

(2) by striking “or 2019” in subclause (II) and inserting “2019, or any year thereafter,”

(3) by inserting before “; and” in subclause (II) the following: “(or, in the case of any such health benefits confirmed in any bankruptcy proceeding, would be subsequently denied or reduced)”, and

(4) by striking “January 1, 2019” in the second sentence and inserting “January 1, 2020”.

(b) INCREASE IN LIMITATION TO ACCOUNT FOR CALCULATION OF HEALTH BENEFIT PLAN EXCESS.—Section 402(i)(3) of such Act (30 U.S.C. 1232(i)(3)) is amended by adding at the end the following new subparagraph:

“(C) INCREASE IN LIMITATION TO ACCOUNT FOR CALCULATION OF HEALTH BENEFIT PLAN EXCESS.—The dollar limitation under subparagraph (A) shall be increased by the amount of the cost to provide benefits which are taken into account under subsection (h)(2)(C)(ii) solely by reason of the amendments made by section 2(a) of the American Miner Benefits Improvement Act of 2020.”.

(c) APPLICATION.—

(1) IN GENERAL.—Except as provided in paragraph (2), the amendments made by this section shall take effect on the date of the enactment of this Act.

(2) SUBSECTION (a)(3).—The amendment made by subsection (a)(3) shall apply to denials and reductions after December 31, 2019.

DIVISION Z—ENERGY ACT OF 2020

SEC. 101. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This division may be cited as the “Energy Act of 2020”.

(b) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

DIVISION Z—ENERGY ACT OF 2020

Sec. 101. Short title; table of contents.

TITLE I—EFFICIENCY

- Sec. 1001. Coordination of energy retrofitting assistance for schools.
- Sec. 1002. Use of energy and water efficiency measures in Federal buildings.
- Sec. 1003. Energy efficient data centers.
- Sec. 1004. Energy-efficient and energy-saving information technologies.
- Sec. 1005. Extended Product System Rebate Program.
- Sec. 1006. Energy Efficient Transformer Rebate Program.
- Sec. 1007. Smart building acceleration.
- Sec. 1008. Modifications to the ceiling fan energy conservation standard.
- Sec. 1009. Report on electrochromic glass.
- Sec. 1010. Energy and water for sustainability.
- Sec. 1011. Weatherization Assistance Program.
- Sec. 1012. Federal Energy Management Program.
- Sec. 1013. CHP Technical Assistance Partnership Program.
- Sec. 1014. Smart energy water efficiency pilot program.

TITLE II—NUCLEAR

- Sec. 2001. Advanced Nuclear Fuel Availability.
- Sec. 2002. Amendments to definitions in Energy Policy Act of 2005.
- Sec. 2003. Nuclear energy research, development, demonstration, and commercial application programs.
- Sec. 2004. High-performance computation collaborative research program.
- Sec. 2005. Nuclear energy budget plan.

H. R. 133—1238

- Sec. 2006. Organization and administration of programs.
- Sec. 2007. Extension and expansion of limitations on importation of uranium from Russian Federation.
- Sec. 2008. Fusion energy research.

TITLE III—RENEWABLE ENERGY AND STORAGE

Subtitle A—Renewable Energy Research and Development

- Sec. 3001. Water power research and development.
- Sec. 3002. Advanced geothermal innovation leadership.
- Sec. 3003. Wind energy research and development.
- Sec. 3004. Solar energy research and development.
- Sec. 3005. Hydroelectric production incentives and efficiency improvements.
- Sec. 3006. Conforming amendments.

Subtitle B—Natural Resources Provisions

- Sec. 3101. Definitions.
- Sec. 3102. Program to improve eligible project permit coordination.
- Sec. 3103. Increasing economic certainty.
- Sec. 3104. National goal for renewable energy production on Federal land.
- Sec. 3105. Facilitation of coproduction of geothermal energy on oil and gas leases.
- Sec. 3106. Savings clause.

Subtitle C—Energy Storage

- Sec. 3201. Better energy storage technology.
- Sec. 3202. Energy storage technology and microgrid assistance program.

TITLE IV—CARBON MANAGEMENT

- Sec. 4001. Fossil energy.
- Sec. 4002. Establishment of carbon capture technology program.
- Sec. 4003. Carbon storage validation and testing.
- Sec. 4004. Carbon utilization program.
- Sec. 4005. High efficiency turbines.
- Sec. 4006. National energy technology laboratory reforms.
- Sec. 4007. Study on Blue Hydrogen Technology.
- Sec. 4008. Produced water research and development.

TITLE V—CARBON REMOVAL

- Sec. 5001. Carbon removal.
- Sec. 5002. Carbon dioxide removal task force and report.

TITLE VI—INDUSTRIAL AND MANUFACTURING TECHNOLOGIES

- Sec. 6001. Purpose.
- Sec. 6002. Coordination of research and development of energy efficient technologies for industry.
- Sec. 6003. Industrial emissions reduction technology development program.
- Sec. 6004. Industrial Technology Innovation Advisory Committee.
- Sec. 6005. Technical assistance program to implement industrial emissions reduction.
- Sec. 6006. Development of national smart manufacturing plan.

TITLE VII—CRITICAL MINERALS

- Sec. 7001. Rare earth elements.
- Sec. 7002. Mineral security.
- Sec. 7003. Monitoring mineral investments under Belt and Road Initiative of People's Republic of China.

TITLE VIII—GRID MODERNIZATION

- Sec. 8001. Smart grid regional demonstration initiative.
- Sec. 8002. Smart grid modeling, visualization, architecture, and controls.
- Sec. 8003. Integrated energy systems.
- Sec. 8004. Grid integration research and development.
- Sec. 8005. Advisory committee.
- Sec. 8006. Coordination of efforts.
- Sec. 8007. Technology demonstration on the distribution grid.
- Sec. 8008. Voluntary model pathways.
- Sec. 8009. Performance metrics for electricity infrastructure providers.
- Sec. 8010. Voluntary State, regional, and local electricity distribution planning.
- Sec. 8011. Micro-grid and integrated micro-grid systems program.
- Sec. 8012. Technical amendments; authorization of appropriations.

H. R. 133—1239

- Sec. 8013. Indian energy.
- Sec. 8014. Report on electricity access and reliability.
- Sec. 8015. Net metering study and evaluation.

TITLE IX—DEPARTMENT OF ENERGY INNOVATION

- Sec. 9001. Office of technology transitions.
- Sec. 9002. Lab partnering service pilot program.
- Sec. 9003. Technology commercialization fund.
- Sec. 9004. Streamlining prize competitions.
- Sec. 9005. Milestone-based demonstration projects.
- Sec. 9006. Other transaction authority extension.
- Sec. 9007. Technology transfer reports and evaluation.
- Sec. 9008. Veterans' health initiative.
- Sec. 9009. Sustainable Transportation Research and Development.
- Sec. 9010. Loan program office title XVII reform.
- Sec. 9011. Established Program to Stimulate Competitive Research.

TITLE X—ARPA-E AMENDMENTS

- Sec. 10001. ARPA-E amendments.

TITLE XI—OTHER MATTERS

- Sec. 11001. Low-Dose Radiation Research.
- Sec. 11002. Authorization.
- Sec. 11003. Sense of Congress.
- Sec. 11004. Addressing insufficient compensation of employees and other personnel of the Federal Energy Regulatory Commission.
- Sec. 11005. Report on the authority of the Secretary of Energy to implement flexible compensation models.

TITLE I—EFFICIENCY

SEC. 1001. COORDINATION OF ENERGY RETROFITTING ASSISTANCE FOR SCHOOLS.

(a) DEFINITION OF SCHOOL.—In this section, the term “school” means—

- (1) an elementary school or secondary school (as defined in section 8101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801));
- (2) an institution of higher education (as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)));
- (3) a postsecondary vocational institution (as defined in section 102(c) of the Higher Education Act of 1965 (20 U.S.C. 1002(c)));
- (4) a school of the defense dependents' education system under the Defense Dependents' Education Act of 1978 (20 U.S.C. 921 et seq.) or established under section 2164 of title 10, United States Code;
- (5) a school operated by the Bureau of Indian Education;
- (6) a tribally controlled school (as defined in section 5212 of the Tribally Controlled Schools Act of 1988 (25 U.S.C. 2511)); and
- (7) a Tribal College or University (as defined in section 316(b) of the Higher Education Act of 1965 (20 U.S.C. 1059c(b))).

(b) DESIGNATION OF LEAD AGENCY.—The Secretary of Energy (in this section referred to as the “Secretary”), acting through the Office of Energy Efficiency and Renewable Energy, shall act as the lead Federal agency for coordinating and disseminating information on existing Federal programs and assistance that may be used to help initiate, develop, and finance energy efficiency, renewable energy, and energy retrofitting projects for schools.

(c) REQUIREMENTS.—In carrying out coordination and outreach under subsection (b), the Secretary shall—

(1) in consultation and coordination with the appropriate Federal agencies, carry out a review of existing programs and financing mechanisms (including revolving loan funds and loan guarantees) available in or from the Department of Agriculture, the Department of Energy, the Department of Education, the Department of the Treasury, the Internal Revenue Service, the Environmental Protection Agency, and other appropriate Federal agencies with jurisdiction over energy financing and facilitation that are currently used or may be used to help initiate, develop, and finance energy efficiency, renewable energy, and energy retrofitting projects for schools;

(2) establish a Federal cross-departmental collaborative coordination, education, and outreach effort to streamline communication and promote available Federal opportunities and assistance described in paragraph (1), for energy efficiency, renewable energy, and energy retrofitting projects that enables States, local educational agencies, and schools—

(A) to use existing Federal opportunities more effectively; and

(B) to form partnerships with Governors, State energy programs, local educational, financial, and energy officials, State and local government officials, nonprofit organizations, and other appropriate entities, to support the initiation of the projects;

(3) provide technical assistance for States, local educational agencies, and schools to help develop and finance energy efficiency, renewable energy, and energy retrofitting projects—

(A) to increase the energy efficiency of buildings or facilities;

(B) to install systems that individually generate energy from renewable energy resources;

(C) to establish partnerships to leverage economies of scale and additional financing mechanisms available to larger clean energy initiatives; or

(D) to promote—

(i) the maintenance of health, environmental quality, and safety in schools, including the ambient air quality, through energy efficiency, renewable energy, and energy retrofit projects; and

(ii) the achievement of expected energy savings and renewable energy production through proper operations and maintenance practices;

(4) develop and maintain a single online resource website with contact information for relevant technical assistance and support staff in the Office of Energy Efficiency and Renewable Energy for States, local educational agencies, and schools to effectively access and use Federal opportunities and assistance described in paragraph (1) to develop energy efficiency, renewable energy, and energy retrofitting projects; and

(5) establish a process for recognition of schools that—

(A) have successfully implemented energy efficiency, renewable energy, and energy retrofitting projects; and

(B) are willing to serve as resources for other local educational agencies and schools to assist initiation of similar efforts.

(d) REPORT.—Not later than 180 days after the date of enactment of this Act, the Secretary shall submit to Congress a report describing the implementation of this section.

SEC. 1002. USE OF ENERGY AND WATER EFFICIENCY MEASURES IN FEDERAL BUILDINGS.

(a) REPORTS.—Section 548(b) of the National Energy Conservation Policy Act (42 U.S.C. 8258(b)) is amended—

(1) in paragraph (3), by striking “and” at the end;

(2) in paragraph (4), by striking the period at the end and inserting “; and”; and

(3) by adding at the end the following:

“(5)(A) the status of the energy savings performance contracts and utility energy service contracts of each agency, to the extent that the information is not duplicative of information provided to the Secretary under a separate authority;

“(B) the quantity and investment value of the contracts for the previous year;

“(C) the guaranteed energy savings, or for contracts without a guarantee, the estimated energy savings, for the previous year, as compared to the measured energy savings for the previous year;

“(D) a forecast of the estimated quantity and investment value of contracts anticipated in the following year for each agency; and

“(E)(i) a comparison of the information described in subparagraph (B) and the forecast described in subparagraph (D) in the report of the previous year; and

“(ii) if applicable, the reasons for any differences in the data compared under clause (i).”

(b) DEFINITION OF ENERGY CONSERVATION MEASURES.—Section 551(4) of the National Energy Conservation Policy Act (42 U.S.C. 8259(4)) is amended by striking “or retrofit activities” and inserting “retrofit activities, or energy consuming devices and required support structures”.

(c) AUTHORITY TO ENTER INTO CONTRACTS.—Section 801(a)(2)(F) of the National Energy Conservation Policy Act (42 U.S.C. 8287(a)(2)(F)) is amended—

(1) in clause (i), by striking “or” at the end;

(2) in clause (ii), by striking the period at the end and inserting “; or”; and

(3) by adding at the end the following:

“(iii) limit the recognition of operation and maintenance savings associated with systems modernized or replaced with the implementation of energy conservation measures, water conservation measures, or any combination of energy conservation measures and water conservation measures.”

(d) MISCELLANEOUS AUTHORITY; EXCLUDED CONTRACTS.—Section 801(a)(2) of the National Energy Conservation Policy Act (42 U.S.C. 8287(a)(2)) is amended by adding at the end the following:

“(H) MISCELLANEOUS AUTHORITY.—Notwithstanding subtitle I of title 40, United States Code, a Federal agency may accept, retain, sell, or transfer, and apply the proceeds of the sale or transfer of, any energy and water incentive, rebate, grid services revenue, or credit (including a renewable energy certificate) to fund a contract under this title.

“(I) EXCLUDED CONTRACTS.—A contract entered into under this title may not be for work performed—

“(i) at a Federal hydroelectric facility that provides power marketed by a Power Marketing Administration; or

“(ii) at a hydroelectric facility owned and operated by the Tennessee Valley Authority established under the Tennessee Valley Authority Act of 1933 (16 U.S.C. 831 et seq.).”

(e) PAYMENT OF COSTS.—Section 802 of the National Energy Conservation Policy Act (42 U.S.C. 8287a) is amended by striking “(and related operation and maintenance expenses)” and inserting “, including related operations and maintenance expenses”.

