric Research shall collaborate with and support the non-Federal weather research community, which includes institutions of higher education, private entities, and nongovernmental organizations, by making funds available through com-

petitive grants, contracts, and cooperative agreements. Preference shall be given to applicants with significant expertise in severe weather research that are co-located with existing NOAA intramural weather related laboratories.

(2) EXTRAMURAL ACADEMIC PARTNERS.—Of the funds authorized in subsection (e), not less than 80 percent shall be dedicated to research of extramural academic partners.

(e) AUTHORIZATION OF APPROPRIATIONS.—For each of fiscal years 2021 and 2022, there are authorized out of funds appropriated to the National Oceanic and Atmospheric Administration, $10,000,000 to carry out the activities of this section.

SEC. 405. NEXT GENERATION DIGITAL RADAR.

(a) FINDINGS.—Congress finds that—

(1) the national weather radar network is aging, and procurement and replacement must begin by early in the decade commencing with the year 2030;

(2) research by the National Oceanic and Atmospheric Administration on next generation radar systems has largely focused on the development of a phased array radar for severe weather forecasting;

(3) a phased array radar system can achieve precise measurements of precipitation rates and conditions through a rapid scan of the atmosphere to reveal critical weather thumbprints that point to the potential of severe weather;

(4) though initially established through the joint collaboration between the Federal Aviation Administration and the National Oceanic and Atmospheric Administration, the potential for use of the phased array radar for severe weather observations has emerged as the focus;

(5) lifetime operations and maintenance costs will be significantly reduced due to the simple, digital process for updating the digital array radar system; and

(6) the National Oceanic and Atmospheric Administration must continue to conduct crucial technical risk reduction research to be ready for the next generation of radar networks.

(b) PROGRAM.—The Under Secretary of Commerce for Oceans and Atmosphere shall develop, in collaboration with the Assistant Administrators for Weather Services and Oceanic and Atmospheric Research, and utilizing NOAA's existing academic partners for implementation, a technical risk reduction program, that will lead to the

baseline requirements to procure an all-digital ground based phased array radar system for initial deployment by no later than 2032. At a minimum, such a program must demonstrate the ability to significantly improve the accuracy of severe weather forecasts while lowering long term Federal operating costs.

(c) PROGRAM ELEMENTS.—The program described in subsection (b) shall focus on the following activities:

(1) Definition of key system requirements needed to cost effectively lead to significantly improve weather forecasting accuracy and precision through a nationwide all-digital ground based phased array weather radar system.

(2) Identification of critical technologies and subsystems on the critical path to the development of an all-digital phased array system, and an investment schedule to reduce risk in each designated area.

(3) Development of a full-scale digital phased array radar demonstrator that will meet requirements set in paragraph (1).

(4) Development of a multi-year effort to strengthen ties between NOAA and its public university based academic partners so as to maintain an ongoing reservoir of science and technology talent to

help to guide and advise Federal program managers on the implementation and use of an all-digital phased array radar system.

(d) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts otherwise made available to the National Oceanic and Atmospheric Administration's Operations, Research, and Facilities Action, there are authorized to carry out this section $20,000,000 for each of fiscal years 2021 through 2025.

SEC. 406. FELLOWSHIPS.

(a) IN GENERAL.—To carry out the educational and training objectives of this Act, the Administrator shall support a program of weather fellowships for qualified individuals at the graduate and postgraduate level. The fellowships shall be related to meteorology, atmospheric science, space weather, and climatology and awarded pursuant to guidelines established by the Administrator.

(b) WEATHER FELLOWSHIP.—The Administrator may award weather fellowships to support the placement of individuals at the graduate level of education in fields related to meteorology, atmospheric science, space weather, and climatology within NOAA. A fellowship awarded under this subsection shall be for a period of not more than 1 year.

SEC. 407. AUTHORIZATION OF APPROPRIATIONS.

(a) FINDINGS.—Congress finds the following:

(1) The National Oceanic and Atmospheric Administration promotes United States science and innovation by providing weather forecasts, severe storm warnings, and climate monitoring that support and affect more than one-third of the national gross domestic product.

(2) The Office of Oceanic and Atmospheric Research provides science that enables better forecasts, earlier warnings for natural disasters, and a greater understanding of the Earth.

(3) The cutting-edge research conducted at OAR provides citizens, planners, and emergency managers reliable information that is critical to daily life.

(b) AUTHORIZATION OF APPROPRIATIONS.—Of amounts otherwise available to the National Oceanic and Atmospheric Administration, there are authorized to be appropriated for the Office of Oceanic and Atmospheric Research—

(1) $590,000,000 for fiscal year 2020;

(2) $655,555,555 for fiscal year 2021;

(3) $721,111,110 for fiscal year 2022;

(4) $786,666,665 for fiscal year 2023;

(5) $852,222,220 for fiscal year 2024;

(6) $917,777,775 for fiscal year 2025;

(7) $983,333,330 for fiscal year 2026;

(8) $1,048,888,885 for fiscal year 2027;

(9) $1,114,444,440 for fiscal year 2028; and

(10) $1,180,000,000 for fiscal year 2029.

TITLE V—NATIONAL SCIENCE FOUNDATION

SEC. 501. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2020.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $8,278,330,000 for fiscal year 2020.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $6,737,200,000 shall be made available for research and related activities;

(B) $940,000,000 shall be made available for education and human resources including—

(i) $75,000,000 for the Advanced Technical Education Program;

(ii) $313,500,000 for the Graduate Research Fellowship Program;

(iii) $67,000,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $68,750,000 for the CyberCorps Scholarship for Service Program;

(C) $243,230,000 shall be made available for major research equipment and facilities construction, of which $65,000,000 shall be for mid-scale projects;

(D) $336,900,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $16,500,000 shall be made available for the Office of the Inspector General.

(b) FISCAL YEAR 2021.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $9,422,160,000 for fiscal year 2021.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $7,824,000,000 shall be made available for research and related activities;

(B) $980,000,000 shall be made available for education and human resources including—

(i) $79,200,000 for the Advanced Technical Education Program;

(ii) $342,000,000 for the Graduate Research Fellowship Program;

(iii) $97,500,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $82,500,000 for the CyberCorps Scholarship for Service Program;

(C) $255,000,000 shall be made available for major research equipment and facilities construction, of which $90,000,000 shall be for mid-scale projects;

(D) $343,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $15,660,000 shall be made available for the Office of the Inspector General.

(c) FISCAL YEAR 2022.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $10,106,500,000 for fiscal year 2022.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $8,476,000,000 shall be made available for research and related activities;

(B) $1,005,000,000 shall be made available for education and human resources including—

(i) $85,800,000 for the Advanced Technical Education Program;

(ii) $370,500,000 for the Graduate Research Fellowship Program;

(iii) $113,750,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $96,250,000 for the CyberCorps Scholarship for Service Program;

(C) $255,000,000 shall be made available for major research equipment and facilities construction, of which $90,000,000 shall be for mid-scale projects;

(D) $350,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $16,000,000 shall be made available for the Office of the Inspector General.

(d) FISCAL YEAR 2023.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $10,790,800,000 for fiscal year 2023.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $9,128,000,000 shall be made available for research and related activities;

(B) $1,029,000,000 shall be made available for education and human resources including—

(i) $92,400,000 for the Advanced Technical Education Program;

(ii) $399,000,000 for the Graduate Research Fellowship Program;

(iii) $130,000,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $110,000,000 for the CyberCorps Scholarship for Service Program;

(C) $255,000,000 shall be made available for major research equipment and facilities construction, of which $90,000,000 shall be for mid-scale projects;

(D) $358,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $16,300,000 shall be made available for the Office of the Inspector General.

(e) FISCAL YEAR 2024.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $11,501,100,000 for fiscal year 2024.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $9,780,000,000 shall be made available for research and related activities;

(B) $1,050,000,000 shall be made available for education and human resources including—

(i) $99,000,000 for the Advanced Technical Education Program;

(ii) $427,500,000 for the Graduate Research Fellowship Program;

(iii) $132,600,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $112,200,000 for the CyberCorps Scholarship for Service Program;

(C) $285,000,000 shall be made available for major research equipment and facilities construction, of which $120,000,000 shall be for mid-scale projects;

(D) $365,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $16,600,000 shall be made available for the Office of the Inspector General.

(f) FISCAL YEAR 2025.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $12,182,500,000 for fiscal year 2025.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $10,432,000,000 shall be made available for research and related activities;

(B) $1,072,000,000 shall be made available for education and human resources including—

(i) $105,600,000 for the Advanced Technical Education Program;

(ii) $456,000,000 for the Graduate Research Fellowship Program;

(iii) $135,300,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $114,400,000 for the CyberCorps Scholarship for Service Program;

(C) $285,000,000 shall be made available for major research equipment and facilities con-

struction, of which $205,000,000 shall be for mid-scale projects;

(D) $372,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $17,000,000 shall be made available for the Office of the Inspector General.

(g) FISCAL YEAR 2026.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $12,863,800,000 for fiscal year 2026.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $11,084,000,000 shall be made available for research and related activities;

(B) $1,093,000,000 shall be made available for education and human resources including—

(i) $112,200,000 for the Advanced Technical Education Program;

(ii) $484,500,000 for the Graduate Research Fellowship Program;

(iii) $138,000,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $116,700,000 for the CyberCorps Scholarship for Service Program;

(C) $285,000,000 shall be made available for major research equipment and facilities construction, of which $225,000,000 shall be for mid-scale projects;

(D) $380,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $17,300,000 shall be made available for the Office of the Inspector General.

(h) FISCAL YEAR 2027.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $13,555,100,000 for fiscal year 2027.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $11,736,000,000 shall be made available for research and related activities;

(B) $1,115,000,000 shall be made available for education and human resources including—

(i) $118,800,000 for the Advanced Technical Education Program;

(ii) $513,000,000 for the Graduate Research Fellowship Program;

(iii) $140,700,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $119,000,000 for the CyberCorps Scholarship for Service Program;

(C) $295,000,000 shall be made available for major research equipment and facilities construction, of which $225,000,000 shall be for mid-scale projects;

(D) $387,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $17,600,000 shall be made available for the Office of the Inspector General.

(i) FISCAL YEAR 2028.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $14,237,500,000 for fiscal year 2028.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $12,388,000,000 shall be made available for research and related activities;

(B) $1,137,000,000 shall be made available for education and human resources including—

(i) $125,400,000 for the Advanced Technical Education Program;

(ii) $541,500,000 for the Graduate Research Fellowship Program;

(iii) $143,500,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $121,400,000 for the CyberCorps Scholarship for Service Program;

(C) $295,000,000 shall be made available for major research equipment and facilities construction, of which $225,000,000 shall be for mid-scale projects;

(D) $395,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $18,000,000 shall be made available for the Office of the Inspector General.

(j) FISCAL YEAR 2029.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $14,918,800,000 for fiscal year 2029.

(2) SPECIFIC ALLOCATION.—Of the amount authorized by paragraph (1)—

(A) $13,040,000,000 shall be made available for research and related activities;

(B) $1,158,000,000 shall be made available for education and human resources including—

(i) $132,000,000 for the Advanced Technical Education Program;

(ii) $570,000,000 for the Graduate Research Fellowship Program;

(iii) $146,400,000 for the Robert Noyce Teacher Scholarship Program; and

(iv) $123,800,000 for the CyberCorps Scholarship for Service Program;

(C) $295,000,000 shall be made available for major research equipment and facilities construction, of which $225,000,000 shall be for mid-scale projects;

(D) $403,000,000 shall be made available for agency operations and award management;

(E) $4,500,000 shall be made available for the Office of the National Science Board; and

(F) $18,300,000 shall be made available for the Office of the Inspector General.

SEC. 502. NSF ORGANIZATIONAL REVIEW.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) since its establishment in 1950, the National Science Foundation has been the gold standard for the world in funding basic science and engineering research;

(2) the National Science Foundation should continue to fund competitive, merit-reviewed basic research across all fields of science and engineering to achieve its statutory mission;

(3) scientific research has become increasingly interdisciplinary, crossing the boundaries of individual fields and the divisions and directorates of the National Science Foundation that support research grants; and

(4) as the nature of scientific research changes, it is important for the institutions that support science like the National Science Foundation, to periodically evaluate whether the organization needs to evolve to continue to fund the best science, the best scientists, and the most groundbreaking research.

(b) STUDY.—Not later than 60 days after the date of enactment of this Act, the Director shall contract with the National Academy of Public Administration (referred to in this section as the ''National Academy'') to conduct

a study on the organizational and management structure of the Foundation, to—

(1) evaluate and make recommendations for the structure of the Foundation's directorates, divisions, and offices of the Foundation to efficiently and effectively fund and oversee research grants and education and training programs;

(2) evaluate and make recommendations for any structural changes needed to improve the support for cross-disciplinary and trans-disciplinary research;

(3) evaluate and make recommendations for the long-term planning and development of research infrastructure projects; and

(4) make recommendations for the management of the Foundation's business practices, including personnel and financial management.

(c) REPORT TO CONGRESS.—Upon completion of the study under subsection (b), the Director shall transmit the study to Congress along with a summary of the Director's plans, if any, to implement the recommendations of the National Academy.

SEC. 503. ETHICS AND SECURITY PLANS.

(a) DEVELOPMENT OF ETHICS AND SECURITY POLICIES.—Not later than 6 months after the date of enact-

ment of this Act, the Director shall develop and implement a policy requiring that all proposals for research funding from the Foundation include, if applicable, a plan for managing the risk of any potential ethical or security implications resulting from such research.

(b) REQUIREMENTS.—The policy shall—

(1) include clear guidance of what constitutes ethical and security risks;

(2) include field specific guidance as appropriate, which may include biology, artificial intelligence, or cybersecurity;

(3) include mechanisms to ensure appropriate evaluation of the submitted ethical and security plans required under this section;

(4) include mechanisms to ensure that researchers comply with approved ethical and security plans; and

(5) to the extent practical be harmonized with existing ethical and security policies or requirements, including the Common Rule (Federal Policy for the Protection of Human Subjects, 45 CFR 690).

(c) LIMITATION.—The policy developed under subsection (a) shall not factor into award decisions unless deemed necessary by the merit review panel for each program.

SEC. 504. MAJOR RESEARCH INSTRUMENTATION UPDATE.

Section 7036(a) of the America COMPETES Act of 2007 (42 U.S.C. 1862o–14) is amended by striking ''The maximum award under the program shall be $4,000,000 except if the total amount appropriated for the program for a fiscal year exceeds $125,000,000, in which case the maximum amount of an award shall be $6,000,000'' and inserting ''The maximum amount of an award under the program shall be $6,000,000''.

SEC. 505. NSF MID-SCALE PROJECT INVESTMENTS.

(a) FINDINGS.—Congress finds the following:

(1) The Foundation funds major research facilities, infrastructure, and instrumentation that provide unique capabilities at the frontiers of science and engineering.

(2) Modern and effective research facilities, infrastructure, and instrumentation are critical to maintaining United States leadership in science and engineering.

(3) The costs of some proposed research instrumentation, equipment, and upgrades to major research facilities fall between programs currently funded by the Foundation, creating a gap between the established parameters of the Major Research Instrumentation and Major Research Equipment and Facilities Construction programs, including

projects that have been identified as cost-effective additions of high priority to the advancement of scientific understanding.

(4) The National Science Board in a 2018 report to Congress, ''Bridging the Gap: Building a Sustained Approach to Mid-scale Research Infrastructure and Cyberinfrastructure at NSF'' recommended funding mid-scale projects in the $20,000,000 to $70,000,000 range through the major research equipment and facilities program.

(b) MID-SCALE PROJECTS.—

(1) IN GENERAL.—The Foundation may fund mid-scale projects through the major research equipment and facilities construction program.

(2) PROJECT OVERSIGHT UPDATE.—Section 110 of the American Innovation and Competitiveness Act (42 U.S.C. 1862s–2) is amended by striking (g)(2) and inserting the following:

''(2) MAJOR MULTI-USER RESEARCH FACILITY PROJECT.—The term 'major multi-user research facility project' means a science and engineering construction or acquisition project that exceeds $100,000,000 in total project costs to the Foundation.''.

(c) DEFINITION OF MID-SCALE PROJECTS.—In this section, the term ''mid-scale projects'' means research instrumentation, equipment, and upgrades to major research facilities or other research infrastructure investments that exceed the maximum award funded by the major research instrumentation program and are below $100,000,000 total project cost.

SEC. 506. REPRODUCIBILITY IN SCIENCE.

(a) IN GENERAL.—The Director shall award grants, on a competitive basis, to institutions of higher education or nonprofit organizations (or a consortia thereof) to—

(1) support research and development of open source, usable tools and infrastructure that support reproducibility for a broad range of studies across different disciplines;

(2) support research on computational reproducibility, including the limits of reproducibility and the consistency of computational results in the development of new computation hardware, tools, and methods;

(3) support the education and training of students, faculty, and researchers on computational methods and tools to improve the quality of data and code to produce reproducible research; and

(4) support the education and training of students, faculty, and researchers on the knowledge, skills, and tools needed to conduct research that adheres to the highest scientific standard and to be able to clearly communicate methods and results accurately and appropriately to reflect the uncertainty involved in the research.

(b) DATA REPOSITORIES.—Not later than 12 months after the date of enactment of this Act, the Director of the National Science Foundation shall coordinate with the heads of other Federal science agencies to develop a set of criteria for trusted open repositories to be used by the scientific community in order to facilitate the transparent sharing and availability of data and code for federally funded research studies.

(c) DEFINITION OF REPRODUCIBILITY.—For the purposes of this section, the term ''reproducibility'' means obtaining consistent results using the same input data, computational steps, methods and code, and conditions of analysis.

SEC. 507. PUBLIC-PRIVATE PARTNERSHIPS.

(a) IN GENERAL.—The Director shall pursue partnerships with private industry, private foundations, and/or other appropriate private entities to—

(1) enhance the impact of the Foundation's investments and contributions to American economic competitiveness and security; and

(2) make available infrastructure, expertise, and financial resources to the United States scientific and engineering research and education enterprise.

(b) MERIT-REVIEW.—Nothing in this section shall be construed as altering any intellectual or broader impacts criteria at the Foundation for evaluating grant applications.

SEC. 508. EPSCOR.

(a) SENSE OF CONGRESS.—

(1) IN GENERAL.—It is the sense of Congress that—

(A) since maintaining the Nation's scientific and economic leadership requires the participation of talented individuals nationwide, EPSCoR investments into State research and education capacities that are in the Federal interest and should be sustained; and

(B) EPSCoR should maintain its experimental component by supporting innovative methods for improving research capacity and competitiveness.

(2) DEFINITION OF EPSCOR.—In this subsection, the term ''EPSCoR'' has the meaning given the term in section 502 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p note).

(b) UPDATE OF EPSCOR.—Section 517(f)(2) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–9(f)(2)) is amended—

(1) in subparagraph (A), by striking ''and'' at the end; and

(2) by adding at the end the following:

''(C) to increase the capacity of rural communities to provide quality STEM education and STEM workforce development programming to students, and teachers; and''.

SEC. 509. COMPUTING ENCLAVE PILOT PROGRAM.

(a) IN GENERAL.—The Director in consultation with the Director of the National Institute of Standards and Technology and the Secretary of Energy, shall award grants to establish a pilot program to ensure the security of federally supported research data and to assist regional institutions of higher education and their researchers in compliance with regulations regarding the safeguarding of sensitive information and other relevant regulations and Federal guidelines.

(b) STRUCTURE.—In carrying out the pilot program established pursuant to subsection (a), the Director shall select three institutions of higher education from among institutions classified under the Indiana University Center for Postsecondary Research Carnegie Classification as a doctorate-granting university with a very high level of research activity, and with a history of working with secure information for the development, installation, maintenance, or sustainment of secure computing enclaves.