(f) DEFINITION OF ENERGY SAVINGS.—Section 804(2) of the National Energy Conservation Policy Act (42 U.S.C. 8287c(2)) is amended—

(1) in subparagraph (A), by striking “federally owned building or buildings or other federally owned facilities” and inserting “Federal building (as defined in section 551)” each place it appears;

(2) in subparagraph (C), by striking “; and” and inserting a semicolon;

(3) in subparagraph (D), by striking the period at the end and inserting a semicolon; and

(4) by adding at the end the following:

“(E) the use, sale, or transfer of any energy and water incentive, rebate, grid services revenue, or credit (including a renewable energy certificate); and

“(F) any revenue generated from a reduction in energy or water use, more efficient waste recycling, or additional energy generated from more efficient equipment.”

(g) ENERGY AND WATER CONSERVATION MEASURES.—Section 543 of the National Energy Conservation Policy Act (42 U.S.C. 8253) is amended—

(1) in the section heading, by inserting “and water” after “energy”;

(2) in subsection (b)—

(A) in the subsection heading, by inserting “AND WATER” after “ENERGY”; and

(B) by striking paragraphs (1) and (2) and inserting the following:

“(1) IN GENERAL.—Each agency shall—

“(A) not later than October 1, 2022, to the maximum extent practicable, begin installing in Federal buildings owned by the United States all energy and water conservation measures determined by the Secretary to be life cycle cost-effective (as defined in subsection (f)(1)); and

“(B) complete the installation described in subparagraph (A) as soon as practicable after the date referred to in that subparagraph.

“(2) EXPLANATION OF NONCOMPLIANCE.—

“(A) IN GENERAL.—If an agency fails to comply with paragraph (1), the agency shall submit to the Secretary, using guidelines developed by the Secretary, an explanation of the reasons for the failure.

“(B) REPORT TO CONGRESS.—Not later than January 1, 2022, and every 2 years thereafter, the Secretary shall

submit to Congress a report that describes any noncompliance by an agency with the requirements of paragraph (1).”;

(3) in subsection (c)(1)—

(A) in subparagraph (A)—

(i) in the matter preceding clause (i), by striking “An agency” and inserting “The head of each agency”; and

(ii) by inserting “or water” after “energy” each place it appears; and

(B) in subparagraph (B)(i), by inserting “or water” after “energy”;

(4) in subsection (d)(2), by inserting “and water” after “energy”;

(5) in subsection (e)—

(A) in the subsection heading, by inserting “AND WATER” after “ENERGY”;

(B) in paragraph (1)—

(i) in the first sentence—

(I) by striking “October 1, 2012” and inserting “October 1, 2022”;

(II) by inserting “and water” after “energy”; and

(III) by inserting “and water” after “electricity”;

(ii) in the second sentence, by inserting “and water” after “electricity”; and

(iii) in the fourth sentence, by inserting “and water” after “energy”;

(C) in paragraph (2)—

(i) in subparagraph (A)—

(I) by striking “and” before “Federal”; and

(II) by inserting “and any other person the Secretary deems necessary,” before “shall”;

(ii) in subparagraph (B)—

(I) in clause (i)(II), by inserting “and water” after “energy” each place it appears;

(II) in clause (ii), by inserting “and water” after “energy”; and

(III) in clause (iv), by inserting “and water” after “energy”; and

(iii) by adding at the end the following:

“(C) UPDATE.—Not later than 180 days after the date of enactment of this subparagraph, the Secretary shall update the guidelines established under subparagraph (A) to take into account water efficiency requirements under this section.”;

(D) in paragraph (3), in the matter preceding subparagraph (A), by striking “established under paragraph (2)” and inserting “updated under paragraph (2)(C)”; and

(E) in paragraph (4)—

(i) in subparagraph (A)—

(I) by striking “this paragraph” and inserting “the Energy Act of 2020”; and

(II) by inserting “and water” before “use in”; and

(ii) in subparagraph (B)(ii), in the matter preceding subclause (I), by inserting “and water” after “energy”; and

(6) in subsection (f)—

(A) in paragraph (1)—

(i) by redesignating subparagraphs (E), (F), and (G) as subparagraphs (F), (G), and (H), respectively; and

(ii) by inserting after subparagraph (D) the following:

“(E) ONGOING COMMISSIONING.—The term ‘ongoing commissioning’ means an ongoing process of commissioning using monitored data, the primary goal of which is to ensure continuous optimum performance of a facility, in accordance with design or operating needs, over the useful life of the facility, while meeting facility occupancy requirements.”;

(B) in paragraph (2)—

(i) in subparagraph (A), by inserting “and water” before “use”;

(ii) in subparagraph (B)—

(I) by striking “energy” before “efficiency”; and

(II) by inserting “or water” before “use”; and

(iii) by adding at the end the following:

“(C) ENERGY MANAGEMENT SYSTEM.—An energy manager designated for a facility under subparagraph (A) shall take into consideration—

“(i) the use of a system to manage energy and water use at the facility; and

“(ii) the applicability of the certification of the facility in accordance with the International Organization for Standardization standard numbered 50001 and entitled ‘Energy Management Systems’.”;

(C) by striking paragraphs (3) and (4) and inserting the following:

“(3) ENERGY AND WATER EVALUATIONS AND COMMISSIONING.—

“(A) EVALUATIONS.—Except as provided in subparagraph (B), not later than the date that is 180 days after the date of enactment of the Energy Act of 2020, and annually thereafter, each energy manager shall complete, for the preceding calendar year, a comprehensive energy and water evaluation and recommissioning or retrocommissioning for approximately 25 percent of the facilities of the applicable agency that meet the criteria under paragraph (2)(B) in a manner that ensures that an evaluation of each facility is completed not less frequently than once every 4 years.

“(B) EXCEPTIONS.—An evaluation and recommissioning or retrocommissioning shall not be required under subparagraph (A) with respect to a facility that, as of the date on which the evaluation and recommissioning or retrocommissioning would occur—

“(i) has had a comprehensive energy and water evaluation during the preceding 8-year period;

“(ii)(I) has been commissioned, recommissioned, or retrocommissioned during the preceding 10-year period; or

“(II) is under ongoing commissioning, recommissioning, or retrocommissioning;

“(iii) has not had a major change in function or use since the previous evaluation and recommissioning or retrocommissioning;

“(iv) has been benchmarked with public disclosure under paragraph (8) during the preceding calendar year; and

“(v)(I) based on the benchmarking described in clause (iv), has achieved at a facility level the most recent cumulative energy savings target under subsection (a) compared to the earlier of—

“(aa) the date of the most recent evaluation;

or

“(bb) the date—

“(AA) of the most recent commissioning, recommissioning, or retrocommissioning; or

“(BB) on which ongoing commissioning began; or

“(II) has a long-term contract in place guaranteeing energy savings at least as great as the energy savings target under subclause (I).

“(4) IMPLEMENTATION OF IDENTIFIED ENERGY AND WATER EFFICIENCY MEASURES.—

“(A) IN GENERAL.—Not later than 2 years after the date of completion of each evaluation under paragraph (3), each energy manager shall implement any energy- or water-saving measure that—

“(i) the Federal agency identified in the evaluation; and

“(ii) is life cycle cost-effective, as determined by evaluating an individual measure or a bundle of measures with varying paybacks.

“(B) PERFORMANCE CONTRACTING.—Each Federal agency shall use performance contracting to address at least 50 percent of the measures identified under subparagraph (A)(i).”;

(D) in paragraph (7)(B)(ii)(II), by inserting “and water” after “energy”; and

(E) in paragraph (9)(A), in the matter preceding clause (i), by inserting “and water” after “energy”.

(h) CONFORMING AMENDMENT.—The table of contents for the National Energy Conservation Policy Act (Public Law 95–619; 92 Stat. 3206) is amended by striking the item relating to section 543 and inserting the following:

“Sec. 543. Energy and water management requirements.”.

SEC. 1003. ENERGY EFFICIENT DATA CENTERS.

Section 453 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17112) is amended—

(1) in subsection (b)—

(A) in paragraph (2)(D)(iv), by striking “determined by the organization” and inserting “proposed by the stakeholders”; and

(B) by striking paragraph (3); and

(2) by striking subsections (c) through (g) and inserting the following:

“(c) STAKEHOLDER INVOLVEMENT.—

“(1) IN GENERAL.—The Secretary and the Administrator shall carry out subsection (b) in collaboration with the information technology industry and other key stakeholders, with the goal of producing results that accurately reflect the most relevant and useful information.

“(2) CONSIDERATIONS.—In carrying out the collaboration described in paragraph (1), the Secretary and the Administrator shall pay particular attention to organizations that—

“(A) have members with expertise in energy efficiency and in the development, operation, and functionality of data centers, information technology equipment, and software, including representatives of hardware manufacturers, data center operators, and facility managers;

“(B) obtain and address input from the National Laboratories (as that term is defined in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801)) or any institution of higher education, research institution, industry association, company, or public interest group with applicable expertise;

“(C) follow—

“(i) commonly accepted procedures for the development of specifications; and

“(ii) accredited standards development processes;

or

“(D) have a mission to promote energy efficiency for data centers and information technology.

“(d) MEASUREMENTS AND SPECIFICATIONS.—The Secretary and the Administrator shall consider and assess the adequacy of the specifications, measurements, best practices, and benchmarks described in subsection (b) for use by the Federal Energy Management Program, the Energy Star Program, and other efficiency programs of the Department of Energy or the Environmental Protection Agency.

“(e) STUDY.—

“(1) DEFINITION OF REPORT.—In this subsection, the term ‘report’ means the report of the Lawrence Berkeley National Laboratory entitled ‘United States Data Center Energy Usage Report’ and dated June 2016, which was prepared as an update to the ‘Report to Congress on Server and Data Center Energy Efficiency’, published on August 2, 2007, pursuant to section 1 of Public Law 109–431 (120 Stat. 2920).

“(2) STUDY.—Not later than 4 years after the date of enactment of the Energy Act of 2020, the Secretary, in collaboration with the Administrator, shall make available to the public an update to the report that provides—

“(A) a comparison and gap analysis of the estimates and projections contained in the report with new data regarding the period from 2015 through 2019;

“(B) an analysis considering the impact of information technologies, including virtualization and cloud computing, in the public and private sectors;

“(C) an evaluation of the impact of the combination of cloud platforms, mobile devices, social media, and big data on data center energy usage;

“(D) an evaluation of water usage in data centers and recommendations for reductions in that water usage; and

“(E) updated projections and recommendations for best practices through fiscal year 2025.

“(f) DATA CENTER ENERGY PRACTITIONER PROGRAM.—

“(1) IN GENERAL.—The Secretary, in collaboration with key stakeholders and the Director of the Office of Management and Budget, shall maintain a data center energy practitioner program that provides for the certification of energy practitioners qualified to evaluate the energy usage and efficiency opportunities in federally owned and operated data centers.

“(2) EVALUATIONS.—Each Federal agency shall consider having the data centers of the agency evaluated once every 4 years by energy practitioners certified pursuant to the program, whenever practicable using certified practitioners employed by the agency.

“(g) OPEN DATA INITIATIVE.—

“(1) IN GENERAL.—The Secretary, in collaboration with key stakeholders and the Director of the Office of Management and Budget, shall establish an open data initiative relating to energy usage at federally owned and operated data centers, with the purpose of making the data available and accessible in a manner that encourages further data center innovation, optimization, and consolidation.

“(2) CONSIDERATION.—In establishing the initiative under paragraph (1), the Secretary shall consider using the online Data Center Maturity Model.

“(h) INTERNATIONAL SPECIFICATIONS AND METRICS.—The Secretary, in collaboration with key stakeholders, shall actively participate in efforts to harmonize global specifications and metrics for data center energy and water efficiency.

“(i) DATA CENTER UTILIZATION METRIC.—The Secretary, in collaboration with key stakeholders, shall facilitate in the development of an efficiency metric that measures the energy efficiency of a data center (including equipment and facilities).

“(j) PROTECTION OF PROPRIETARY INFORMATION.—The Secretary and the Administrator shall not disclose any proprietary information or trade secrets provided by any individual or company for the purposes of carrying out this section or the programs and initiatives established under this section.”.

SEC. 1004. ENERGY-EFFICIENT AND ENERGY-SAVING INFORMATION TECHNOLOGIES.

Section 543 of the National Energy Conservation Policy Act (42 U.S.C. 8253) is amended by adding at the end the following:

“(h) FEDERAL IMPLEMENTATION STRATEGY FOR ENERGY-EFFICIENT AND ENERGY-SAVING INFORMATION TECHNOLOGIES.—

“(1) DEFINITIONS.—In this subsection:

“(A) DIRECTOR.—The term ‘Director’ means the Director of the Office of Management and Budget.

“(B) INFORMATION TECHNOLOGY.—The term ‘information technology’ has the meaning given that term in section 11101 of title 40, United States Code.

“(2) DEVELOPMENT OF IMPLEMENTATION STRATEGY.—Not later than 1 year after the date of enactment of the Energy Act of 2020, each Federal agency shall coordinate with the Director, the Secretary, and the Administrator of the Environmental Protection Agency to develop an implementation strategy (including best-practices and measurement and verification techniques) for the maintenance, purchase, and use by the Federal agency of energy-efficient and energy-saving information technologies at or for facilities owned and operated by the Federal agency, taking into consideration the performance goals established under paragraph (4).

“(3) ADMINISTRATION.—In developing an implementation strategy under paragraph (2), each Federal agency shall consider—

“(A) advanced metering infrastructure;

“(B) energy efficient data center strategies and methods of increasing asset and infrastructure utilization;

“(C) advanced power management tools;

“(D) building information modeling, including building energy management;

“(E) secure telework and travel substitution tools; and

“(F) mechanisms to ensure that the agency realizes the energy cost savings of increased efficiency and utilization.

“(4) PERFORMANCE GOALS.—

“(A) IN GENERAL.—Not later than 180 days after the date of enactment of the Energy Act of 2020, the Director, in consultation with the Secretary, shall establish performance goals for evaluating the efforts of Federal agencies in improving the maintenance, purchase, and use of energy-efficient and energy-saving information technology at or for facilities owned and operated by the Federal agencies.

“(B) BEST PRACTICES.—The Chief Information Officers Council established under section 3603 of title 44, United States Code, shall recommend best practices for the attainment of the performance goals established under subparagraph (A), which shall include, to the extent applicable by law, consideration by a Federal agency of the use of—

“(i) energy savings performance contracting; and

“(ii) utility energy services contracting.

“(5) REPORTS.—

“(A) AGENCY REPORTS.—Each Federal agency shall include in the report of the agency under section 527 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17143) a description of the efforts and results of the agency under this subsection.

“(B) OMB GOVERNMENT EFFICIENCY REPORTS AND SCORECARDS.—Effective beginning not later than October 1, 2022, the Director shall include in the annual report and scorecard of the Director required under section 528 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17144) a description of the efforts and results of Federal agencies under this subsection.

“(C) USE OF EXISTING REPORTING STRUCTURES.—The Director may require Federal agencies to submit any information required to be submitted under this subsection through reporting structures in use as of the date of enactment of the Energy Act of 2020.”.

SEC. 1005. EXTENDED PRODUCT SYSTEM REBATE PROGRAM.

(a) DEFINITIONS.—In this section:

(1) ELECTRIC MOTOR.—The term “electric motor” has the meaning given the term in section 431.12 of title 10, Code of Federal Regulations (as in effect on the date of enactment of this Act).

(2) ELECTRONIC CONTROL.—The term “electronic control” means—

(A) a power converter; or

(B) a combination of a power circuit and control circuit included on 1 chassis.

(3) EXTENDED PRODUCT SYSTEM.—The term “extended product system” means an electric motor and any required associated electronic control and driven load that—

(A) offers variable speed or multispeed operation;

(B) offers partial load control that reduces input energy requirements (as measured in kilowatt-hours) as compared to identified base levels set by the Secretary of Energy (in this section referred to as the “Secretary”); and

(C)(i) has greater than 1 horsepower; and

(ii) uses an extended product system technology, as determined by the Secretary.

(4) QUALIFIED EXTENDED PRODUCT SYSTEM.—

(A) IN GENERAL.—The term “qualified extended product system” means an extended product system that—

(i) includes an electric motor and an electronic control; and

(ii) reduces the input energy (as measured in kilowatt-hours) required to operate the extended product system by not less than 5 percent, as compared to identified base levels set by the Secretary.

(B) INCLUSIONS.—The term “qualified extended product system” includes commercial or industrial machinery or equipment that—

(i)(I) did not previously make use of the extended product system prior to the redesign described in subclause (II); and

(II) incorporates an extended product system that has greater than 1 horsepower into redesigned machinery or equipment; and

(ii) was previously used prior to, and was placed back into service during, calendar year 2021 or 2022.

(b) ESTABLISHMENT.—Not later than 180 days after the date of enactment of this Act, the Secretary shall establish a program to provide rebates for expenditures made by qualified entities for the purchase or installation of a qualified extended product system.

(c) QUALIFIED ENTITIES.—

(1) ELIGIBILITY REQUIREMENTS.—A qualified entity under this section shall be—

(A) in the case of a qualified extended product system described in subsection (a)(4)(A), the purchaser of the qualified extended product that is installed; and

(B) in the case of a qualified extended product system described in subsection (a)(4)(B), the manufacturer of the commercial or industrial machinery or equipment that incorporated the extended product system into that machinery or equipment.

(2) APPLICATION.—To be eligible to receive a rebate under this section, a qualified entity shall submit to the Secretary—

(A) an application in such form, at such time, and containing such information as the Secretary may require; and

(B) a certification that includes demonstrated evidence—

(i) that the entity is a qualified entity; and

(ii)(I) in the case of a qualified entity described in paragraph (1)(A)—

(aa) that the qualified entity installed the qualified extended product system during the 2 fiscal years following the date of enactment of this Act;

(bb) that the qualified extended product system meets the requirements of subsection (a)(4)(A); and

(cc) showing the serial number, manufacturer, and model number from the nameplate of the installed motor of the qualified entity on which the qualified extended product system was installed; or

(II) in the case of a qualified entity described in paragraph (1)(B), demonstrated evidence—

(aa) that the qualified extended product system meets the requirements of subsection (a)(4)(B); and

(bb) showing the serial number, manufacturer, and model number from the nameplate of the installed motor of the qualified entity with which the extended product system is integrated.

(d) AUTHORIZED AMOUNT OF REBATE.—

(1) IN GENERAL.—The Secretary may provide to a qualified entity a rebate in an amount equal to the product obtained by multiplying—

(A) an amount equal to the sum of the nameplate rated horsepower of—

(i) the electric motor to which the qualified extended product system is attached; and

(ii) the electronic control; and

(B) \$25.

(2) MAXIMUM AGGREGATE AMOUNT.—A qualified entity shall not be entitled to aggregate rebates under this section in excess of \$25,000 per calendar year.

(e) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to carry out this section \$5,000,000 for each of fiscal years 2022 and 2023.

SEC. 1006. ENERGY EFFICIENT TRANSFORMER REBATE PROGRAM.

(a) **DEFINITIONS.**—In this section:

(1) **QUALIFIED ENERGY EFFICIENT TRANSFORMER.**—The term “qualified energy efficient transformer” means a transformer that meets or exceeds the applicable energy conservation standards described in the tables in subsection (b)(2) and paragraphs (1) and (2) of subsection (c) of section 431.196 of title 10, Code of Federal Regulations (as in effect on the date of enactment of this Act).

(2) **QUALIFIED ENERGY INEFFICIENT TRANSFORMER.**—The term “qualified energy inefficient transformer” means a transformer with an equal number of phases and capacity to a transformer described in any of the tables in subsection (b)(2) and paragraphs (1) and (2) of subsection (c) of section 431.196 of title 10, Code of Federal Regulations (as in effect on the date of enactment of this Act) that—

(A) does not meet or exceed the applicable energy conservation standards described in paragraph (1); and

(B)(i) was manufactured between January 1, 1987, and December 31, 2008, for a transformer with an equal number of phases and capacity as a transformer described in the table in subsection (b)(2) of section 431.196 of title 10, Code of Federal Regulations (as in effect on the date of enactment of this Act); or

(ii) was manufactured between January 1, 1992, and December 31, 2011, for a transformer with an equal number of phases and capacity as a transformer described in the table in paragraph (1) or (2) of subsection (c) of that section (as in effect on the date of enactment of this Act).

(3) **QUALIFIED ENTITY.**—The term “qualified entity” means an owner of industrial or manufacturing facilities, commercial buildings, or multifamily residential buildings, a utility, or an energy service company that fulfills the requirements of subsection (c).

(b) **ESTABLISHMENT.**—Not later than 90 days after the date of enactment of this Act, the Secretary of Energy (in this section referred to as the “Secretary”) shall establish a program to provide rebates to qualified entities for expenditures made by the qualified entity for the replacement of a qualified energy inefficient transformer with a qualified energy efficient transformer.

(c) **REQUIREMENTS.**—To be eligible to receive a rebate under this section, an entity shall submit to the Secretary an application in such form, at such time, and containing such information as the Secretary may require, including demonstrated evidence—

(1) that the entity purchased a qualified energy efficient transformer;

(2) of the core loss value of the qualified energy efficient transformer;

(3) of the age of the qualified energy inefficient transformer being replaced;

(4) of the core loss value of the qualified energy inefficient transformer being replaced—

(A) as measured by a qualified professional or verified by the equipment manufacturer, as applicable; or

(B) for transformers described in subsection (a)(2)(B)(i), as selected from a table of default values as determined

by the Secretary in consultation with applicable industry;
and

(5) that the qualified energy inefficient transformer has been permanently decommissioned and scrapped.

(d) **AUTHORIZED AMOUNT OF REBATE.**—The amount of a rebate provided under this section shall be—

(1) for a 3-phase or single-phase transformer with a capacity of not less than 10 and not greater than 2,500 kilovolt-amperes, twice the amount equal to the difference in Watts between the core loss value (as measured in accordance with paragraphs (2) and (4) of subsection (c)) of—

(A) the qualified energy inefficient transformer; and

(B) the qualified energy efficient transformer; or

(2) for a transformer described in subsection (a)(2)(B)(i), the amount determined using a table of default rebate values by rated transformer output, as measured in kilovolt-amperes, as determined by the Secretary in consultation with applicable industry.

(e) **AUTHORIZATION OF APPROPRIATIONS.**—There is authorized to be appropriated to carry out this section \$5,000,000 for each of fiscal years 2022 and 2023.

(f) **TERMINATION OF EFFECTIVENESS.**—The authority provided by this section terminates on December 31, 2023.

SEC. 1007. SMART BUILDING ACCELERATION.

(a) **DEFINITIONS.**—In this section:

(1) **DEPARTMENT.**—The term “Department” means the Department of Energy.

(2) **PROGRAM.**—The term “program” means the Federal Smart Building Program established under subsection (b)(1).

(3) **SECRETARY.**—The term “Secretary” means the Secretary of Energy.

(4) **SMART BUILDING.**—The term “smart building” means a building, or collection of buildings, with an energy system that—

(A) is flexible and automated;

(B) has extensive operational monitoring and communication connectivity, allowing remote monitoring and analysis of all building functions;

(C) takes a systems-based approach in integrating the overall building operations for control of energy generation, consumption, and storage;

(D) communicates with utilities and other third-party commercial entities, if appropriate;

(E) protects the health and safety of occupants and workers; and

(F) incorporates cybersecurity best practices.

(5) **SMART BUILDING ACCELERATOR.**—The term “smart building accelerator” means an initiative that is designed to demonstrate specific innovative policies and approaches—

(A) with clear goals and a clear timeline; and

(B) that, on successful demonstration, would accelerate investment in energy efficiency.

(b) **FEDERAL SMART BUILDING PROGRAM.**—

(1) **ESTABLISHMENT.**—Not later than 1 year after the date of enactment of this Act, the Secretary shall, in consultation

with the Administrator of General Services, establish a program to be known as the “Federal Smart Building Program”—

(A) to implement smart building technology; and

(B) to demonstrate the costs and benefits of smart buildings.

(2) SELECTION.—

(A) IN GENERAL.—The Secretary shall coordinate the selection of not fewer than 1 building from among each of several key Federal agencies, as described in paragraph (4), to compose an appropriately diverse set of smart buildings based on size, type, and geographic location.

(B) INCLUSION OF COMMERCIALY OPERATED BUILDINGS.—In making selections under subparagraph (A), the Secretary may include buildings that are owned by the Federal Government but are commercially operated.

(3) TARGETS.—Not later than 18 months after the date of enactment of this Act, the Secretary shall establish targets for the number of smart buildings to be commissioned and evaluated by key Federal agencies by 3 years and 6 years after the date of enactment of this Act.

(4) FEDERAL AGENCY DESCRIBED.—The key Federal agencies referred to paragraph (2)(A) shall include buildings operated by—

(A) the Department of the Army;

(B) the Department of the Navy;

(C) the Department of the Air Force;

(D) the Department;

(E) the Department of the Interior;

(F) the Department of Veterans Affairs; and

(G) the General Services Administration.

(5) REQUIREMENT.—In implementing the program, the Secretary shall leverage existing financing mechanisms including energy savings performance contracts, utility energy service contracts, and annual appropriations.

(6) EVALUATION.—Using the guidelines of the Federal Energy Management Program relating to whole-building evaluation, measurement, and verification, the Secretary shall evaluate the costs and benefits of the buildings selected under paragraph (2), including an identification of—

(A) which advanced building technologies—

(i) are most cost-effective; and

(ii) show the most promise for—

(I) increasing building energy savings;

(II) increasing service performance to building

occupants;

(III) reducing environmental impacts; and

(IV) establishing cybersecurity; and

(B) any other information the Secretary determines to be appropriate.

(7) AWARDS.—The Secretary may expand awards made under the Federal Energy Management Program and the Better Building Challenge to recognize specific agency achievements in accelerating the adoption of smart building technologies.

(c) SURVEY OF PRIVATE SECTOR SMART BUILDINGS.—

(1) SURVEY.—The Secretary shall conduct a survey of privately owned smart buildings throughout the United States, including commercial buildings, laboratory facilities, hospitals,

multifamily residential buildings, and buildings owned by non-profit organizations and institutions of higher education.

(2) **SELECTION.**—From among the smart buildings surveyed under paragraph (1), the Secretary shall select not fewer than 1 building each from an appropriate range of building sizes, types, and geographic locations.

(3) **EVALUATION.**—Using the guidelines of the Federal Energy Management Program relating to whole-building evaluation, measurement, and verification, the Secretary shall evaluate the costs and benefits of the buildings selected under paragraph (2), including an identification of—

(A) which advanced building technologies and systems—

(i) are most cost-effective; and

(ii) show the most promise for—

(I) increasing building energy savings;

(II) increasing service performance to building occupants;

(III) reducing environmental impacts; and

(IV) establishing cybersecurity; and

(B) any other information the Secretary determines to be appropriate.

(d) **BETTER BUILDING CHALLENGE.**—As part of the Better Building Challenge of the Department, the Secretary, in consultation with major private sector property owners, shall develop smart building accelerators to demonstrate innovative policies and approaches that will accelerate the transition to smart buildings in the public, institutional, and commercial buildings sectors.

(e) **RESEARCH AND DEVELOPMENT ON INTEGRATING BUILDINGS ONTO THE ELECTRIC GRID.**—

(1) **IN GENERAL.**—Subtitle B of title IV of the Energy Independence and Security Act of 2007 (42 U.S.C. 17081 et seq.) is amended by adding at the end the following:

“SEC. 426. ADVANCED INTEGRATION OF BUILDINGS ONTO THE ELECTRIC GRID.