(c) REGIONALIZATION.—

(1) In selecting universities pursuant to subsection (b), the Director shall give preference to institutions of higher education with the capability of serving other regional universities.

(2) The enclaves should be geographically dispersed to better meet the needs of regional interests.

(d) PROGRAM ELEMENTS.—The Director shall work with Institutions of Higher Education selected pursuant to subsection (b) to—

(1) develop an approved design blueprint for compliance with Federal data protection protocols;

(2) develop a comprehensive and confidential list, or a bill of materials, of each binary component of the software, firmware, or product that is re-

quired to deploy additional secure computing enclaves;

(3) develop templates for all policies and procedures required to operate the secure computing enclave in a research setting;

(4) develop a system security plan template; and

(5) develop a process for managing a plan of action and milestones for the secure computing enclave.

(e) DURATION.—The pilot program established pursuant to subsection (a) shall operate for not less than 3 years.

(f) REPORT.—

(1) IN GENERAL.—The Director shall report to Congress not later than 6 months after the completion of the pilot program under subsection (a).

(2) CONTENTS.—The report required under paragraph (1) shall include—

(A) an assessment of the pilot program under subsection (a), including an assessment of the security benefits provided by such secure computing enclaves;

(B) recommendations related to the value of expanding the network of secure computing enclaves; and

(C) recommendations on the efficacy of the use of secure computing enclaves by other Federal agencies in a broader effort to expand security of Federal research.

SEC. 510. DEFINITIONS.

In this title, unless expressly provided otherwise:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Science Foundation.

(2) FEDERAL SCIENCE AGENCY.—The term ''Federal science agency'' has the meaning given the term in section 103 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6623).

(3) FOUNDATION.—The term ''Foundation'' means the National Science Foundation.

(4) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given the term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).

TITLE VI—STEM WORKFORCE FOR THE 21ST CENTURY

SEC. 601. FINDINGS; SENSE OF CONGRESS.

(a) FINDINGS.—Congress finds the following:

(1) Many reports over the past decade have found that it is critical to our Nation's economic leadership and global competitiveness that the United States educates and trains more scientists and engineers.

(2) According to the National Science Board's Science and Engineering Indicators, the science and engineering workforce has grown faster over time than the workforce overall and now represents 5 percent of all United States jobs, with a median salary more than double that of non-science and engineering occupations.

(3) According to Bureau of Labor Statistics projections, the faster growth in STEM employment relative to overall employment is expected to continue, and the United States will need one million additional STEM professionals than it is on track to produce in the coming decade.

(4) A recent report by ACT, the scholastic testing service, found that only 20 percent of United States students in the 2016 ACT-tested high school graduating class were ready for first-year STEM college courses.

(5) Out of the 70 countries that participate in the Organisation for Economic Co-operation and De-

velopment's Programme for International Student Assessment, the United States ranks 25th in science and 40th in mathematics.

(6) The Federal Government spends over $3 billion annually on STEM education related research, programs and activities, but encouraging STEM education activities beyond the scope of the Federal Government is crucial to the future technical and economic competitiveness of the United States.

(b) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) the Nation's future economic and national security relies on building a STEM-capable workforce in order to remain competitive in the global economy, foster greater innovation, and provide a foundation for shared prosperity;

(2) the Federal Government plays a key role in developing and sustaining a STEM-capable workforce by working with stakeholders at all levels, including researchers, practitioners, industry, and State and local governments to support and promote evidence-based approaches;

(3) applying a more holistic view of the STEM workforce that moves beyond academic degrees and

occupations will highlight the contributions and opportunities for workers at all education levels;

(4) increasing the diversity and inclusion in the STEM workforce is needed to help address the STEM skills shortage;

(5) supporting an interdisciplinary approach to STEM learning, where academic concepts are coupled with real-world applications and students use STEM in contexts that make connections between school, community, work, and the wider world will improve outcomes for students in elementary, secondary and post-secondary education and for skilled technical workers in different career stages;

(6) leveraging private and nonprofit investments in STEM education will be essential to strengthening the Federal STEM portfolio; and

(7) coordinating STEM programs and activities across the Federal Government in order to limit duplication and engage stakeholders in STEM programs and related activities for which objective outcomes can be measured will bolster results of Federal STEM education programs, improve the return on taxpayers' investments in STEM education programs, and in turn strengthen the United States economy.

SEC. 602. ADVANCED TECHNICAL EDUCATION AND SKILLED TECHNICAL WORKFORCE.

(a) FINDINGS.—Congress finds the following:

(1) A National Academies of Science, Engineering, and Medicine report predicts a shortfall of nearly 3,400,000 skilled technical workers by 2022.

(2) The National Science Foundation's Advanced Technical Education program is critical to helping improve the training of the skilled technical workforce, with an emphasis on two-year Institutions of Higher Education (IHEs) and educating technicians for the high-technology fields that drive our nation's economy.

(3) The National Science Board's 2019 report on the skilled technical workforce called for strengthening partnerships between skilled technical workforce programs and business and industry.

(b) ADVANCED TECHNICAL EDUCATION PROGRAM UPDATE.—Section 3(b) of the Scientific and Advanced-Technology Act of 1992 (42 U.S.C. 1862i(b)) is amended to read as follows:

''(b) NATIONAL COORDINATION NETWORK FOR SCIENCE AND TECHNICAL EDUCATION.—The Director shall award grants to institutions of higher education, nonprofit institutions, associate-degree granting colleges

(or consortia thereof) to establish a network of centers for science and technical education. The centers shall—

''(1) coordinate research, training and education activities funded by awards under subsection (a) and share information and best practices across the network of awardees;

''(2) serve as national and regional clearinghouse and resource to communicate and coordinate research, training and educational activities across disciplinary, organizational, geographic and international boundaries and disseminate best practices; and

''(3) develop national and regional partnerships between K–12 schools, two-year colleges, institutions of higher education, workforce development programs, and industry to meet workforce needs.''.

(c) NSF PORTFOLIO REVIEW AND COORDINATION PLAN.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Director of the National Science Foundation shall conduct a full portfolio analysis of the Foundation's skilled technical workforce investments and develop a plan to improve coordination and collaboration of research and education investments and the communication

of those funding opportunities to the research and education community.

(2) SUBMISSION TO CONGRESS.—Not later than 180 days after the date of the review and development of the plan under paragraph (1) is complete, the Director of the National Science Foundation shall submit to Congress and make widely available to the public a summary of the portfolio review and plan.

SEC. 603. GRADUATE RESEARCH FELLOWSHIP PROGRAM UPDATE.

(a) FINDINGS.—Congress finds the following:

(1) The National Science Foundation Graduate Research Fellowship Program is the nation's oldest fellowship program that directly supports American graduate students in various STEM fields and is a model for training the best innovators in the United States.

(2) Since 1952, NSF has funded over 50,000 Graduate Research Fellowships out of more than 500,000 applicants, 42 Fellows have gone on to become Nobel laureates, and more than 450 have become members of the National Academy of Sciences.

(3) Foreign nations are increasingly investing in foreign talent programs to compete with the United States.

(b) SENSE OF CONGRESS.—It is the sense of Congress that the National Science Foundation should grow the number of new graduate research fellows supported annually over the next 10 years to no less than 2,500 fellows.

(c) PROGRAM UPDATE.—Section 10 of the National Science Foundation Act of 1950 (42 U.S.C. 1869) is amended—

(1) in subsection (a), by inserting ''and as will address national workforce demand in critical STEM fields'' after ''throughout the United States'';

(2) in subsection (b), by striking ''of $12,000'' and inserting ''sufficient to cover full tuition and mandatory fees''; and

(3) by adding at the end the following:

''(c) OUTREACH.—The Director shall ensure program outreach to recruit fellowship applicants from fields of study that are in areas of critical national need, from all regions of the country, and from historically underrepresented populations in STEM.''.

SEC. 604. ROBERT NOYCE TEACHER SCHOLARSHIP PROGRAM SENSE OF CONGRESS.

It is the sense of Congress that—

(1) the Robert Noyce Teacher Scholarship Program plays an important role in supporting the development and dissemination of evidence-based teacher preparation models and the recruitment, preparation, and retention of STEM educators;

(2) the Robert Noyce Teacher Scholarship Program improves recruitment of underrepresented and STEM-trained students into teaching, encourages teachers to work in high-need areas, and can improve relationships between teacher preparation programs and industry; and

(3) the Robert Noyce Teacher Scholarship Program which currently supports between 1,000 to 1,500 new math and science teachers a year, including in high-need districts should be doubled over the next ten years to meet the growing demand for STEM capable educators.

TITLE VII—ANTARCTIC SCIENCE AND CONSERVATION MODERNIZATION

Subtitle A—Antarctic Nongovernmental Activity Preparedness Act

SEC. 701. CONGRESSIONAL FINDINGS AND DECLARATION OF PURPOSE.

(a) FINDINGS.—The Congress finds that—

(1) for over half a century, scientific investigation and environmental protection has been the principal activity of the Federal Government and United States citizens in Antarctica;

(2) the National Science Foundation funds and manages the United States Antarctic Program, the national program of scientific research in Antarctica, together with associated logistical support activities, infrastructure, as well as broad environmental stewardship responsibilities in Antarctica;

(3) land- and ship-borne tourism in Antarctica, including tourism that United States-based companies organize or originate, continues to increase at a significant rate;

(4) achievement of the United States Antarctic Program scientific objectives requires the full com-

mitment of the operational and logistics capabilities of the Program;

(5) long-standing United States policy regarding private non-governmental expeditions to Antarctica has been not to offer support or other services to private expeditions in Antarctica, and, instead, to encourage complete operational and financial self-sufficiency on the part of non-governmental expeditions to Antarctica;

(6) in limited emergency situations the United States may attempt, at its discretion and in accordance with international law and humanitarian principles, the rescue of private individuals provided that no unacceptable risks are posed to United States personnel and the rescue can be accomplished by the United States within locally available means;

(7) increased tourism and other non-governmental activities could result in additional health and safety, search and rescue, medical care and evacuation costs. These costs could increase the financial burden on the United States Antarctic Program, increase the risks to the safety of those involved in search and rescue, and jeopardize scientific objectives through the diversion of resources; and

(8) in recognition of the growing potential for additional costs to be imposed on national Antarctic programs, the Antarctic Treaty Consultative Parties, including the United States, adopted Measure 4 (2004), ''Insurance and Contingency Planning for Tourism and Non-Governmental Activities in the Antarctic Treaty Area''. Measure 4 (2004), after it takes effect, will require the Parties to impose operational and financial self-sufficiency requirements on non-governmental persons organizing expeditions to Antarctica organized in or proceeding from their country.