“(a) **IN GENERAL.**—The Secretary shall establish a program of research, development, and demonstration to enable components of commercial and residential buildings to serve as dynamic energy loads on and resources for the electric grid. The program shall focus on—

“(1) developing low-cost, low power, wireless sensors to—

“(A) monitor building energy load;

“(B) forecast building energy need; and

“(C) enable building-level energy control;

“(2) developing data management capabilities and standard communication protocols to further interoperability at the building and grid-level;

“(3) developing advanced building-level energy management of components through integration of smart technologies, control systems, and data processing, to enable energy efficiency and savings;

“(4) optimizing energy consumption at the building level to enable grid stability and resilience;

“(5) improving visualization of behind the meter equipment and technologies to provide better insight into the energy needs and energy forecasts of individual buildings;

“(6) reducing the cost of key components to accelerate the adoption of smart building technologies;

“(7) protecting against cybersecurity threats and addressing security vulnerabilities of building systems or equipment; and

“(8) other areas determined appropriate by the Secretary.

“(b) CONSIDERATIONS.—In carrying out the program under subsection (a), the Secretary shall—

“(1) work with utility partners, building owners, technology vendors, and building developers to test and validate technologies and encourage the commercial application of these technologies by building owners; and

“(2) consider the specific challenges of enabling greater interaction between components of—

“(A) small- and medium-sized buildings and the electric grid; and

“(B) residential and commercial buildings and the electric grid.

“(c) BUILDINGS-TO-GRID INTEGRATION REPORT.—Not later than 1 year after the enactment of this section, the Secretary shall submit to the Committee on Science, Space, and Technology and the Committee on Energy and Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on the results of a study that examines the research, development, and demonstration opportunities, challenges, and standards needed to enable components of commercial and residential buildings to serve as dynamic energy loads on and resources for the electric grid.

“(1) REPORT REQUIREMENTS.—The report shall include—

“(A) an assessment of the technologies needed to enable building components as dynamic loads on and resources for the electric grid, including how such technologies can be—

“(i) incorporated into new commercial and residential buildings; and

“(ii) retrofitted in older buildings;

“(B) guidelines for the design of new buildings and building components to enable modern grid interactivity and improve energy efficiency;

“(C) an assessment of barriers to the adoption by building owners of advanced technologies enabling greater integration of building components onto the electric grid; and

“(D) an assessment of the feasibility of adopting technologies developed under subsection (a) at Department facilities.

“(2) RECOMMENDATIONS.—As part of the report, the Secretary shall develop a 10-year roadmap to guide the research, development, and demonstration program to enable components of commercial and residential buildings to serve as dynamic energy loads on and resources for the electric grid.

“(3) UPDATES.—The Secretary shall update the report required under this section every 3 years for the duration of the program under subsection (a) and shall submit the updated report to the Committee on Science, Space, and Technology and the Committee on Energy and Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

“(d) PROGRAM IMPLEMENTATION.—In carrying out this section, the Secretary shall—

“(1) implement the recommendations from the report in subsection (c); and

“(2) coordinate across all relevant program offices at the Department to achieve the goals established in this section, including the Office of Electricity.”.

(2) CONFORMING AMENDMENT.—The table of contents for the Energy Independence and Security Act of 2007 is amended by adding after the item relating to section 425 the following:

“Sec. 426. Advanced integration of buildings onto the electric grid.”.

(f) REPORT.—Not later than 2 years after the date of enactment of this Act, and every 2 years thereafter until a total of 3 reports have been made, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Energy and Commerce and the Committee on Science, Space, and Technology of the House of Representatives a report on—

(1) the establishment of the Federal Smart Building Program and the evaluation of Federal smart buildings under subsection (b);

(2) the survey and evaluation of private sector smart buildings under subsection (c); and

(3) any recommendations of the Secretary to further accelerate the transition to smart buildings.

SEC. 1008. MODIFICATIONS TO THE CEILING FAN ENERGY CONSERVATION STANDARD.

(a) IN GENERAL.—Section 325(ff)(6) of the Energy Policy and Conservation Act (42 U.S.C. 6295(ff)(6)) is amended by adding at the end the following:

“(C)(i) Large-diameter ceiling fans manufactured on or after January 21, 2020, shall—

“(I) not be required to meet minimum ceiling fan efficiency in terms of ratio of the total airflow to the total power consumption as described in the final rule titled ‘Energy Conservation Program: Energy Conservation Standards for Ceiling Fans’ (82 Fed. Reg. 6826 (January 19, 2017)); and

“(II) have a CFEI greater than or equal to—

“(aa) 1.00 at high speed; and

“(bb) 1.31 at 40 percent speed or the nearest speed that is not less than 40 percent speed.

“(ii) For purposes of this subparagraph, the term ‘CFEI’ means the Fan Energy Index for large-diameter ceiling fans, calculated in accordance with ANSI/AMCA Standard 208–18 titled ‘Calculation of the Fan Energy Index’, with the following modifications:

“(I) Using an Airflow Constant (Q_0) of 26,500 cubic feet per minute.

“(II) Using a Pressure Constant (P_0) of 0.0027 inches water gauge.

“(III) Using a Fan Efficiency Constant (η_0) of 42 percent.”.

(b) REVISION.—For purposes of section 325(m) of the Energy Policy and Conservation Act (42 U.S.C. 6295(m)), the standard established in section 325(ff)(6)(C) of such Act (as added by subsection (a) of this section) shall be treated as if such standard was issued on January 19, 2017.

SEC. 1009. REPORT ON ELECTROCHROMIC GLASS.

(a) **DEFINITION OF ELECTROCHROMIC GLASS.**—In this section, the term “electrochromic glass” means glass that uses electricity to change the light transmittance properties of the glass to heat or cool a structure.

(b) **REPORT.**—Not later than 1 year after the date of enactment of this Act, the Secretary of Energy, in collaboration with the heads of other relevant agencies, shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Energy and Commerce of the House of Representatives a report that addresses the benefits of electrochromic glass, including the following:

(1) Reductions in energy consumption in commercial buildings, especially peak cooling load reduction and annual energy bill savings.

(2) Benefits in the workplace, especially visual comfort and employee health.

(3) Benefits of natural light in hospitals for patients and staff, especially accelerated patient healing and recovery time.

SEC. 1010. ENERGY AND WATER FOR SUSTAINABILITY.

(a) **NEXUS OF ENERGY AND WATER FOR SUSTAINABILITY.**—

(1) **DEFINITIONS.**—In this section:

(A) **DEPARTMENT.**—The term “Department” means the Department of Energy.

(B) **ENERGY-WATER NEXUS.**—The term “energy-water nexus” means the links between—

(i) the water needed to produce fuels, electricity, and other forms of energy; and

(ii) the energy needed to transport, reclaim, and treat water and wastewater.

(C) **INTERAGENCY RD&D COORDINATION COMMITTEE.**—The term “Interagency RD&D Coordination Committee” means the Interagency RD&D Coordination Committee on the Nexus of Energy and Water for Sustainability (or the “NEWS RD&D Committee”) established under paragraph (3)(A).

(D) **NEXUS OF ENERGY AND WATER SUSTAINABILITY RD&D OFFICE; NEWS RD&D OFFICE.**—The term “Nexus of Energy and Water Sustainability RD&D Office” or the “NEWS RD&D Office” means an office located at the Department and managed in cooperation with the Department of the Interior pursuant to an agreement between the 2 agencies to carry out leadership and administrative functions for the Interagency RD&D Coordination Committee.

(E) **RD&D.**—The term “RD&D” means research, development, and demonstration.

(F) **SECRETARY.**—The term “Secretary” means the Secretary of Energy.

(2) **STATEMENT OF POLICY.**—Recognizing States’ primacy over allocation and administration of water resources (except in specific instances where preempted under Federal law) and the siting of energy infrastructure within State boundaries on non-Federal lands, it is the national policy that the Federal government, in all energy-water nexus management activities, shall maximize coordination and consultation among Federal

agencies and with State and local governments, and disseminate information to the public in the most effective manner.

(3) INTERAGENCY RD&D COORDINATION COMMITTEE.—

(A) ESTABLISHMENT.—Not later than 180 days after the date of enactment of this Act, the Secretary and the Secretary of the Interior shall establish the joint NEWS RD&D Office and Interagency RD&D Coordination Committee on the Nexus of Energy and Water for Sustainability (or the “NEWS RD&D Committee”) to carry out the duties described in subparagraph (C).

(B) ADMINISTRATION.—

(i) CHAIRS.—The Secretary and the Secretary of the Interior shall jointly manage the NEWS RD&D Office and serve as co-chairs of the Interagency RD&D Coordination Committee.

(ii) MEMBERSHIP; STAFFING.—Membership and staffing shall be determined by the co-chairs.

(C) DUTIES.—The Interagency RD&D Coordination Committee shall—

(i) serve as a forum for developing common Federal goals and plans on energy-water nexus RD&D activities, in coordination with the National Science and Technology Council;

(ii) not later than 1 year after the date of enactment of this Act, and biennially thereafter, issue a strategic plan on energy-water nexus RD&D activities, priorities, and objectives pursuant to subparagraph (D), which shall be developed in consultation with relevant State and local governments;

(iii) convene and promote coordination of RD&D activities of relevant Federal departments and agencies on energy-water nexus;

(iv)(I) coordinate and develop capabilities and methodologies related to RD&D activities for data collection, data communication protocols (including models and modeling results), data management, and dissemination of validated data and results related to energy-water nexus RD&D activities to requesting Federal departments and agencies; and

(II) promote information exchange between Federal departments and agencies—

(aa) to identify and document Federal and non-Federal RD&D programs and funding opportunities that support basic and applied RD&D proposals to advance energy-water nexus related science and technologies;

(bb) to leverage existing RD&D programs by encouraging joint solicitations, block grants, and matching programs with non-Federal entities; and

(cc) to identify opportunities for domestic and international public-private partnerships, innovative financing mechanisms, and information and data exchange with respect to RD&D activities;

(v) identify ways to leverage existing RD&D programs, including programs at the State and local level;

(vi) make publicly available the results of RD&D activities on the energy water nexus;

(vii) with regard to RD&D programs, recommend improvements and best practices for the collection and dissemination of federal water use data and the use of monitoring networks; and

(viii) promote coordination on RD&D with non-Federal interests by—

(I) consulting with representatives of research and academic institutions, State, local, and Tribal governments, public utility commissions, and industry, who have expertise in technologies, technological innovations, or practices relating to the energy-water nexus; and

(II) considering conducting technical workshops.

(D) STRATEGIC PLAN.—In developing the strategic plan pursuant to (C)(ii), the Interagency RD&D Coordination Committee shall—

(i) to the maximum extent possible, avoid duplication with other Federal RD&D programs, and projects, including with those of the National Laboratories;

(ii) consider inclusion of specific research, development and demonstration needs, including—

(I) innovative practices, technologies and other advancements improving water efficiency, treatment, recovery, or reuse associated with energy generation, including cooling, and fuel production;

(II) innovative practices, technologies and other advancements associated with energy use in water collection, supply, delivery, distribution, treatment, or reuse;

(III) innovative practices, technologies and other advancements associated with generation or production of energy from water or wastewater systems; and

(IV) modeling and systems analysis related to energy-water nexus; and

(iii) submit the plan to the Committee on Energy and Natural Resources of the Senate and the Committees on Science, Space, and Technology, Energy and Commerce, and Natural Resources of the House of Representatives.

(E) RULES OF CONSTRUCTION.—

(i) Nothing in this section grants to the Interagency RD&D Coordination Committee the authority to promulgate regulations or set standards.

(ii) Notwithstanding any other provision of law, nothing in this section shall be construed to require State, Tribal, or local governments to take any action that may result in an increased financial burden to such governments.

(F) ADDITIONAL PARTICIPATION.—In developing the strategic plan described in subparagraph (C)(ii), the Secretary shall consult and coordinate with a diverse group of representatives from research and academic institutions, industry, public utility commissions, and State and local governments who have expertise in technologies and practices relating to the energy-water nexus.

(G) REVIEW; REPORT.—At the end of the 5-year period beginning on the date on which the Interagency RD&D Coordination Committee and NEWS RD&D Office are established, the NEWS RD&D Office shall—

(i) review the activities, relevance, and effectiveness of the Interagency RD&D Coordination Committee; and

(ii) submit to the Committee on Energy and Natural Resources of the Senate and the Committees on Science, Space, and Technology, Energy and Commerce, and Natural Resources of the House of Representatives a report that—

(I) describes the results of the review conducted under clause (i); and

(II) includes a recommendation on whether the Interagency RD&D Coordination Committee should continue.

(4) CROSSCUT BUDGET.—Not later than 30 days after the President submits the budget of the United States Government under section 1105 of title 31, United States Code, the co-chairs of the Interagency RD&D Coordination Committee (acting through the NEWS RD&D Office) shall submit to the Committee on Energy and Natural Resources of the Senate and the Committees on Science, Space, and Technology, Energy and Commerce, and Natural Resources of the House of Representatives, an interagency budget crosscut report that displays at the program-, project-, and activity-level for each of the Federal agencies that carry out or support (including through grants, contracts, interagency and intraagency transfers, and multiyear and no-year funds) basic and applied RD&D activities to advance the energy-water nexus related science and technologies, including—

(A) the budget proposed in the budget request of the President for the upcoming fiscal year;

(B) expenditures and obligations for the prior fiscal year; and

(C) estimated expenditures and obligations for the current fiscal year.

(5) TERMINATION.—

(A) IN GENERAL.—The authority provided to the NEWS RD&D Office and NEWS RD&D Committee under this subsection shall terminate on the date that is 7 years after the date of enactment of this Act.

(B) EFFECT.—The termination of authority under subparagraph (A) shall not affect ongoing interagency planning, coordination, or other RD&D activities relating to the energy-water nexus.

(b) INTEGRATING ENERGY AND WATER RESEARCH.—The Secretary shall integrate the following considerations into energy RD&D programs and projects of the Department by—

(1) advancing RD&D for energy and energy efficiency technologies and practices that meet the objectives of—

(A) minimizing freshwater withdrawal and consumption;

(B) increasing water use efficiency; and

(C) utilizing nontraditional water sources;

(2) considering the effects climate variability may have on water supplies and quality for energy generation and fuel production; and

(3) improving understanding of the energy-water nexus (as defined in subsection (a)(1)).

(c) **ADDITIONAL ACTIVITIES.**—The Secretary may provide for such additional RD&D activities as appropriate to integrate the considerations described in subsection (b) into the RD&D activities of the Department.

SEC. 1011. WEATHERIZATION ASSISTANCE PROGRAM.

(a) **REAUTHORIZATION OF WEATHERIZATION ASSISTANCE PROGRAM.**—Section 422 of the Energy Conservation and Production Act (42 U.S.C. 6872) is amended by striking paragraphs (1) through (5) and inserting the following:

“(1) \$330,000,000 for fiscal year 2021; and

“(2) \$350,000,000 for each of fiscal years 2022 through 2025.”

(b) **MODERNIZING THE DEFINITION OF WEATHERIZATION MATERIALS.**—Section 412(9)(J) of the Energy Conservation and Production Act (42 U.S.C. 6862(9)(J)) is amended—

(1) by inserting “, including renewable energy technologies and other advanced technologies,” after “devices or technologies”; and

(2) by striking “, the Secretary of Agriculture, and the Director of the Community Services Administration”.

(c) **CONSIDERATION OF HEALTH BENEFITS.**—Section 413(b) of the Energy Conservation and Production Act (42 U.S.C. 6863(b)) is amended—

(1) in paragraph (3)—

(A) by striking “and with the Director of the Community Services Administration”;

(B) by inserting “and by” after “in carrying out this part,”; and

(C) by striking “, and the Director of the Community Services Administration in carrying out weatherization programs under section 222(a)(12) of the Economic Opportunity Act of 1964”;

(2) by redesignating paragraphs (4) through (6) as paragraphs (5) through (7), respectively; and

(3) by inserting after paragraph (3), the following:

“(4) The Secretary may amend the regulations prescribed under paragraph (1) to provide that the standards described in paragraph (2)(A) take into consideration improvements in the health and safety of occupants of dwelling units, and other non-energy benefits, from weatherization.”

(d) **CONTRACTOR OPTIMIZATION.**—

(1) **IN GENERAL.**—The Energy Conservation and Production Act is amended by inserting after section 414B (42 U.S.C. 6864b) the following:

“SEC. 414C. CONTRACTOR OPTIMIZATION.

“(a) **IN GENERAL.**—The Secretary may request that entities receiving funding from the Federal Government or from a State through a weatherization assistance program under section 413 or section 414 perform periodic reviews of the use of private contractors in the provision of weatherization assistance, and encourage expanded use of contractors as appropriate.

“(b) USE OF TRAINING FUNDS.—Entities described in subsection (a) may use funding described in such subsection to train private, non-Federal entities that are contracted to provide weatherization assistance under a weatherization program, in accordance with rules determined by the Secretary.”

(2) TABLE OF CONTENTS AMENDMENT.—The table of contents for the Energy Conservation and Production Act is amended by inserting after the item relating to section 414B the following:

“Sec. 414C. Contractor optimization.”

(e) FINANCIAL ASSISTANCE FOR WAP ENHANCEMENT AND INNOVATION.—

(1) IN GENERAL.—The Energy Conservation and Production Act is amended by inserting after section 414C (as added by subsection (d) of this section) the following:

“SEC. 414D. FINANCIAL ASSISTANCE FOR WAP ENHANCEMENT AND INNOVATION.

“(a) PURPOSES.—The purposes of this section are—

“(1) to expand the number of dwelling units that are occupied by low-income persons that receive weatherization assistance by making such dwelling units weatherization-ready;

“(2) to promote the deployment of renewable energy in dwelling units that are occupied by low-income persons;

“(3) to ensure healthy indoor environments by enhancing or expanding health and safety measures and resources available to dwellings that are occupied by low-income persons;

“(4) to disseminate new methods and best practices among entities providing weatherization assistance; and

“(5) to encourage entities providing weatherization assistance to hire and retain employees who are individuals—

“(A) from the community in which the assistance is provided; and

“(B) from communities or groups that are underrepresented in the home energy performance workforce, including religious and ethnic minorities, women, veterans, individuals with disabilities, and individuals who are socioeconomically disadvantaged.

“(b) FINANCIAL ASSISTANCE.—The Secretary shall, to the extent funds are made available, award financial assistance, on an annual basis, through a competitive process to entities receiving funding from the Federal Government or from a State, tribal organization, or unit of general purpose local government through a weatherization program under section 413 or section 414, or to nonprofit entities, to be used by such an entity—

“(1) with respect to dwelling units that are occupied by low-income persons, to—

“(A) implement measures to make such dwelling units weatherization-ready by addressing structural, plumbing, roofing, and electrical issues, environmental hazards, or other measures that the Secretary determines to be appropriate;

“(B) install energy efficiency technologies, including home energy management systems, smart devices, and other technologies the Secretary determines to be appropriate;

“(C) install renewable energy systems (as defined in section 415(c)(6)(A)); and

“(D) implement measures to ensure healthy indoor environments by improving indoor air quality, accessibility, and other healthy homes measures as determined by the Secretary;

“(2) to improve the capability of the entity—

“(A) to significantly increase the number of energy retrofits performed by such entity;

“(B) to replicate best practices for work performed pursuant to this section on a larger scale;

“(C) to leverage additional funds to sustain the provision of weatherization assistance and other work performed pursuant to this section after financial assistance awarded under this section is expended; and

“(D) to hire and retain employees who are individuals described subsection (a)(5);

“(3) for innovative outreach and education regarding the benefits and availability of weatherization assistance and other assistance available pursuant to this section;

“(4) for quality control of work performed pursuant to this section;

“(5) for data collection, measurement, and verification with respect to such work;

“(6) for program monitoring, oversight, evaluation, and reporting regarding such work;

“(7) for labor, training, and technical assistance relating to such work;

“(8) for planning, management, and administration (up to a maximum of 15 percent of the assistance provided); and

“(9) for such other activities as the Secretary determines to be appropriate.

“(c) AWARD FACTORS.—In awarding financial assistance under this section, the Secretary shall consider—

“(1) the applicant’s record of constructing, renovating, repairing, or making energy efficient single-family, multifamily, or manufactured homes that are occupied by low-income persons, either directly or through affiliates, chapters, or other partners (using the most recent year for which data are available);

“(2) the number of dwelling units occupied by low-income persons that the applicant has built, renovated, repaired, weatherized, or made more energy efficient in the 5 years preceding the date of the application;

“(3) the qualifications, experience, and past performance of the applicant, including experience successfully managing and administering Federal funds;

“(4) the strength of an applicant’s proposal to achieve one or more of the purposes under subsection (a);

“(5) the extent to which such applicant will utilize partnerships and regional coordination to achieve one or more of the purposes under subsection (a);

“(6) regional and climate zone diversity;

“(7) urban, suburban, and rural localities; and

“(8) such other factors as the Secretary determines to be appropriate.

“(d) APPLICATIONS.—

“(1) ADMINISTRATION.—To be eligible for an award of financial assistance under this section, an applicant shall submit to the Secretary an application in such manner and containing such information as the Secretary may require.

“(2) AWARDS.—Subject to the availability of appropriations, not later than 270 days after the date of enactment of this section, the Secretary shall make a first award of financial assistance under this section.

“(e) MAXIMUM AMOUNT AND TERM.—

“(1) IN GENERAL.—The total amount of financial assistance awarded to an entity under this section shall not exceed \$2,000,000.

“(2) TECHNICAL AND TRAINING ASSISTANCE.—The total amount of financial assistance awarded to an entity under this section shall be reduced by the cost of any technical and training assistance provided by the Secretary that relates to such financial assistance.

“(3) TERM.—The term of an award of financial assistance under this section shall not exceed 3 years.

“(4) RELATIONSHIP TO FORMULA GRANTS.—An entity may use financial assistance awarded to such entity under this section in conjunction with other financial assistance provided to such entity under this part.

“(f) REQUIREMENTS.—Not later than 90 days after the date of enactment of this section, the Secretary shall issue requirements to implement this section, including, for entities receiving financial assistance under this section—

“(1) standards for allowable expenditures;

“(2) a minimum saving-to-investment ratio; and

“(3) standards for—

“(A) training programs;

“(B) energy audits;

“(C) the provision of technical assistance;

“(D) monitoring activities carried out using such financial assistance;

“(E) verification of energy and cost savings;

“(F) liability insurance requirements; and

“(G) recordkeeping and reporting requirements, which shall include reporting to the Office of Weatherization and Intergovernmental Programs of the Department of Energy applicable data on each dwelling unit retrofitted or otherwise assisted pursuant to this section.

“(g) COMPLIANCE WITH STATE AND LOCAL LAW.—Nothing in this section supersedes or otherwise affects any State or local law, to the extent that the State or local law contains a requirement that is more stringent than the applicable requirement of this section.

“(h) REVIEW AND EVALUATION.—The Secretary shall review and evaluate the performance of each entity that receives an award of financial assistance under this section (which may include an audit).

“(i) ANNUAL REPORT.—The Secretary shall submit to Congress an annual report that provides a description of—

“(1) actions taken under this section to achieve the purposes of this section; and

“(2) accomplishments as a result of such actions, including energy and cost savings achieved.

“(j) FUNDING.—

“(1) AMOUNTS.—

“(A) IN GENERAL.—For each of fiscal years 2021 through 2025, of the amount made available under section 422 for such fiscal year to carry out the weatherization program under this part (not including any of such amount made available for Department of Energy headquarters training or technical assistance), not more than—

“(i) 2 percent of such amount (if such amount is \$225,000,000 or more but less than \$260,000,000) may be used to carry out this section;

“(ii) 4 percent of such amount (if such amount is \$260,000,000 or more but less than \$300,000,000) may be used to carry out this section; and

“(iii) 6 percent of such amount (if such amount is \$300,000,000 or more) may be used to carry out this section.

“(B) MINIMUM.—For each of fiscal years 2021 through 2025, if the amount made available under section 422 (not including any of such amount made available for Department of Energy headquarters training or technical assistance) for such fiscal year is less than \$225,000,000, no funds shall be made available to carry out this section.

“(2) LIMITATION.—For any fiscal year, the Secretary may not use more than \$25,000,000 of the amount made available under section 422 to carry out this section.

“(k) TERMINATION.—The Secretary may not award financial assistance under this section after September 30, 2025.”

(2) TABLE OF CONTENTS.—The table of contents for the Energy Conservation and Production Act is amended by inserting after the item relating to section 414C the following:

“Sec. 414D. Financial assistance for WAP enhancement and innovation.”

(f) HIRING.—

(1) IN GENERAL.—The Energy Conservation and Production Act is amended by inserting after section 414D (as added by subsection (e) of this section) the following:

“SEC. 414E. HIRING.

“The Secretary may, as the Secretary determines appropriate, encourage entities receiving funding from the Federal Government or from a State through a weatherization program under section 413 or section 414, to prioritize the hiring and retention of employees who are individuals described in section 414D(a)(5).”

(2) TABLE OF CONTENTS.—The table of contents for the Energy Conservation and Production Act is amended by inserting after the item relating to section 414D the following:

“Sec. 414E. Hiring.”

(g) INCREASE IN ADMINISTRATIVE FUNDS.—Section 415(a)(1) of the Energy Conservation and Production Act (42 U.S.C. 6865(a)(1)) is amended by striking “10 percent” and inserting “15 percent”.

(h) AMENDING RE-WEATHERIZATION DATE.—Paragraph (2) of section 415(c) of the Energy Conservation and Production Act (42 U.S.C. 6865(c)) is amended to read as follows:

“(2) Dwelling units weatherized (including dwelling units partially weatherized) under this part, or under other Federal programs

(in this paragraph referred to as ‘previous weatherization’), may not receive further financial assistance for weatherization under this part until the date that is 15 years after the date such previous weatherization was completed. This paragraph does not preclude dwelling units that have received previous weatherization from receiving assistance and services (including the provision of information and education to assist with energy management and evaluation of the effectiveness of installed weatherization materials) other than weatherization under this part or under other Federal programs, or from receiving non-Federal assistance for weatherization.”.

(i) ANNUAL REPORT.—Section 421 of the Energy Conservation and Production Act (42 U.S.C. 6871) is amended by inserting “the number of multifamily buildings in which individual dwelling units were weatherized during the previous year, the number of individual dwelling units in multifamily buildings weatherized during the previous year,” after “the average size of the dwellings being weatherized,”.

(j) REPORT ON WAIVERS.—Not later than 180 days after the date of enactment of this Act, the Secretary of Energy shall submit to Congress a report on the status of any request made after September 30, 2010, for a waiver of any requirement under section 200.313 of title 2, Code of Federal Regulations, as such requirement applies with respect to the weatherization assistance program under part A of title IV of the Energy Conservation and Production Act (42 U.S.C. 6861 et seq.), including a description of any such waiver that has been granted and any such request for a waiver that has been considered but not granted.

SEC. 1012. FEDERAL ENERGY MANAGEMENT PROGRAM.

Section 543 of the National Energy Conservation Policy Act (42 U.S.C. 8253) is further amended by adding at the end the following:

“(i) FEDERAL ENERGY MANAGEMENT PROGRAM.—

“(1) IN GENERAL.—The Secretary shall carry out a program, to be known as the ‘Federal Energy Management Program’ (referred to in this subsection as the ‘Program’), to facilitate the implementation by the Federal Government of cost-effective energy and water management and energy-related investment practices—

“(A) to coordinate and strengthen Federal energy and water resilience; and

“(B) to promote environmental stewardship.

“(2) FEDERAL DIRECTOR.—The Secretary shall appoint an individual to serve as the director of the Program (referred to in this subsection as the ‘Federal Director’), which shall be a career position in the Senior Executive service, to administer the Program.