(b) PURPOSE.—The purpose of this subtitle is to implement Measure 4 (2004), ''Insurance and Contingency Planning for Tourism and Non-Governmental Activities in the Antarctic Treaty Area''.

SEC. 702. DEFINITIONS.

For purposes of this subtitle:

(1) The term ''Antarctica'' means the area south of 60 degrees south latitude.

(2) The term ''Director'' means the Director of the National Science Foundation.

(3) The term ''expedition'' means an activity undertaken by one or more non-governmental persons organized within or proceeding from the United

States to or within Antarctica for which advance notification is required under Paragraph 5 of Article VII of the Antarctic Treaty. The term ''expedition'' does not include fishing activities or the operation of fishing vessels.

(4) The term ''person'' has the meaning given that term in section 1 of title 1, United States Code, and includes any person subject to the jurisdiction of the United States except that the term does not include any department, agency, or other instrumentality of the Federal Government.

SEC. 703. OBLIGATION OF PERSONS ORGANIZING EXPEDITIONS TO PREPARE CONTINGENCY PLANS AND OBTAIN INSURANCE.

(a) Persons organizing expeditions shall—

(1) prepare and establish appropriate contingency plans and sufficient arrangements for health and safety, search and rescue, medical care and evacuation of persons engaged in an expedition;

(2) obtain adequate insurance or other financial arrangements to cover all costs associated with search and rescue and medical care and possible evacuation of any persons engaged in an expedition; and

(3) establish or obtain the contingency plans, arrangements and insurance or other financial arrangements referred to in this subsection prior to the date on which an expedition commences.

(b) The contingency plans and other arrangements referred to in subsection (a) shall not rely on support from national Antarctic programs or other agencies of governments conducting research or other activities in Antarctica without their express written agreement.

SEC. 704. CERTIFICATION OF COMPLIANCE.

(a) Persons organizing expeditions shall submit to the Director a written certification that confirms its compliance with the requirements of section 703 of this subtitle, including a statement that all such plans, arrangements and insurance or other financial arrangements meet all applicable international and domestic legal and regulatory requirements as well as clearly established industry standards.

(b) Any certification filed pursuant to subsection (a) of this section shall contain an acknowledgment that any knowing and willful false statement made in such certification is punishable under section 1001 of title 18, United States Code, by fine or imprisonment of not more than 5 years, or both. The Director may refer potential viola-

tions of section 1001 of such title to the Department of Justice for criminal prosecution, as appropriate.

SEC. 705. COSTS AND ADMINISTRATIVE FEES.

(a) If any person organizing an expedition receives any services covered by this subtitle from any department, agency, or instrumentality of the Federal Government, or contractors working in support of such entities, absent an express written agreement for such services with the National Science Foundation, the Director may assess the costs, direct and indirect, of any such services incurred by the National Science Foundation, its contractors, or other department, agency or instrumentality of the Federal Government, including all reasonable attorney's fees and costs associated with the collection of such sums. The Director may request the Attorney General to initiate a civil action for the recovery of such costs. The National Science Foundation is authorized to retain all monies collected pursuant to this subsection and shall distribute such monies to any department, agency or instrumentality of the Federal Government to the extent non-reimbursed costs were actually incurred by those entities. Such monies shall remain available for expenditure, without further appropriation, until expended.

(b) Beginning in fiscal year 2014 and thereafter, the Director may establish, modify, charge, and collect admin-

istrative fees for the administration of the requirements of this subtitle. The National Science Foundation is authorized to retain all monies collected pursuant to this section. Such monies shall remain available for expenditure, without further appropriation, until expended.

SEC. 706. FOREIGN EXPEDITIONS.

A person organizing an expedition shall not be required to comply with the provisions of this subtitle if the Secretary of State determines at any time, in writing, that another Party to the Antarctic Treaty has jurisdiction over that expedition and is exercising its authority with regard to that expedition. However, to the extent the National Science Foundation, its contractors, or other department, agency or instrumentality of the Federal Government incurs direct or indirect costs relating to services covered by this subtitle for an expedition, those costs remain recoverable against persons subject to the jurisdiction of the United States pursuant to section 705.

SEC. 707. CIVIL PENALTIES.

(a) ASSESSMENT OF PENALTIES.—Any person organizing an expedition that the Director determines, after notice and an opportunity for a hearing, to have failed to comply with the requirements of this subtitle, or its implementing regulations, shall be liable to the United States for a civil penalty. The amount of the civil penalty shall

not exceed $125,000 for each violation unless the prohibited act was knowingly committed, in which case the amount of the civil penalty shall not exceed $250,000 for each violation. Each day an expedition remains in Antarctica without complying with the requirements of this subtitle shall constitute a separate offense for penalty purposes. The amount of any civil penalty shall be assessed by the Director by written notice. Any civil penalty assessed under this subsection may be remitted or mitigated by the Director.

(b) HEARINGS.—Hearings for the assessment of civil penalties under subsection (a) shall be conducted in accordance with section 554 of title 5, United States Code. For the purposes of conducting any such hearing, the Director may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and may administer oaths. Witnesses summoned shall be paid the same fees and mileage that are paid to witnesses in the courts of the United States. In case of contumacy or refusal to obey a subpoena served upon any person pursuant to this subsection, the district court of the United States for any district in which such person is found, resides, or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring

such person to appear and give testimony before the Director or to appear and produce documents before the Director, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(c) REVIEW.—Upon the failure of any person against whom a civil penalty is assessed under subsection (a) of this section to pay such penalty, the Director may request the Attorney General to institute a civil action in a district court of the United States for any district in which such person is found, resides, or transacts business to collect the penalty and such court shall have jurisdiction to hear and decide any such action. The court shall hear such action on the record made before the Director and shall sustain the decision of the Director if it is supported by substantial evidence on the record considered as a whole.

(d) PENALTIES UNDER OTHER LAWS.—The assessment of a civil penalty under subsection (a) of this section for any act shall not be deemed to preclude the assessment of a civil penalty for such act under any other law.

SEC. 708. REGULATIONS.

The Director may prescribe such regulations as may be appropriate to implement and enforce the provisions of this subtitle.

SEC. 709. EFFECTIVE DATE.

This subtitle shall take effect 180 days after enactment.

Subtitle B—Antarctic Environmental Liability Act of 2020

SEC. 711. SHORT TITLE.

This subtitle may be cited as the ''Antarctic Environmental Liability Act of 2020''.

SEC. 712. PURPOSE.

The purpose of this subtitle is to implement Annex VI to the Protocol on Environmental Protection to the Antarctic Treaty, ''Liability Arising From Environmental Emergencies''.

SEC. 713. IMPLEMENTING AMENDMENTS.

(a) IN GENERAL.—The Antarctic Conservation Act of 1978 (16 U.S.C. 2401 et seq.) is amended—

(1) in section 3, by striking ''and'' at the end of paragraph (22), striking the period at the end of paragraph (23) and inserting a semicolon, and by adding at the end the following:

''(24) the term 'Annex VI' means Annex VI to the Protocol on Environmental Protection to the Antarctic Treaty, Liability Arising From Environmental Emergencies;

''(25) the term 'environmental emergency' means any event that occurs after the entry into

force of Annex VI, and that results in, or imminently threatens to result in, any significant and harmful impact on the Antarctic environment;

''(26) the term 'nongovernmental operator' means any operator other than a governmental operator or a contractor or subcontractor acting on behalf of any governmental operator;

''(27) the term 'operator' means any person who organizes activities (including tourist activities) in the United States to be carried out in Antarctica, and any person who organizes activities (including tourist activities) in a country other than the United States to be carried out in Antarctica if such person has its principal place of business or habitual place of residence in the United States, or is incorporated in the United States, except that the term operator does not include—

''(A) an individual who is an employee, contractor, subcontractor, or agent of, or who is in the service of, a person who organizes activities to be carried out in Antarctica;

''(B) a contractor or subcontractor acting on behalf of any governmental operator; or

''(C) any person who organizes only fishing activities to be carried out in Antarctica;

''(28) the term 'reasonable', as applied to 'preventative measures' and 'response action', means measures or actions which are appropriate, practicable, proportionate and based on the availability of objective criteria and information, including—

''(A) risks to the Antarctic environment, and the rate of its natural recovery;

''(B) risks to human life and safety; and

''(C) technological and economic feasibility; and

''(29) the term 'response action' means reasonable measures taken after an environmental emergency has occurred to avoid, minimize or contain the impact of that environmental emergency, which to that end may include clean-up in appropriate circumstances, and includes determining the extent of that emergency and its impact, except that for purposes of this Act, the definition of 'response' contained in section 101(25) of the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601(25)) shall not apply.'';

(2) by inserting after section 4A the following:

"SEC. 4B. PREVENTATIVE MEASURES.

"(a) Operators shall undertake reasonable preventative measures that are designed to reduce the risk of environmental emergencies and their potential adverse impact.

"(b) Such preventative measures may include—

"(1) specialized structures or equipment incorporated into the design and construction of facilities and means of transportation;

"(2) specialized procedures incorporated into the operation or maintenance of facilities and means of transportation; and

"(3) specialized training of personnel.

"SEC. 4C. CONTINGENCY PLANS.