“(3) PROGRAM ACTIVITIES.—

“(A) STRATEGIC PLANNING AND TECHNICAL ASSISTANCE.—In administering the Program, the Federal Director shall—

“(i) provide technical assistance and project implementation support and guidance to agencies to identify, implement, procure, and track energy and water conservation measures required under this Act and under other provisions of law;

“(ii) in coordination with the Administrator of the General Services Administration, establish appropriate procedures, methods, and best practices for use by agencies to select, monitor, and terminate contracts entered into pursuant to a utility incentive program under section 546(c) with utilities;

“(iii) carry out the responsibilities of the Secretary under section 801, as determined appropriate by the Secretary;

“(iv) establish and maintain internet-based information resources and project tracking systems and tools for energy and water management;

“(v) coordinate comprehensive and strategic approaches to energy and water resilience planning for agencies; and

“(vi) establish a recognition program for Federal achievement in energy and water management, energy-related investment practices, environmental stewardship, and other relevant areas, through events such as individual recognition award ceremonies and public announcements.

“(B) ENERGY AND WATER MANAGEMENT AND REPORTING.—In administering the Program, the Federal Director shall—

“(i) track and report on the progress of agencies in meeting the requirements of the agency under this section;

“(ii) make publicly available agency performance data required under—

“(I) this section and sections 544, 546, 547, and 548; and

“(II) section 203 of the Energy Policy Act of 2005 (42 U.S.C. 15852);

“(iii)(I) collect energy and water use and consumption data from each agency; and

“(II) based on that data, submit to each agency a report that will facilitate the energy and water management, energy-related investment practices, and environmental stewardship of the agency in support of Federal goals under this Act and under other provisions of law;

“(iv) carry out the responsibilities of the Secretary under section 305 of the Energy Conservation and Production Act (42 U.S.C. 6834);

“(v) in consultation with the Administrator of the General Services Administration, acting through the head of the Office of High-Performance Green Buildings, establish and implement sustainable design principles for Federal facilities; and

“(vi) designate products that meet the highest energy conservation standards for categories not covered under the Energy Star program established under section 324A of the Energy Policy and Conservation Act (42 U.S.C. 6294a).

“(C) FEDERAL INTERAGENCY COORDINATION.—In administering the Program, the Federal Director shall—

“(i) develop and implement accredited training consistent with existing Federal programs and activities—

“(I) relating to energy and water use, management, and resilience in Federal facilities, energy-related investment practices, and environmental stewardship; and

“(II) that includes in-person training, internet-based programs, and national in-person training events;

“(ii) carry out the functions of the Secretary with respect to the Interagency Energy Management Task Force under section 547; and

“(iii) report on the implementation of the priorities of the President, including Executive orders, relating to energy and water use in Federal facilities, in coordination with—

“(I) the Office of Management and Budget;

“(II) the Council on Environmental Quality;

and

“(III) any other entity, as considered necessary by the Federal Director.

“(D) FACILITY AND FLEET OPTIMIZATION.—In administering the Program, the Federal Director shall develop guidance, supply assistance to, and track the progress of agencies—

“(i) in conducting portfolio-wide facility energy and water resilience planning and project integration;

“(ii) in building new construction and major renovations to meet the sustainable design and energy and water performance standards required under this section;

“(iii) in developing guidelines for—

“(I) facility commissioning; and

“(II) facility operations and maintenance; and

“(iv) in coordination with the Administrator of the General Services Administration, in meeting statutory and agency goals for Federal fleet vehicles.

“(4) MANAGEMENT COUNCIL.—The Federal Director shall establish a management council to advise the Federal Director that shall—

“(A) convene not less frequently than once every quarter; and

“(B) consist of representatives from—

“(i) the Council on Environmental Quality;

“(ii) the Office of Management and Budget; and

“(iii) the Office of Federal High-Performance Green Buildings in the General Services Administration.

“(5) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out this subsection \$36,000,000 for each of fiscal years 2021 through 2025.”.

SEC. 1013. CHP TECHNICAL ASSISTANCE PARTNERSHIP PROGRAM.

(a) IN GENERAL.—Section 375 of the Energy Policy and Conservation Act (42 U.S.C. 6345) is amended to read as follows:

“SEC. 375. CHP TECHNICAL ASSISTANCE PARTNERSHIP PROGRAM.

“(a) RENAMING.—

“(1) IN GENERAL.—The Clean Energy Application Centers of the Department of Energy are redesignated as the CHP Technical Assistance Partnership Program (referred to in this section as the ‘Program’).

“(2) PROGRAM DESCRIPTION.—The Program shall consist of—

“(A) the 10 regional CHP Technical Assistance Partnerships in existence on the date of enactment of the Energy Act of 2020;

“(B) such other regional CHP Technical Assistance Partnerships as the Secretary may establish with consideration given to establishing such partnerships in rural communities; and

“(C) any supporting technical activities under the Technical Partnership Program of the Advanced Manufacturing Office.

“(3) REFERENCES.—Any reference in any law, rule, regulation, or publication to a Combined Heat and Power Application Center or a Clean Energy Application Center shall be deemed to be a reference to the Program.

“(b) CHP TECHNICAL ASSISTANCE PARTNERSHIP PROGRAM.—

“(1) IN GENERAL.—The Program shall—

“(A) operate programs to encourage deployment of combined heat and power, waste heat to power, and efficient district energy (collectively referred to in this subsection as ‘CHP’) technologies by providing education and outreach to—

“(i) building, industrial, and electric and natural gas utility professionals;

“(ii) State and local policymakers; and

“(iii) other individuals and organizations with an interest in efficient energy use, local or opportunity fuel use, resiliency, or energy security, microgrids, and district energy; and

“(B) provide project specific support to building and industrial professionals through economic and engineering assessments and advisory activities.

“(2) FUNDING FOR CERTAIN ACTIVITIES.—

“(A) IN GENERAL.—The Program shall make funds available to institutions of higher education, research centers, and other appropriate institutions to ensure the continued operations and effectiveness of the regional CHP Technical Assistance Partnerships.

“(B) USE OF FUNDS.—Funds made available under subparagraph (A) may be used—

“(i) to collect and distribute informational materials relevant to manufacturers, commercial buildings, institutional facilities, and Federal sites, including continued support of the mission goals of the Department of Defense, on CHP and microgrid technologies, including continuation and updating of—

“(I) the CHP installation database;

“(II) CHP technology potential analyses;

“(III) State CHP resource pages; and

“(IV) CHP Technical Assistance Partnerships websites;

“(ii) to produce and conduct workshops, reports, seminars, internet programs, CHP resiliency resources, and other activities to provide education to end users, regulators, and stakeholders in a manner that leads to the deployment of CHP technologies;

“(iii) to provide or coordinate onsite assessments for sites and enterprises that may consider deployment of CHP technology, including the potential use of biomass CHP systems;

“(iv) to identify candidates for deployment of CHP technologies, hybrid renewable-CHP technologies, biomass CHP, microgrids, and clean energy;

“(v) to provide nonbiased engineering support to sites considering deployment of CHP technologies;

“(vi) to assist organizations and communities, including rural communities, developing clean energy technologies and policies in overcoming barriers to deployment; and

“(vii) to assist companies, communities (including rural communities), and organizations with field validation and performance evaluations of CHP and other clean energy technologies implemented.

“(C) DURATION.—The Program shall make funds available under subparagraph (A) for a period of 5 years.

“(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section \$12,000,000 for each of fiscal years 2021 through 2025.”.

(b) CONFORMING AMENDMENT.—The table of contents of the Energy Policy and Conservation Act is amended by striking the item relating to section 375 and inserting the following:

“375. CHP Technical Assistance Partnership Program.”.

SEC. 1014. SMART ENERGY WATER EFFICIENCY PILOT PROGRAM.

(a) SMART ENERGY AND WATER EFFICIENCY PILOT PROGRAM.—Subtitle A of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16191 et seq.) is amended by adding at the end the following:

“SEC. 918. SMART ENERGY AND WATER EFFICIENCY PILOT PROGRAM.

“(a) DEFINITIONS.—In this section:

“(1) ELIGIBLE ENTITY.—The term ‘eligible entity’ means—

“(A) a utility;

“(B) a municipality;

“(C) a water district;

“(D) an Indian Tribe or Alaska Native village; and

“(E) any other authority that provides water, wastewater, or water reuse services.

“(2) SMART ENERGY AND WATER EFFICIENCY PILOT PROGRAM.—The term ‘smart energy and water efficiency pilot program’ or ‘pilot program’ means the pilot program established under subsection (b).

“(b) SMART ENERGY AND WATER EFFICIENCY PILOT PROGRAM.—

“(1) IN GENERAL.—The Secretary shall establish and carry out a smart energy and water efficiency pilot program in accordance with this section.

“(2) PURPOSE.—The purpose of the smart energy and water efficiency pilot program is to award grants to eligible entities

to demonstrate unique, advanced, or innovative technology-based solutions that will—

“(A) improve the net energy balance of water, wastewater, and water reuse systems;

“(B) improve the net energy balance of water, wastewater, and water reuse systems to help communities across the United States make measurable progress in conserving water, saving energy, and reducing costs;

“(C) support the implementation of innovative and unique processes and the installation of established advanced automated systems that provide real-time data on energy and water; and

“(D) improve energy-water conservation and quality and predictive maintenance through technologies that utilize internet connected technologies, including sensors, intelligent gateways, and security embedded in hardware.

“(3) PROJECT SELECTION.—

“(A) IN GENERAL.—The Secretary shall make competitive, merit-reviewed grants under the pilot program to not less than 3, but not more than 5, eligible entities.

“(B) SELECTION CRITERIA.—In selecting an eligible entity to receive a grant under the pilot program, the Secretary shall consider—

“(i) energy and cost savings;

“(ii) the uniqueness, commercial viability, and reliability of the technology to be used;

“(iii) the degree to which the project integrates next-generation sensors software, analytics, and management tools;

“(iv) the anticipated cost-effectiveness of the pilot project through measurable energy savings, water savings or reuse, and infrastructure costs averted;

“(v) whether the technology can be deployed in a variety of geographic regions and the degree to which the technology can be implemented in a wide range of applications ranging in scale from small towns to large cities, including Tribal communities;

“(vi) whether the technology has been successfully deployed elsewhere;

“(vii) whether the technology was sourced from a manufacturer based in the United States; and

“(viii) whether the project will be completed in 5 years or less.

“(C) APPLICATIONS.—

“(i) IN GENERAL.—Subject to clause (ii), an eligible entity seeking a grant under the pilot program shall submit to the Secretary an application at such time, in such manner, and containing such information as the Secretary determines to be necessary.

“(ii) CONTENTS.—An application under clause (i) shall, at a minimum, include—

“(I) a description of the project;

“(II) a description of the technology to be used in the project;

“(III) the anticipated results, including energy and water savings, of the project;

“(IV) a comprehensive budget for the project;

“(V) the names of the project lead organization and any partners;

“(VI) the number of users to be served by the project;

“(VII) a description of the ways in which the proposal would meet performance measures established by the Secretary; and

“(VIII) any other information that the Secretary determines to be necessary to complete the review and selection of a grant recipient.

“(4) ADMINISTRATION.—

“(A) IN GENERAL.—Not later than 1 year after the date of enactment of this section, the Secretary shall select grant recipients under this section.

“(B) EVALUATIONS.—

“(i) ANNUAL EVALUATIONS.—The Secretary shall annually carry out an evaluation of each project for which a grant is provided under this section that meets performance measures and benchmarks developed by the Secretary, consistent with the purposes of this section.

“(ii) REQUIREMENTS.—Consistent with the performance measures and benchmarks developed under clause (i), in carrying out an evaluation under that clause, the Secretary shall—

“(I) evaluate the progress and impact of the project; and

“(II) assess the degree to which the project is meeting the goals of the pilot program.

“(C) TECHNICAL AND POLICY ASSISTANCE.—On the request of a grant recipient, the Secretary shall provide technical and policy assistance.

“(D) BEST PRACTICES.—The Secretary shall make available to the public through the Internet and other means the Secretary considers to be appropriate—

“(i) a copy of each evaluation carried out under subparagraph (B); and

“(ii) a description of any best practices identified by the Secretary as a result of those evaluations.

“(E) REPORT TO CONGRESS.—The Secretary shall submit to Congress a report containing the results of each evaluation carried out under subparagraph (B).

“(c) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out this section \$15,000,000, to remain available until expended.”

(b) CONFORMING AMENDMENT.—The table of contents of the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 594) is amended by inserting after the item relating to section 917 the following:

“Sec. 918. Smart energy and water efficiency pilot program.”

TITLE II—NUCLEAR

SEC. 2001. ADVANCED NUCLEAR FUEL AVAILABILITY.

(a) PROGRAM.—

(1) ESTABLISHMENT.—The Secretary shall establish and carry out, through the Office of Nuclear Energy, a program to support the availability of HA–LEU for civilian domestic research, development, demonstration, and commercial use.