"(a) Operators shall—

"(1) establish contingency plans for responses to incidents with potential adverse impacts on the Antarctic environment or dependent and associated ecosystems; and

"(2) cooperate in the formulation and implementation of such contingency plans.

"(b) Such contingency plans shall include, when appropriate, the following components:

"(1) procedures for conducting an assessment of the nature of the incident;

"(2) notification procedures;

''(3) identification and mobilization of resources;

''(4) response plans;

''(5) training;

''(6) recordkeeping; and

''(7) demobilization.

''SEC. 4D. RESPONSE ACTION.

''An operator shall take prompt and effective response action to environmental emergencies arising from the activities of that operator.'';

(3) by inserting after section 6 the following:

''SEC. 6A. LIABILITY OF NONGOVERNMENTAL OPERATORS.

''(a) LIABILITY.—Whenever, on the basis of information available to it, a Government of a State Party to Annex VI, other than the United States—

''(1) finds that a nongovernmental operator has failed to take prompt and effective response action to an environmental emergency arising from that operator's activities, as required by section 4D, and

''(2) said Government takes a response action to that environmental emergency, such Government may bring a civil action against that operator to recover the costs of such response action in an appropriate district court in accordance with section 12.

Any such operator found to have violated the requirements of section 4D shall be liable to pay to that Government the costs of the response action taken by such Government.

''(b) FAILURE TO COMPLY.—Failure of a Government to comply with the provisions of Article 5, paragraphs 3, 4, or 5 of Annex VI shall not be a defense to liability under this section.

''(c) STRICT LIABILITY.—Liability pursuant to subsections (a), (e), (k), and (l) shall be strict.

''(d) JOINT LIABILITY.—When an environmental emergency arises from the activities of two or more nongovernmental operators, they shall be jointly and severally liable under subsection (a), (k), or (l), except that an operator which establishes that only part of the environmental emergency resulted from its activities shall be liable in respect of that part only.

''(e) CLAIMS.—Any nongovernmental operator may seek contribution from any other nongovernmental operator that is liable or potentially liable under section 2406 of this title. Such claims shall be brought in accordance with this section and the Federal Rules of Civil Procedure, and shall be governed by Federal law. In resolving contribution claims, the court may allocate response costs among liable parties using such equitable factors as the

court determines are appropriate. Nothing in this subsection shall diminish the right of any person to bring an action for contribution in the absence of a civil action under subsection (a), (k), or (l) of section 7.

"(f) PERIOD IN WHICH ACTIONS MAY BE BROUGHT.—

"(1) RESPONSE PERIOD.—An action under section 7(a) or (k) of this title must be commenced within three years of the commencement of the response action or within three years of the date on which the Government bringing the action knew or ought reasonably to have known the identity of the nongovernmental operator, whichever is later. In no event shall an action against a nongovernmental operator be commenced later than 15 years after the commencement of the response action.

"(2) COST RECOVERY PERIOD.—An action under section 7(e) of this title for contribution toward costs incurred pursuant to section 7(a) or (b) must be commenced within three years of the date of judgment in any action under section 7(a) or (k) for recovery of such response costs or in the absence of such an action, within three years of the date that the person seeking contribution knew or ought rea-

sonably to have known the identity of the nongovernmental operator.

''(3) COST CONTRIBUTION PERIOD.—An action under section 7(e) for contribution toward response costs assessed pursuant to section 7(l) must be commenced within three years of the date of the assessment or within three years of the date of any judgment under subsection 7(l)(vii), whichever is later.

''(g) LIABILITY COST LIMIT.—The maximum amount for which each nongovernmental operator may be liable for the costs of response actions under sections 7(a), 7(k), or 7(l), in respect of each environmental emergency, shall be as follows:

''(1) For an environmental emergency arising from an event involving a ship:

''(A) one million SDR for a ship with a tonnage not exceeding 2,000 tons; and

''(B) for a ship with a tonnage in excess of 2,000 tons, the following amount in addition to that referred to in subparagraph (A):

''(i) for each ton from 2,001 to 30,000 tons, 400 SDR;

''(ii) for each ton from 30,001 to 70,000 tons, 300 SDR; and

"(iii) for each ton in excess of 70,000 tons, 200 SDR.

"(2) For an environmental emergency arising from an event which does not involve a ship, three million SDR.

"(3) For the purposes of this subsection:

"(A) 'ship' means a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms;

"(B) 'SDR' means the Special Drawing Rights as defined by the International Monetary Fund; and

"(C) a ship's tonnage shall be the gross tonnage calculated in accordance with the tonnage measurement rules contained in Annex I of the International Convention on Tonnage Measurement of Ships, 1969.

"(h) EXCEPTION.—Notwithstanding the provisions of subsection (g), liability shall not be limited if it is proved that the environmental emergency resulted from an act or omission of the operator, committed with the intent to cause such emergency, or recklessly and with knowledge that such emergency would probably result.

''(i) EXCEPTION.—A nongovernmental operator shall not be liable pursuant to subsection (a), subsection (e), subsection (k), or subsection (l) if it proves that the environmental emergency was caused by—

''(1) an act or omission necessary to protect human life or safety;

''(2) an event constituting in the circumstances of Antarctica a natural disaster of an exceptional character, which could not have been reasonably foreseen, either generally or in the particular case, provided all reasonable preventative measures were taken that are designed to reduce the risk of environmental emergencies and their potential adverse impact;

''(3) an act of terrorism by some other person or entity; or

''(4) an act of belligerency by some other person or entity against the activities of the operator.

''(j) INSURANCE REQUIREMENT.—Nongovernmental operators shall maintain adequate insurance or other financial security, such as the guarantee of a bank or similar financial institution, to cover liability under section 7 of this title up to the limits set forth in subsection (g).

''(k) CIVIL ACTION.—Whenever, on the basis of information available to it, a department, agency or other in-

strumentality of the United States (i) finds that a nongovernmental operator has failed to take prompt and effective response action to an environmental emergency arising from its activities, as required by section 4D, and (ii) takes a response action to that environmental emergency, such department, agency or other instrumentality may request the Attorney General to bring a civil action to recover the costs of such response action in an appropriate district court in accordance with section 12 of this title. Any such operator found to have violated the requirements of section 4D shall be liable to the United States for the costs of the response action taken by said department, agency or instrumentality. The department, agency, or other instrumentality of the United States that takes a response action under this subsection, or section 9(a), is authorized to retain, in its budget, the monies collected pursuant to this subsection. Such monies shall remain available for expenditure, without further appropriation, until expended by that department, agency or other instrumentality.

''(l) NOTIFICATION.—Upon notice that a nongovernmental operator has failed to take prompt and effective response action to an environmental emergency arising from its activities, as required by section 4D, and no re-

sponse action was taken by any Party to the Protocol, the following procedures shall be followed:

''(1) The Director, after notice and opportunity for a hearing in accordance with subsection (l)(ii), shall assess the cost of the response action that should have been taken and may assess the reasonable costs incurred by the United States under this subsection to determine that cost. The Director is authorized to promulgate regulations to implement this subsection.

''(2) Hearings for the assessment of the costs under subsection (l)(i) shall be conducted in accordance with section 554 of title 5, United States Code. For the purposes of conducting any such hearing, the Director may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and may administer oaths. Witnesses summoned shall be paid the same fees and mileage that are paid to witnesses in the courts of the United States. In case of contumacy or refusal to obey a subpoena served upon any person pursuant to this subsection, the district court of the United States for any district in which such person is found, resides, or transacts business, upon application by the United States and after notice to

such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Director or to appear and produce documents before the Director and any failure to obey such order of the court may be punished by such court as a contempt thereof.

''(3) Response action costs assessed pursuant to this section shall reflect, as much as possible, the costs of the response action that should have been taken and the maximum recovery amount of those costs shall be as set forth in subsection (g). Further, the assessment of response action costs pursuant to this section shall not be deemed to preclude the assessment of additional civil or criminal penalties for violations of any other provision of this Chapter or any other law.

''(4) At the request of the Director, and with the concurrence of the Secretary of the Department in which the Coast Guard is operating, the Commandant of the Coast Guard shall—

''(A) render, on a non-reimbursable basis, such assistance that the Director may require, necessary to assess the cost of response action that should have been taken in the case of an environmental emergency caused by the opera-

tor's ship-based activities, including any determination concerning the underlying response activity; and

"(B) conduct, on a non-reimbursable basis, an investigation or an evidentiary hearing, necessary to assess the cost of the response action that should have been taken in the case of an environmental emergency caused by the operator's ship-based activities, including any determination concerning the underlying response activity and to submit to the Director proposed findings of fact and recommendations for adjudication by the Director.

"(5) With regard to any investigation or evidentiary hearing conducted pursuant to clause (iv), the Director is authorized to delegate, to the Commandant, the authority, set forth in clause (ii), to issue subpoenas and administer oaths, and to pay fees and mileage. In case of contumacy or refusal to obey a subpoena served upon any person pursuant to this clause, the district court of the United States for any district in which such person is found, resides, or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such

person to appear and give testimony before the agency head or to appear and produce documents before the agency head, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

''(6) The Director shall not commence an administrative proceeding in accordance with clauses (i) and (ii) of this section later than 15 years after the United States Government becomes aware of the environmental emergency.

''(7) Upon the failure of any operator against whom costs have been assessed under this section to pay such costs, the Director may request the Attorney General to institute a civil action in a district court of the United States for any district in which such person is found, resides, or transacts business to collect the costs and such court shall have jurisdiction to hear and decide any such action. The court shall hear such action on the record made before the Director pursuant to this section and shall sustain the Director's decision if it is supported by substantial evidence on the record considered as a whole.

''(m) FEES.—Any monetary recovery under subsections (a), (k) and (l) shall, in addition, include all reasonable attorney's fees and costs.

''(n) ARTICLE 12 FUND.—An amount equal to the amount recovered pursuant to section (1) for the cost of the response action that should have been taken shall be forwarded to the fund established pursuant to Article 12 of Annex VI.