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

(A) shall develop, in consultation with the Commission, criticality benchmark data to assist the Commission in—

(i) the licensing and regulation of special nuclear material fuel fabrication and enrichment facilities under part 70 of title 10, Code of Federal Regulations; and

(ii) certification of transportation packages under part 71 of title 10, Code of Federal Regulations;

(B) shall conduct research and development, and provide financial assistance to assist commercial entities, to design and license transportation packages for HA–LEU, including canisters for metal, gas, and other HA–LEU compositions;

(C) shall, to the extent practicable—

(i) by January 1, 2024, support commercial entity submission of such transportation package designs to the Commission for certification by the Commission under part 71 of title 10, Code of Federal Regulations; and

(ii) encourage the Commission to have such transportation package designs so certified by the Commission within 24 months after receipt of an application;

(D) shall consider options for acquiring or providing HA–LEU from a stockpile of uranium owned by the Department, or using enrichment technology, to make available to members of the consortium established pursuant to subparagraph (F) for commercial use or demonstration projects, taking into account cost and amount of time required, and prioritizing methods that would produce usable HA–LEU the quickest, including options for acquiring or providing HA–LEU—

(i) that—

(I) directly meets the needs of an end user; and

(II) has been previously used or fabricated for another purpose;

(ii) that meets the needs of an end user after having radioactive or other contaminants that resulted from a previous use or fabrication of the fuel for research, development, demonstration, or deployment activities of the Department removed;

(iii) that is produced from high-enriched uranium that is blended with lower assay uranium to become HA–LEU to meet the needs of an end user;

(iv) that is produced by Department research, development, and demonstration activities;

(v) that is produced in the United States by—

(I) a United States-owned commercial entity operating United States-origin technology;

(II) a United States-owned commercial entity operating a foreign-origin technology; or

(III) a foreign-owned entity operating a foreign-origin technology;

(vi) that does not require extraction of uranium or development of uranium from lands managed by the Federal Government, cause harm to the natural or cultural resources of Tribal communities or sovereign Native Nations, or result in degraded ground or surface water quality on publicly managed or privately owned lands; or

(vii) that does not negatively impact the availability of HA-LEU by the Department to support the production of medical isotopes, including the medical isotopes defined under the American Medical Isotopes Production Act of 2012 (Public Law 112-239; 126 Stat. 2211);

(E) not later than 1 year after the date of enactment of this Act, and biennially thereafter, shall conduct a survey of stakeholders to estimate the quantity of HA-LEU necessary for domestic commercial use for each of the 5 subsequent years;

(F) shall establish, and from time to time update, a consortium, which may include entities involved in any stage of the nuclear fuel cycle, to partner with the Department to support the availability of HA-LEU for civilian domestic demonstration and commercial use, including by—

(i) providing information to the Secretary for purposes of surveys conducted under subparagraph (E);

(ii) purchasing HA-LEU made available by the Secretary to members of the consortium for commercial use under the program; and

(iii) carrying out demonstration projects using HA-LEU provided by the Secretary under the program;

(G) if applicable, shall, prior to acquiring or providing HA-LEU under subparagraph (H), in coordination with the consortium established pursuant to subparagraph (F), develop a schedule for cost recovery of HA-LEU made available to members of the consortium using HA-LEU for commercial use pursuant to subparagraph (H);

(H) shall, beginning not later than 3 years after the establishment of a consortium under subparagraph (F), have the capability to acquire or provide HA-LEU, in order to make such HA-LEU available to members of the consortium beginning not later than January 1, 2026, in amounts that are consistent, to the extent practicable, with—

(i) the quantities estimated under the surveys conducted under subparagraph (E); plus

(ii) the quantities necessary for demonstration projects carried out under the program, as determined by the Secretary;

(I) shall, for advanced reactor demonstration projects, prioritize the provision of HA-LEU made available under this section through a merit-based, competitive selection process; and

(J) shall seek to ensure that the activities carried out under this section do not cause any delay in the progress

of any HA-LEU project between private industry and the Department that is underway as of the date of the enactment of this section.

(3) APPLICABILITY OF USEC PRIVATIZATION ACT.—

(A) SALE OR TRANSFER TO CONSORTIUM.—The requirements of section 3112 of the USEC Privatization Act (42 U.S.C. 2297h-10), except for the requirements of subparagraph (A) of section 3112(d)(2), shall not apply to the provision of enrichment services, or the sale or transfer of HA-LEU for commercial use by the Secretary to a member of the consortium under this subsection.

(B) DEMONSTRATION.—HA-LEU made available to members of the consortium established pursuant to paragraph (2)(F) for demonstration projects shall remain the property of and title will remain with the Department, which shall be responsible for the storage, use, and disposition of all radioactive waste and spent nuclear fuel created by the irradiation, processing, or purification of such uranium, and shall not be subject to the requirements of a sale or transfer of uranium under sections 3112, except for the requirements of subparagraph (A) of section 3112(d)(2), and 3113 of the USEC Privatization Act (42 U.S.C. 2297h-10; 42 U.S.C. 2297h-11).

(4) NATIONAL SECURITY NEEDS.—The Secretary shall only make available to a member of the consortium under this section for commercial or demonstration project use material that the President has determined is not necessary for national security needs, provided that this available material shall not include any material that the Secretary may determine to be necessary for the National Nuclear Security Administration or other critical Departmental missions.

(5) DOE ACQUISITION OF HA-LEU.—The Secretary may not make commitments under this section (including cooperative agreements (used in accordance with section 6305 of title 31, United States Code), purchase agreements, guarantees, leases, service contracts, or any other type of commitment) for the purchase or other acquisition of HA-LEU unless—

(A) funds are specifically provided for such purposes in advance in subsequent appropriations Acts, and only to the extent that the full extent of anticipated costs stemming from such commitments is recorded as an obligation up front and in full at the time it is made; or

(B) such committing agreement includes a clause conditioning the Federal Government's obligation on the availability of future year appropriations.

(6) SUNSET.—The authority of the Secretary to carry out the program under this subsection shall expire on the earlier of—

(A) September 30, 2034; or

(B) 90 days after the date on which HA-LEU is available to provide a reliable and adequate supply for civilian domestic advanced nuclear reactors in the commercial market.

(7) LIMITATION.—The Secretary shall not barter or otherwise sell or transfer uranium in any form in exchange for services relating to the final disposition of radioactive waste from uranium that is made available under this subsection.

(b) REPORTS TO CONGRESS.—

(1) COMMISSION REPORT ON NECESSARY REGULATORY UPDATES.—Not later than 12 months after the date of enactment of this Act, the Commission shall submit to Congress a report that includes—

(A) identification of updates to regulations, certifications, and other regulatory policies that the Commission determines are necessary in order for HA–LEU to be commercially available, including—

(i) guidance for material control and accountability of special nuclear material;

(ii) certifications relating to transportation packaging for HA–LEU; and

(iii) licensing of enrichment, conversion, and fuel fabrication facilities for HA–LEU, and associated physical security plans for such facilities;

(B) a description of such updates; and

(C) a timeline to complete such updates.

(2) DOE REPORT ON PROGRAM TO SUPPORT THE AVAILABILITY OF HA–LEU FOR CIVILIAN DOMESTIC DEMONSTRATION AND COMMERCIAL USE.—

(A) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary shall submit to Congress a report that describes actions proposed to be carried out by the Secretary under the program described in subsection (a)(1).

(B) COORDINATION AND STAKEHOLDER INPUT.—In developing the report under this paragraph, the Secretary shall consult with—

(i) the Commission;

(ii) suppliers of medical isotopes that have converted their operations to use HA–LEU;

(iii) the National Laboratories;

(iv) institutions of higher education;

(v) a diverse group of entities from the nuclear energy industry;

(vi) a diverse group of technology developers;

(vii) experts in nuclear nonproliferation, environmental safety, safeguards and security, and public health and safety; and

(viii) members of the consortium created under subsection (a)(2)(F).

(C) COST AND SCHEDULE ESTIMATES.—The report under this paragraph shall include estimated costs, budgets, and timeframes for all activities carried out under this section.

(D) REQUIRED EVALUATIONS.—The report under this paragraph shall evaluate—

(i) the actions required to establish and carry out the program under subsection (a)(1) and the cost of such actions, including with respect to—

(I) proposed preliminary terms for contracting between the Department and recipients of HA–LEU under the program (including guidelines defining the roles and responsibilities between the Department and the recipient); and

(II) the potential to coordinate with recipients of HA–LEU under the program regarding—

- (aa) fuel fabrication; and
- (bb) fuel transport;

(ii) the potential sources and fuel forms available to provide uranium for the program under subsection (a)(1);

(iii) options to coordinate the program under subsection (a)(1) with the operation of the versatile, reactor-based fast neutron source under section 959A of the Energy Policy Act of 2005 (as added by section 2003);

(iv) the ability of uranium producers to provide materials for advanced nuclear reactor fuel;

(v) any associated legal, regulatory, and policy issues that should be addressed to enable—

(I) implementation of the program under subsection (a)(1); and

(II) the establishment of an industry capable of providing HA-LEU; and

(vi) any research and development plans to develop criticality benchmark data under subsection (a)(2)(A), if needed.

(3) ALTERNATE FUELS REPORT.—Not later than 180 days after the date of enactment of this Act, the Secretary shall, after consulting with relevant entities, including National Laboratories, institutions of higher education, and technology developers, submit to Congress a report identifying any and all options for providing nuclear material, containing isotopes other than the uranium-235 isotope, such as uranium-233 and thorium-232 to be used as fuel for advanced nuclear reactor research, development, demonstration, or commercial application purposes.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out research, development, demonstration, and transportation activities in this section—

- (1) \$31,500,000 for fiscal year 2021;
- (2) \$33,075,000 for fiscal year 2022;
- (3) \$34,728,750 for fiscal year 2023;
- (4) \$36,465,188 for fiscal year 2024; and
- (5) \$38,288,447 for fiscal year 2025.

(d) DEFINITIONS.—In this section:

(1) COMMISSION.—The term “Commission” means the Nuclear Regulatory Commission.

(2) DEMONSTRATION PROJECT.—The term “demonstration project” has the meaning given such term in section 959A of the Energy Policy Act of 2005.

(3) HA-LEU.—The term “HA-LEU” means high-assay low-enriched uranium.

(4) HIGH-ASSAY LOW-ENRICHED URANIUM.—The term “high-assay low-enriched uranium” means uranium having an assay greater than 5.0 weight percent and less than 20.0 weight percent of the uranium-235 isotope.

(5) HIGH-ENRICHED URANIUM.—The term “high-enriched uranium” means uranium with an assay of 20.0 weight percent or more of the uranium-235 isotope.

(6) SECRETARY.—The term “Secretary” means the Secretary of Energy.

SEC. 2002. AMENDMENTS TO DEFINITIONS IN ENERGY POLICY ACT OF 2005.

Section 951(b)(1) of the Energy Policy Act of 2005 (42 U.S.C. 16271(b)(1)) is amended to read as follows:

“(1) **ADVANCED NUCLEAR REACTOR.**—The term ‘advanced nuclear reactor’ means—

“(A) a nuclear fission reactor, including a prototype plant (as defined in sections 50.2 and 52.1 of title 10, Code of Federal Regulations (or successor regulations)), with significant improvements compared to reactors operating on the date of enactment of the Energy Act of 2020, including improvements such as—

- “(i) additional inherent safety features;
 - “(ii) lower waste yields;
 - “(iii) improved fuel and material performance;
 - “(iv) increased tolerance to loss of fuel cooling;
 - “(v) enhanced reliability or improved resilience;
 - “(vi) increased proliferation resistance;
 - “(vii) increased thermal efficiency;
 - “(viii) reduced consumption of cooling water and other environmental impacts;
 - “(ix) the ability to integrate into electric applications and nonelectric applications;
 - “(x) modular sizes to allow for deployment that corresponds with the demand for electricity or process heat; and
 - “(xi) operational flexibility to respond to changes in demand for electricity or process heat and to complement integration with intermittent renewable energy or energy storage; and
- “(B) a fusion reactor.”.

SEC. 2003. NUCLEAR ENERGY RESEARCH, DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION PROGRAMS.

(a) **REACTOR CONCEPTS RESEARCH, DEVELOPMENT, AND DEMONSTRATION.**—Section 952 of the Energy Policy Act of 2005 (42 U.S.C. 16272) is amended to read as follows:

“SEC. 952. REACTOR CONCEPTS RESEARCH, DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION.

“(a) **SUSTAINABILITY PROGRAM FOR LIGHT WATER REACTORS.**—

“(1) **IN GENERAL.**—The Secretary shall carry out a program of research, development, demonstration, and commercial application, including through the use of modeling and simulation, to support existing operating nuclear power plants which shall address technologies to modernize and improve, with respect to such plants—

- “(A) reliability;
- “(B) capacity;
- “(C) component aging;
- “(D) safety;
- “(E) physical security and security costs;
- “(F) plant lifetime;
- “(G) operations and maintenance costs, including by utilizing risk-informed systems analysis;
- “(H) the ability for plants to operate flexibly;

“(I) nuclear integrated energy system applications described in subsection (c);

“(J) efficiency;

“(K) environmental impacts; and

“(L) resilience.

“(2) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the program under this subsection \$55,000,000 for each of fiscal years 2021 through 2025.

“(3) REPORT.—The Secretary shall submit annually a public report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate documenting funds spent under the program that describes program activities, objectives, and outcomes, including those that could benefit the entirety of the existing reactor fleet, such as with respect to aging management and related sustainability concerns, and identifying funds awarded to private entities.

“(b) ADVANCED REACTOR TECHNOLOGIES.—

“(1) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application to support advanced reactor technologies.

“(2) REQUIREMENTS.—In carrying out the program under this subsection, the Secretary shall—

“(A) prioritize designs for advanced nuclear reactors that are proliferation resistant and passively safe, including designs that, compared to reactors operating on the date of enactment of the Energy Act of 2020—

“(i) are economically competitive with other electric power generation plants;

“(ii) have higher efficiency, lower cost, less environmental impacts, increased resilience, and improved safety;

“(iii) use fuels that are proliferation resistant and have reduced production of high-level waste per unit of output; and

“(iv) use advanced instrumentation and monitoring systems;

“(B) consult with the Nuclear Regulatory Commission on appropriate metrics to consider for the criteria specified in subparagraph (A);

“(C) support research and development to resolve materials challenges relating to extreme environments, including environments that contain high levels of—

“(i) radiation fluence;

“(ii) temperature;

“(iii) pressure; and

“(iv) corrosion;

“(D) support research and development to aid in the qualification of advanced fuels, including fabrication techniques;

“(E) support activities that address near-term challenges in modeling and simulation to enable accelerated design of and licensing of advanced nuclear reactors, including the identification of tools and methodologies for validating such modeling and simulation efforts;

“(F) develop technologies, including technologies to manage, reduce, or reuse nuclear waste;

“(G) ensure that nuclear research infrastructure is maintained or constructed, including—

“(i) currently operational research reactors at the National Laboratories and institutions of higher education;

“(ii) hot cell research facilities;

“(iii) a versatile fast neutron source; and

“(iv) advanced coolant testing facilities, including coolants such as lead, sodium, gas, and molten salt;

“(H) improve scientific understanding of nonlight water coolant physics and chemistry;

“(I) develop advanced sensors and control systems, including the identification of tools and methodologies for validating such sensors and systems;

“(J) investigate advanced manufacturing and advanced construction techniques and materials to reduce the cost of advanced nuclear reactors, including the use of digital twins and of strategies to implement project and construction management best practices, and study the effects of radiation and corrosion on materials created with these techniques;

“(K) consult with the Administrator of the National Nuclear Security Administration to integrate reactor safeguards and security into design;

“(L) support efforts to reduce any technical barriers that would prevent commercial application of advanced nuclear energy systems; and

“(M) develop various safety analyses and emergency preparedness and response methodologies.