''(o) EXPENDITURE.—To the extent the department, agency, or other instrumentality of the United States retains monies collected pursuant to this section, such entity is authorized to retain, in its budget, the monies collected pursuant to this section. Such monies shall remain available for expenditure, without further appropriation, until expended by that department, agency or other instrumentality of the United States.'';

(4) in section 6—

(A) in subsection (a)—

(i) by striking ''Annex II and Annex V'' and inserting ''Annex II, Annex V and Annex VI''; and

(ii) by striking ''including sections 4(b)(2), (3), (4) and (5)'' and inserting ''including section 3, section 4(b)(2), (3),

(4) and (5), section 4D and section 7''; and

(B) in subsection (b), by striking ''to implement Annex IV to the Protocol and the provisions of this Act which implement that Annex'' and inserting ''to implement Annex IV and ship-based matters under Annex VI to the Protocol and the provisions of this Act which implement these Annexes'';

(5) in section 9—

(A) in subsection (a) by adding ''other than a Federal department, agency or instrumentality'' after ''person''; and

(B) by striking ''$5,000'' and inserting ''$10,000'';

(6) in section 11—

(A) by striking the section heading and inserting ''**JURISDICTION OF FEDERAL COURTS; VENUE, REVIEW OF REGULATIONS; SERVICE OF PROCESS**'';

(B) by inserting ''(a) U.S. DISTRICT COURTS.—'' before ''The district courts of the United States shall have exclusive jurisdiction over any case or controversy arising under the provisions of this chapter or of any regulation

prescribed, or permit issued, under this chapter.''; and

(C) by adding the following subsections at the end of the section:

''(b) JURISDICTION.—An action by any Government of a State Party to Annex VI, including the United States, against any person subject to legal action under this chapter may be brought only in a district court in a jurisdiction where such person is located or resides or is doing business. A claim for contribution by a nongovernmental operator under section 2406(e) of this title may be brought in any district in which the defendant resides, may be found, or has his principal office.

''(c) LIMITATION.—In any action brought under section 2406 of this title, process may be served in any district where the defendant is found, resides, transacts business, or has appointed an agent for the service of process.''.

SEC. 714. EFFECTIVE DATE.

This subtitle and the amendments made by this subtitle shall take effect upon the entry into force of Annex VI, except that the amendments made by subsections (f) and (g) of section 713 shall take effect immediately upon the enactment of this Act.

TITLE VIII—TECHNOLOGY TRANSFER AND INNOVATION

SEC. 801. FEDERAL LABORATORY COMPUTER PROGRAMS UPDATE.

(a) UTILIZATION OF FEDERAL TECHNOLOGY UPDATE.—Section 11 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710) is amended by adding at the end the following:

''(j)(1) COPYRIGHT PROTECTION.—Pursuant to section 105(b)(1) of title 17, United States Code, and subject to the requirements therein, the director of any Government-operated Federal laboratory may seek copyright protection on behalf of the United States in a work described in that section.

''(2) GUIDELINES.—The Secretary is authorized to provide guidelines to implement paragraph (1) of this section and to provide guidance for the management of works in which copyright protection is obtained.''.

(b) GOVERNMENT WORKS COPYRIGHT UPDATE.—Section 105 of title 17, United States Code, is amended—

(1) by striking ''Copyright protection'' and inserting ''(a) Copyright protection''; and

(2) by adding at the end the following:

''(b) Notwithstanding subsection (a), copyright protection under this title is available for—

''(1) a computer program that is a work of the United States Government and is created at a Federal laboratory, as defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703), and which is a result of research, development, or engineering at the Federal laboratory, provided that the United States Government makes application for copyright registration under section 409 pursuant to the authority granted under section 11(k) of such Act within 6 months from employee disclosure of the work to the Federal laboratory, and provided further that a certificate of registration is issued pursuant to section 410 of this title or following judicial review pursuant to chapter 7 of title 5; and

''(2) standard reference data prepared or made available by the Department of Commerce, provided the copyright is secured by the Secretary of Commerce in the manner set forth in section 6 of the Standard Reference Data Act (15 U.S.C. 290e).''.

SEC. 802. EXTEND CRADA INFORMATION PROTECTION PERIOD.

Section 12(c)(7)(B) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C.

3710a(c)(7)(B)) is amended by striking ''5'' and inserting ''12''.

SEC. 803. STEVENSON-WYDLER ACT AUTHORITY UPDATE.

Section 11 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710(g)) is amended to read as follows:

''(g) FUNCTIONS OF SECRETARY.—The Secretary shall convene an Interagency Working Group for Technology Transfer comprising those agencies with at least one Federal laboratory to—

''(1) share best practices for realizing the commercial potential of inventions and methods and options for commercialization which are available to the Federal laboratories, including research and development limited partnerships and cooperative research and development agreements; and

''(2) issue such guidelines as may be necessary to carry out this chapter, acting through the Director of the National Institute of Standards and Technology and with the concurrence of the Interagency Working Group for Technology Transfer.''.

SEC. 804. ROYALTY PAYMENTS TO FEDERAL EMPLOYEES UPDATE.

Section 14 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710c) is amended—

(1) by striking ''inventions'' each place the term appears and inserting ''inventions and other intellectual property'';

(2) by striking ''invention'' each place the term appears and inserting ''invention or other intellectual property'';

(3) by striking ''inventors'' each place the term appears and inserting ''inventors or contributors'';

(4) in subsection (a)(1) after ''shall be'' inserting ''non-appropriated funds and shall be'';

(5) in subsection (a)(1)(A)(i) inserting at the end '', or to the contributor or co-contributors if a certificate of copyright registration is issued to the United States'';

(6) in subsection (a)(1)(A)(ii) after ''inventor of'' inserting ''or contributor to'';

(7) in subsection (a)(3) by striking ''inventor'' each place the term appears and inserting ''inventor or contributor'';

(8) in subsection (a)(3) by striking ''$150,000'' each place the term appears and inserting ''500,000'';

(9) at the end of subsection (a) by inserting the following new paragraph:

''(5) Any royalties or other payments received by a Federal agency from the licensing and assignment of works under agreements entered into by Federal laboratories under section 12 of this Act, and from the licensing of works by Federal laboratories under any provision of law shall be retained by the agency licensing or assigning the work on behalf of the United States Government and shall be disposed of after payment of any copyright registration cots. The head of the agency is authorized to dispose of such royalties or other payments through transfer by the agency to its bureaus or laboratories, with the majority share of the royalties or other payments from any copyright going to the bureau or laboratory where or for which the copyrighted work was made.

''(A) The royalties or other payments so transferred to any bureau or laboratory may be used or obligated by that bureau or laboratory during the fiscal year in which they are received or during the 2 succeeding fiscal years—

''(i) to reward contributors of copyrighted computer programs;

''(ii) to further information exchange among bureaus and laboratories of the agency or with another agency;

''(iii) for education and training of employees consistent with the missions and objectives of the agency, bureau, or laboratory;

''(iv) for payment of expenses incidental to the administration and licensing of intellectual property by the agency or laboratory with respect to copyrighted computer programs made at that bureau or laboratory, including the fees or other costs for the services of other agencies, persons, or organizations for intellectual property management and licensing services; or

''(v) for scientific research and development consistent with the research and development missions and objectives of the bureau or laboratory.

''(B) All royalties or other payments retained by the agency, bureau, or laboratory after payments have been made pursuant to subparagraph (A) that is unobligated and unexpended at the end of the second fiscal year succeeding the fiscal year in which the royalties and other payments were received shall be paid into the Treasury.

''(C) As used in the section, the term 'contributor' means a laboratory employee who is a creator

of an original expression in a copyrighted computer program.''; and

(10) in subsection (a)(1)(B)—

(A) by striking ''; or'' at the end of clause (iv) and inserting a semicolon;

(B) by striking the period at the end of clause (v) and inserting ''; or''; and

(C) by inserting at the end the following:

''(vi) for the acquisition, administration and licensing of intellectual property.''.

SEC. 805. GOVERNMENT INTELLECTUAL PROPERTY CLARIFICATION.

Section 15 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710d) is amended in subsection (a) to read as follows:

''(a) IN GENERAL.—

''(1) INVENTION RIGHTS.—The Government shall obtain the entire right, title and interest in and to all inventions made by any Federal employee—

''(A) during working hours;

''(B) with a contribution by the Government of facilities, equipment, materials, funds, or information, or of time or services of other Federal employees on official duty; or

''(C) within his or her field of research or within his or her official employment responsibility and activity.

''(2) DISCLOSURE.—Any invention made by a Federal employee as described in paragraph (1) shall be disclosed by the Federal employee to the agency that employs the Federal employee within 10 months of the earlier of the date of conception or actual reduction to practice of the invention. The Government shall obtain the entire right, title, and interest in and to any invention conceived or actually reduced to practice by a Federal employee that is not disclosed to the Government within 10 months from the earlier of the date of conception or actual reduction to practice of the invention.

''(3) PRESUMPTION.—Any invention made by a Federal employee as described in paragraph (1) shall be presumed to be owned by the Government, and the Federal employee is presumptively obligated to assign the entire right, title, and interest in and to the invention to the Government. A Federal employee that disagrees with the presumption of ownership and obligation of assignment may request, from the agency employing the Federal employee, a determination of rights in and to the invention and shall

do so within 30 days of the disclosure pursuant to paragraph (2). The request shall provide all grounds and justification for leaving rights with the Federal employee. If the request is not made by the employee within the 30-day period, the Government shall retain all right, title, and interest to the invention.

''(4) PATENT RIGHTS.—If a Federal agency which has ownership of or the right of ownership to an invention made by a Federal employee does not intend to file for a patent application or otherwise promote commercialization of such invention, the agency shall (upon request) allow the inventor, if the inventor is a Federal employee or former employee who made the invention during the course of employment with the Government, to obtain or retain title to the invention (subject to reservation by the Government of a nonexclusive, nontransferable, irrevocable, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government). In addition, the agency may condition the inventor's right to title on the timely filing of a patent application in cases when the Government determines that it has or may have a need to practice the invention.

''(5) COMPUTER PROGRAM DISCLOSURE.—Any computer program that is a work of the United States Government and is created at a Federal laboratory within section 105(b)(1) of title 17, United States Code, shall be disclosed by the Federal employee who created such program to the Federal laboratory that employs the Federal employee.

''(6) AUTHOR RIGHTS.—Any program described in paragraph (5) prepared by a Federal employee within the scope of his or her employment shall be considered a work made for hire and the Government shall be the author. A Federal employee who discloses as required under paragraph (5) but who contests that the Government is the author may request, from the agency employing the Federal employee, a determination of rights in and to the program and shall do so within 30 days of the disclosure pursuant to paragraph (5). The request shall provide all grounds and justification for leaving rights with the Federal employee. If the request is not made by the Federal employee within the 30-day period, the Government shall remain and shall be the author of such program.

''(7) REPORTING EXEMPTION.—Such reporting requirements shall not apply to Federal employees

who are otherwise prohibited from applying for or obtaining a patent. The Secretary may issue guidelines to implement this section.''.

SEC. 806. CLARIFYING CRADA AUTHORITY.

Section 12 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a) is amended—

(1) by inserting at the end of the section the following new subsection:

''(h) PATENT OBLIGATION.—Under an agreement entered into pursuant to this section, there is an obligation on the part of the collaborating party, in the event a United States patent application is filed by or on behalf of the collaborating party or by any assignee of the collaborating party, to include within the specification of such application and any patent issuing thereon, a statement specifying that the invention was made with Government support and that the Government has certain rights in the invention.''; and

(2) by striking subsection (d).

SEC. 807. EXPANSION OF AGREEMENTS FOR COMMERCIALIZING TECHNOLOGY AUTHORITY.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is amended by inserting after section 14 the following:

"SEC. 14A. AGREEMENTS FOR COMMERCIALIZING TECHNOLOGY.

''(a) AGREEMENTS WITH NON-FEDERAL ENTITIES.—The head of each Federal agency may permit the director of any of its Government-owned, contractor-operated laboratories to perform work for non-Federal entities (sponsors) on a fully reimbursable basis and to execute agreements with a non-Federal entity, including a non-Federal entity already receiving Federal funding that will be used to support activities under the agreements, provided that such funding is solely used to carry out the purposes of the Federal award.

''(b) RESTRICTION.—The requirements of chapter 18 of title 35, United States Code (commonly known as the 'Bayh-Dole Act'), shall apply if—

''(1) the agreement is a funding agreement (as that term is defined in section 201 of such title); and

''(2) at least one of the parties to the funding agreement is eligible to receive rights under that chapter.

''(c) SUBMISSION TO AGENCY.—Each affected director of a Government-owned, contractor-operated laboratory shall submit to the head of the Federal agency, with respect to each agreement entered into under this section—

''(1) a summary of information relating to the relevant project;

''(2) the total estimated costs of the project;

''(3) estimated commencement and completion dates of the project; and

''(4) other documentation determined to be appropriate by the head of the Federal agency.

''(d) CERTIFICATION.—The head of the Federal agency shall require the contractor of the affected Government-owned, contractor-operated laboratory to certify that each activity carried out under a project for which an agreement is entered into under this section—

''(1) is not in direct competition with the private sector; and

''(2) does not present, or minimizes, any apparent conflict of interest, and avoids or neutralizes any actual conflict of interest, as a result of the agreement under this section.

''(e) LIMITATION.—This authority only pertains to Federal agencies that do not have agency-specific authorities for Agreements for Commercializing Technology elsewhere in statute.''.

SEC. 808. OTHER TRANSACTION AUTHORITY.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is amended by inserting after section 15 the following:

"SEC. 15A. OTHER TRANSACTIONS.

''(a) GENERAL AUTHORITY.—

''(1) PERMISSION.—Each Federal agency may permit the director of any of its Government-operated Federal laboratories to enter into such other transactions as may be necessary in the conduct of the work of the Federal laboratory and on such terms as the director of the Federal laboratory considers appropriate, in furtherance of the purposes of this Act.

''(2) DISCLOSURE.—The Federal agency may protect from disclosure, for up to 12 years after the date on which the information is developed, any information developed pursuant to a transaction under this section that would be protected from disclosure under section 552(b)(4) of title 5, United States Code, if obtained from a person other than a Federal agency.

''(3) AUTHORITY LIMITATION.—This authority only pertains to Federal agencies that do not have agency-specific authorities for other transactions elsewhere in statute.

''(b) LIMITATIONS.—A Federal laboratory using the authorities granted in subsection (a) may only enter into such other transactions when—

''(1) a warranted contracting officer determines that use of other authority of the Federal agency would be insufficient to achieve the purposes of this Act; and

''(2) use of such other transaction is approved by the Federal agency.''.

SEC. 809. NONPROFIT FOUNDATIONS.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is further amended by adding at the end the following:

''SEC. 29. FOUNDATIONS.

''(a) IN GENERAL.—A Government-owned Federal laboratory may establish or enter into an agreement with a nonprofit organization to establish a Federal laboratory Foundation in support of its mission. Such a Foundation shall not be an agency or instrumentality of the United States Government, and the United States shall not be liable for any debts, defaults, acts, or omissions of the Foundation.

''(b) PURPOSE.—The purpose of a Foundation established under this section shall be to support the Government-owned Federal laboratory in its mission.

''(c) ACTIVITIES.—Activities of the Foundation may include the following:

''(1) The receipt, administration, solicitation, acceptance and use of funds, gifts, devises, or bequests, either absolutely or in trust of real or personal property or any income therefrom or other interest or equity therein for the benefit of, or in connection with, the mission of the Government-owned Federal laboratory. A gift, devise, or bequest may be accepted by the Foundation even though it is encumbered, restricted, or subject to beneficial interests of private persons if any current or future interest therein is for the benefit of the Federal laboratory in its research and development activities. Contributions, gifts, and other transfers made to or for the use of a Foundation established under this section shall be regarded as contributions, gifts, or transfers to or for the use of the United States.

''(2) The conduct of support studies, competitions, projects, research and other activities that further the purposes of the Foundation.

''(3) Programs for fostering collaboration and partnerships with researches from the Federal and State governments, institutions of higher education, federally funded research and development centers,

industry and nonprofit organizations for the research, development or commercialization of federally supported technologies.

''(4) Programs for leveraging technologies to support new product development that supports regional economic development.

''(5) Administering prize competitions to accelerate private sector competition and investment.

''(6) Provision of fellowships and grants to research and development personnel at, or affiliated with, federally funded centers. Such fellowships and grants may include stipends, travel, health insurance benefits and other appropriate expenses. The recipients of fellowships shall be selected by the donors and the Foundation upon the recommendation of the employees in the Federal laboratory where the fellow would serve, and shall be subject to agreement of the head of the agency whose mission is supported by the Foundation.

''(7) Supplementary programs to provide for—

''(A) scientists of other countries to serve in research capacities in the United States in association with the Federal laboratory whose mission the Foundation supports, or elsewhere, or opportunities for employees of the Federal

laboratory whose mission the Foundation supports to serve in such capacities in other countries, or both;

"(B) the conduct and support of studies, projects, and research, that may include stipends, travel and other support for personnel in collaboration with national and international nonprofit and for-profit organizations;

"(C) the conduct and support of forums, meetings, conferences, courses, and training workshops that may include undergraduate, graduate, post-graduate, and post-doctoral accredited courses and the maintenance of accreditation of such courses by the Foundation at the State and national level for college or continuing education credits or for degrees;

"(D) programs to support and encourage teachers and students of science at all levels of education and programs for the general public which promote the understanding of science;

"(E) programs for writing, editing, printing, publishing, and vending of books and other materials; and

''(F) the conduct of other activities to carry out and support the purpose described in subsection (b).

''(d) TRANSFER OF FUNDS.—Notwithstanding any other provision of law, a Foundation established under this section may transfer funds to the Government-owned Federal laboratory and the Government-owned Federal laboratory may accept transfers of funds from the Foundation.''.

SEC. 810. IMPROVING REPORTING AND METRICS.

Section 11 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710) is amended by striking subsections (f) and (g) and inserting the following:

''(f) AGENCY REPORTS ON UTILIZATION.—

''(1) IN GENERAL.—Each Federal agency which operates or directs one or more Federal laboratories or which conducts activities under subsection (k) of this section or sections 207 and 209 of title 35, United States Code, shall report annually to the Office of Management and Budget, on the activities performed by that agency and its Federal laboratories under the provisions of this section and of sections 207 and 209 of such title 35.

''(2) CONTENTS.—The report shall include—

''(A) an explanation of the agency's technology transfer activities for the preceding fiscal year and the agency's plans to manage innovations with commercial promise consistent with the agency's mission and benefitting the competitiveness of United States industry; and

''(B) information on technology transfer activities for the preceding fiscal year, including—

''(i) the number of patent applications filed;

''(ii) the number of patents received;

''(iii) the number of works registered for copyright protection in the United States on behalf of the United States, pursuant to section 105(b) of title 17, United States Code;

''(iv) the number of fully-executed licenses which received income from licensing in the preceding fiscal year;

''(v) the total income from licensing;

''(vi) the number of licenses terminated for cause;

''(vii) the number of collaborative research and development relationships; and

"(viii) any other parameters or discussion that the agency deems relevant or unique to its practice of technology transfer.

"(3) COPY TO SECRETARY.—The agency shall transmit a copy of the report to the Secretary of Commerce for inclusion in the annual summary required by subsection (g)(2).

"(4) PUBLIC AVAILABILITY.—Each Federal agency reporting under this subsection shall make available to the public through internet sites, updated at least annually—

"(A) the information contained in such report;

"(B) information on intellectual property which is available for licensing from the Federal agency; and

"(C) information on Federal research and development programs, facilities, equipment and tools, expertise, services, and other relevant assets which are made available to the public by the Federal agency.

"(5) PUBLICATION BY NIST.—The Director of the National Institute of Standards and Technology is authorized to provide the summary required by

subsection (g)(2) to the public through internet sites.''.

SEC. 811. INNOVATIVE APPROACHES TO TECHNOLOGY TRANSFER.

Section 9(jj) of the Small Business Act (15 U.S.C. 638(jj)) is amended to read as follows:

''(jj) INNOVATIVE APPROACHES TO TECHNOLOGY TRANSFER.—

''(1) GRANT PROGRAM.—

''(A) IN GENERAL.—Each Federal agency required by subsection (n) to establish an STTR program shall carry out a grant program to support innovative approaches to technology transfer at institutions of higher education (as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a))), nonprofit research institutions and Federal laboratories in order to accelerate the commercialization of federally funded research and technology by small business concerns, including new businesses.

''(B) AWARDING OF GRANTS AND AWARDS.—

''(i) IN GENERAL.—Each Federal agency required by subparagraph (A) to

participate in this program, shall award, through a competitive, merit-based process, grants, in the amounts listed in subparagraph (C) to institutions of higher education, technology transfer organizations that facilitate the commercialization of technologies developed by one or more such institutions of higher education, Federal laboratories, other public and private nonprofit entities, and consortia thereof, for initiatives that help identify high-quality, commercially viable federally funded research and technologies and to facilitate and accelerate their transfer into the marketplace.

''(ii) USE OF FUNDS.—Activities supported by grants under this subsection may include—

''(I) providing early-stage proof of concept funding for translational research;

''(II) identifying research and technologies at recipient institutions that have the potential for accelerated commercialization;

"(III) technology maturation funding to support activities such as prototype construction, experiment analysis, product comparison, and collecting performance data;

"(IV) technical validations, market research, clarifying intellectual property rights position and strategy, and investigating commercial and business opportunities; and

"(V) programs to provide advice, mentoring, entrepreneurial education, project management, and technology and business development expertise to innovators and recipients of technology transfer licenses to maximize commercialization potential.

"(iii) SELECTION PROCESS AND APPLICATIONS.—Qualifying institutions seeking a grant under this subsection shall submit an application to a Federal agency required by subparagraph (A) to participate in this program at such time, in such manner, and containing such information

as the agency may require. The application shall include, at a minimum—

"(I) a description of innovative approaches to technology transfer, technology development, and commercial readiness that have the potential to increase or accelerate technology transfer outcomes and can be adopted by other qualifying institutions, or a demonstration of proven technology transfer and commercialization strategies, or a plan to implement proven technology transfer and commercialization strategies, that can achieve greater commercialization of federally funded research and technologies with program funding;

"(II) a description of how the qualifying institution will contribute to local and regional economic development efforts; and

"(III) a plan for sustainability beyond the duration of the funding award.

"(iv) PROGRAM OVERSIGHT BOARDS.—

"(I) IN GENERAL.—Successful proposals shall include a plan to assemble a Program Oversight Board, the members of which shall have technical, scientific, or business expertise and shall be drawn from industry, start-up companies, venture capital, technical enterprises, financial institutions, and business development organizations.

"(II) PROGRAM OVERSIGHT BOARDS RESPONSIBILITIES.—Program Oversight Boards shall—

"(aa) establish award programs for individual projects;

"(bb) provide rigorous evaluation of project applications;

"(cc) determine which projects should receive awards, in accordance with guidelines established under subparagraph (C)(ii);

"(dd) establish milestones and associated award amounts for projects that reach milestones;

"(ee) determine whether awarded projects are reaching milestones; and

"(ff) develop a process to reallocate outstanding award amounts from projects that are not reaching milestones to other projects with more potential.

"(C) GRANT AND AWARD AMOUNTS.—

"(i) GRANT AMOUNTS.—Each Federal agency required by subparagraph (A) to carry out a grant program may make grants to a qualifying institution for up to $1,000,000 per year for up to 3 years.

"(ii) AWARD AMOUNTS.—Each qualifying institution that receives a grant under subparagraph (B) shall provide awards for individual projects of not more than $150,000, to be provided in phased amounts, based on reaching the milestones

established by the qualifying institution's Program Oversight Board.

"(D) AUTHORIZED EXPENDITURES FOR INNOVATIVE APPROACHES TO TECHNOLOGY TRANSFER GRANT PROGRAM.—

"(i) PERCENTAGE.—The percentage of the extramural budget each Federal agency required by subsection (n) to establish an STTR program shall expend on the Innovative Approaches to Technology Transfer Grant Program shall be—

"(I) 0.05 percent for each of fiscal years 2014 and 2015; and

"(II) 0.1 percent for each of fiscal years 2016 and 2017.

"(ii) TREATMENT OF EXPENDITURES.—Any portion of the extramural budget expended by a Federal agency on the Innovative Approaches to Technology Transfer Grant Program shall apply towards the agency's expenditure requirements under subsection (n).

"(2) PROGRAM EVALUATION AND DATA COLLECTION AND DISSEMINATION.—

"(A) EVALUATION PLAN AND DATA COLLECTION.—Each Federal agency required by paragraph (1)(A) to establish an Innovative Approaches to Technology Transfer Grant Program shall develop a program evaluation plan and collect annually such information from grantees as is necessary to assess the Program. Program evaluation plans shall require the collection of data aimed at identifying outcomes resulting from the transfer of technology with assistance from the Innovative Approaches to Technology Transfer Grant Program, such as—

"(i) specific follow-on funding identified or obtained, including follow-on funding sources, such as Federal sources or private sources;

"(ii) number of projects which result in a license to a start-up company or an established company with sufficient resources for effective commercialization within 5 years of receiving an award under paragraph (1);

"(iii) invention disclosures and patents;

"(iv) number of projects supported by qualifying institutions receiving a grant under paragraph (1) that secure Phase I or Phase II SBIR or STTR awards;

"(v) available information on revenue, sales or other measures of products that have been commercialized as a result of projects awarded under paragraph (1);

"(vi) number and location of jobs created resulting from projects awarded under paragraph (1); and

"(vii) other data as deemed appropriate by a Federal agency required by this subparagraph to develop a program evaluation plan.

"(B) EVALUATIVE REPORT TO CONGRESS.—The head of each Federal agency that participates in the Innovative Approaches to Technology Transfer Grant Program shall submit to the Committee on Science, Space, and Technology and the Committee on Small Business of the House of Representatives and the Committee on Small Business and Entrepreneurship of the Senate an evaluative report re-

garding the activities of the program. The report shall include—

"(i) a detailed description of the implementation of the program;

"(ii) a detailed description of the grantee selection process;

"(iii) an accounting of the funds used in the program; and

"(iv) a summary of the data collected under subparagraph (A).

"(C) DATA DISSEMINATION.—For the purposes of program transparency and dissemination of best practices, the Administrator shall include on the public database under subsection (k)(1) information on the Innovative Approaches to Technology Transfer Grant Program, including—

"(i) the program evaluation plan required under subparagraph (A);

"(ii) a list of recipients of awards under paragraph (1); and

"(iii) information on the use of grants under paragraph (1) by recipient institutions.".

SEC. 812. DOE PUBLIC-PRIVATE PARTNERSHIPS FOR COMMERCIALIZATION.

(a) IN GENERAL.—Subject to subsections (b) and (c), the Secretary of Energy shall delegate to directors of the National Laboratories signature authority with respect to any agreement described in subsection (b) the total cost of which (including the National Laboratory contributions and project recipient cost share) is less than $1,000,000, if such an agreement falls within the scope of—

(1) a strategic plan for the National Laboratory that has been approved by the Department of Energy; or

(2) the most recent congressionally approved budget for Department of Energy activities to be carried out by the National Laboratory.

(b) AGREEMENTS.—Subsection (a) applies to—

(1) a cooperative research and development agreement;

(2) a non-Federal work-for-others agreement; and

(3) any other agreement determined to be appropriate by the Secretary of Energy, in collaboration with the directors of the National Laboratories.

(c) ADMINISTRATION.—

(1) ACCOUNTABILITY.—The director of the affected National Laboratory and the affected con-

tractor shall carry out an agreement under this section in accordance with applicable policies of the Department of Energy, including by ensuring that the agreement does not compromise any national security, economic, or environmental interest of the United States.

(2) CERTIFICATION.—The director of the affected National Laboratory and the affected contractor shall certify that each activity carried out under a project for which an agreement is entered into under this section does not present, or minimizes, any apparent conflict of interest, and avoids or neutralizes any actual conflict of interest, as a result of the agreement under this section.

(3) AVAILABILITY OF RECORDS.—Within 30 days of entering an agreement under this section, the director of a National Laboratory shall submit to the Secretary of Energy for monitoring and review all records of the National Laboratory relating to the agreement.

(4) RATES.—The director of a National Laboratory may charge higher rates for services performed under a partnership agreement entered into pursuant to this section, regardless of the full cost of recovery, if such funds are used exclusively to

support further research and development activities at the respective National Laboratory.

(d) EXCEPTION.—This section does not apply to any agreement with a majority foreign-owned company.

(e) CONFORMING AMENDMENT.—Section 12 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a) is amended—

(1) in subsection (a)—

(A) by redesignating paragraphs (1) and (2) as subparagraphs (A) and (B), respectively;

(B) by striking ''Each Federal agency'' and inserting the following:

''(1) IN GENERAL.—Except as provided in paragraph (2), each Federal agency''; and

(C) by adding at the end the following:

''(2) EXCEPTION.—Notwithstanding paragraph (1), in accordance with section 813(a) of the Securing American Leadership in Science and Technology Act of 2020, approval by the Secretary of Energy shall not be required for any technology transfer agreement proposed to be entered into by a National Laboratory of the Department of Energy, the total cost of which (including the National Laboratory contributions and project recipient cost share) is less than $1,000,000.''; and

(2) in subsection (b), by striking ''subsection (a)(1)'' each place it appears and inserting ''subsection (a)(1)(A)''.

(f) SAVINGS CLAUSE.—Nothing in this section or an amendment made by this section abrogates or otherwise affects the primary responsibilities of any National Laboratory to the Department of Energy.

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