“(3) COORDINATION.—The Secretary shall coordinate with individuals engaged in the private sector and individuals who are experts in nuclear nonproliferation, environmental and public health and safety, and economics to advance the development of various designs of advanced nuclear reactors. In carrying out this paragraph, the Secretary shall convene an advisory committee of such individuals and such committee shall submit annually a report to the relevant committees of Congress with respect to the progress of the program.

“(4) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the program under this subsection \$55,000,000 for each of fiscal years 2021 through 2025.

“(c) NUCLEAR INTEGRATED ENERGY SYSTEMS RESEARCH, DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION PROGRAM.—

“(1) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application to develop nuclear integrated energy systems, composed of 2 or more co-located or jointly operated subsystems of energy generation, energy storage, or other technologies and in which not less than 1 such subsystem is a nuclear energy system, to—

“(A) reduce greenhouse gas emissions in both the power and nonpower sectors; and

“(B) maximize energy production and efficiency.

“(2) COORDINATION.—In carrying out the program under paragraph (1), the Secretary shall coordinate with—

“(A) relevant program offices within the Department of Energy;

“(B) National Laboratories;

“(C) institutions of higher education; and

“(D) the private sector.

“(3) FOCUS AREAS.—The program under paragraph (1) may include research, development, demonstration, or commercial application of nuclear integrated energy systems with respect to—

“(A) desalination technologies and processes;

“(B) hydrogen or other liquid and gaseous fuel or chemical production;

“(C) heat for industrial processes;

“(D) district heating;

“(E) heat or electricity generation and storage;

“(F) carbon capture, use, utilization, and storage;

“(G) microgrid or island applications;

“(H) integrated systems modeling, analysis, and optimization, inclusive of different configurations of integrated energy systems; and

“(I) integrated design, planning, building, and operation of systems with existing infrastructure, including interconnection requirements with the electric grid, as appropriate.

“(4) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the program under this subsection—

“(A) \$20,000,000 for fiscal year 2021;

“(B) \$30,000,000 for fiscal year 2022;

“(C) \$30,000,000 for fiscal year 2023;

“(D) \$40,000,000 for fiscal year 2024; and

“(E) \$40,000,000 for fiscal year 2025.”.

(b) FUEL CYCLE RESEARCH AND DEVELOPMENT.—Section 953 of the Energy Policy Act of 2005 (42 U.S.C. 16273) is amended to read as follows:

“SEC. 953. FUEL CYCLE RESEARCH, DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION.

“(a) USED NUCLEAR FUEL RESEARCH, DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION.—

“(1) IN GENERAL.—The Secretary shall conduct an advanced fuel cycle research, development, demonstration, and commercial application program to improve fuel cycle performance, minimize environmental and public health and safety impacts, and support a variety of options for used nuclear fuel storage, use, and disposal, including advanced nuclear reactor and non-reactor concepts (such as radioisotope power systems), which may include—

“(A) dry cask storage;

“(B) consolidated interim storage;

“(C) deep geological storage and disposal, including mined repository, and other technologies;

“(D) used nuclear fuel transportation;

“(E) integrated waste management systems;

“(F) vitrification;

“(G) fuel recycling and transmutation technologies, including advanced reprocessing technologies such as electrochemical and molten salt technologies, and advanced redox extraction technologies;

“(H) advanced materials to be used in subparagraphs (A) through (G); and

“(I) other areas as determined by the Secretary.

“(2) REQUIREMENTS.—In carrying out the program under this subsection, the Secretary shall—

“(A) ensure all activities and designs incorporate state of the art safeguards technologies and techniques to reduce risk of proliferation;

“(B) consult with the Administrator of the National Nuclear Security Administration to integrate safeguards and security by design;

“(C) consider the potential benefits and other impacts of those activities for civilian nuclear applications, environmental health and safety, and national security, including consideration of public consent; and

“(D) consider the economic viability of all activities and designs.

“(3) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the program under this subsection \$60,000,000 for each of fiscal years 2021 through 2025.

“(b) ADVANCED FUELS.—

“(1) IN GENERAL.—The Secretary shall conduct an advanced fuels research, development, demonstration, and commercial application program on next-generation light water reactor and advanced reactor fuels that demonstrate the potential for improved—

“(A) performance;

“(B) accident tolerance;

“(C) proliferation resistance;

“(D) use of resources;

“(E) environmental impact; and

“(F) economics.

“(2) REQUIREMENTS.—In carrying out the program under this subsection, the Secretary shall focus on the development of advanced technology fuels, including fabrication techniques, that offer improved accident-tolerance and economic performance with the goal of initial commercial application by December 31, 2025.

“(3) REPORT.—Not later than 180 days after the date of enactment of this section, 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 that describes how the technologies and concepts studied under this program would impact reactor economics, the fuel cycle, operations, safety, proliferation, and the environment.

“(4) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the program under this subsection \$125,000,000 for each of fiscal years 2021 through 2025.”

(c) NUCLEAR SCIENCE AND ENGINEERING SUPPORT.—Section 954 of the Energy Policy Act of 2005 (42 U.S.C. 16274) is amended—

(1) in the section heading, by striking “university nuclear” and inserting “nuclear”;

(2) in subsection (b)—

(A) in the matter preceding paragraph (1), by striking “this section” and inserting “this subsection”; and

(B) by redesignating paragraphs (1) through (5) as subparagraphs (A) through (E), respectively, and indenting appropriately;

(3) in subsection (c), by redesignating paragraphs (1) and (2) as subparagraphs (A) and (B), respectively, and indenting appropriately;

(4) in subsection (d)—

(A) in the matter preceding paragraph (1), by striking “this section” and inserting “this subsection”; and

(B) by redesignating paragraphs (1) through (4) as subparagraphs (A) through (D), respectively, and indenting appropriately;

(5) in subsection (e), by striking “this section” and inserting “this subsection”;

(6) in subsection (f)—

(A) by striking “this section” and inserting “this subsection”; and

(B) by striking “subsection (b)(2)” and inserting “paragraph (2)(B)”;

(7) by redesignating subsections (a) through (d) as paragraphs (1) through (4), respectively, and indenting appropriately;

(8) by redesignating subsections (e) and (f) as paragraphs (7) and (8), respectively;

(9) by inserting after paragraph (4) (as so redesignated) the following:

“(5) RADIOLOGICAL FACILITIES MANAGEMENT.—

“(A) IN GENERAL.—The Secretary shall carry out a program under which the Secretary shall provide project management, technical support, quality engineering and inspection, and nuclear material handling support to research reactors located at universities.

“(B) AUTHORIZATION OF APPROPRIATIONS.—Of any amounts appropriated to carry out the program under this subsection, there are authorized to be appropriated to the Secretary to carry out the program under this paragraph \$20,000,000 for each of fiscal years 2021 through 2025.

“(6) NUCLEAR ENERGY UNIVERSITY PROGRAM.—In carrying out the programs under this section, the Department shall, to the maximum extent practicable, allocate 20 percent of funds appropriated to nuclear energy research and development programs annually to fund university-led research and university infrastructure projects through an open, competitive solicitation process.”;

(10) by inserting before paragraph (1) (as so redesignated) the following:

“(a) UNIVERSITY NUCLEAR SCIENCE AND ENGINEERING SUPPORT.—”; and

(11) by adding at the end the following:

“(b) NUCLEAR ENERGY GRADUATE TRAINEESHIP SUBPROGRAM.—

“(1) ESTABLISHMENT.—In carrying out the program under subsection (a), the Secretary shall establish a nuclear energy

graduate traineeship subprogram under which the Secretary shall competitively award graduate traineeships in coordination with universities to provide focused, advanced training to meet critical mission needs of the Department, including in industries that are represented by skilled labor unions.

“(2) REQUIREMENTS.—In carrying out the subprogram under this subsection, the Secretary shall—

“(A) encourage appropriate partnerships among National Laboratories, affected universities, and industry; and

“(B) on an annual basis, evaluate the needs of the nuclear energy community to implement graduate traineeships for focused topical areas addressing mission-specific workforce needs.

“(3) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the subprogram under this subsection \$5,000,000 for each of fiscal years 2021 through 2025.”

(d) CONFORMING AMENDMENT.—The table of contents of the Energy Policy Act of 2005 (Public Law 109– 58; 119 Stat. 600) is amended by striking the items relating to sections 952 through 954 and inserting the following:

“Sec. 952. Reactor concepts research, development, demonstration, and commercial application.

“Sec. 953. Fuel cycle research, development, demonstration, and commercial application.

“Sec. 954. Nuclear science and engineering support.”

(e) UNIVERSITY NUCLEAR LEADERSHIP PROGRAM.—Section 313 of the Omnibus Appropriations Act, 2009 (42 U.S.C. 16274a), is amended to read as follows:

“SEC. 313. UNIVERSITY NUCLEAR LEADERSHIP PROGRAM.

“(a) IN GENERAL.—The Secretary of Energy, the Administrator of the National Nuclear Security Administration, and the Chairman of the Nuclear Regulatory Commission shall jointly establish a program, to be known as the ‘University Nuclear Leadership Program’.

“(b) USE OF FUNDS.—

“(1) IN GENERAL.—Except as provided in paragraph (2), amounts made available to carry out the Program shall be used to provide financial assistance for scholarships, fellowships, and research and development projects at institutions of higher education in areas relevant to the programmatic mission of the applicable Federal agency, with an emphasis on providing the financial assistance with respect to research, development, demonstration, and commercial application activities relevant to civilian advanced nuclear reactors including, but not limited to—

“(A) relevant fuel cycle technologies;

“(B) project management; and

“(C) advanced construction, manufacturing, and fabrication methods.

“(2) EXCEPTION.—Notwithstanding paragraph (1), amounts made available to carry out the Program may be used to provide financial assistance for a scholarship, fellowship, or multiyear research and development project that does not align directly with a programmatic mission of the Department of Energy,

if the activity for which assistance is provided would facilitate the maintenance of the discipline of nuclear science or engineering.

“(c) DEFINITIONS.—In this section:

“(1) ADVANCED NUCLEAR REACTOR; INSTITUTION OF HIGHER EDUCATION.—The terms ‘advanced nuclear reactor’ and ‘institution of higher education’ have the meanings given those terms in section 951 of the Energy Policy Act of 2005 (42 U.S.C. 16271).

“(2) PROGRAM.—The term ‘Program’ means the University Nuclear Leadership Program established under this section.

“(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out the Program for each of fiscal years 2021 through 2025—

“(1) \$30,000,000 to the Secretary of Energy, of which \$15,000,000 shall be for use by the Administrator of the National Nuclear Security Administration; and

“(2) \$15,000,000 to the Nuclear Regulatory Commission.”.

(f) NUCLEAR ENERGY RESEARCH INFRASTRUCTURE.—Section 955 of the Energy Policy Act of 2005 (42 U.S.C. 16275) is amended—

(1) in subsection (c), paragraph (1)—

(A) in the paragraph heading, by striking “MISSION NEED” and inserting “AUTHORIZATION”; and

(B) in subparagraph (A), by striking “determine the mission need” and inserting “provide”;

(2) by adding at the end of subsection (c) the following:

“(7) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out to completion the construction of the facility under this section—

“(A) \$295,000,000 for fiscal year 2021;

“(B) \$348,000,000 for fiscal year 2022;

“(C) \$525,000,000 for fiscal year 2023;

“(D) \$534,000,000 for fiscal year 2024; and

“(E) \$584,000,000 for fiscal year 2025.”.

(3) in subsection (c) paragraph (4), by striking “2025” and inserting “2026”; and

(4) by adding at the end the following:

“(d) GATEWAY FOR ACCELERATED INNOVATION IN NUCLEAR.—

“(1) IN GENERAL.—In carrying out the programs under this subtitle, the Secretary is authorized to establish a new initiative to be known as the Gateway for Accelerated Innovation in Nuclear (GAIN). The initiative shall, to the maximum extent practicable and consistent with national security, provide the nuclear energy industry with access to cutting edge research and development along with the technical, regulatory, and financial support necessary to move innovative nuclear energy technologies toward commercialization in an accelerated and cost-effective fashion. The Secretary shall make available, as a minimum—

“(A) experimental capabilities and testing facilities;

“(B) computational capabilities, modeling, and simulation tools;

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

“(D) technical assistance with guidance or processes as needed.

“(2) SELECTION.—

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

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

“(i) the information disclosed by the Department as described in paragraph (1); and

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

(g) ADVANCED REACTOR DEMONSTRATION PROGRAM.—

(1) IN GENERAL.—Subtitle E of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16271 et seq.) is amended by adding at the end the following:

“SEC. 959A. ADVANCED REACTOR DEMONSTRATION PROGRAM.

“(a) DEMONSTRATION PROJECT DEFINED.—For the purposes of this section, the term ‘demonstration project’ means an advanced nuclear reactor operated in any manner, including as part of the power generation facilities of an electric utility system, for the purpose of demonstrating the suitability for commercial application of the advanced nuclear reactor.

“(b) ESTABLISHMENT.—The Secretary shall establish a program to advance the research, development, demonstration, and commercial application of domestic advanced, affordable, nuclear energy technologies by—

“(1) demonstrating a variety of advanced nuclear reactor technologies, including those that could be used to produce—

“(A) safer, emissions-free power at a competitive cost of electricity compared to other new energy generation technologies on the date of enactment of the Energy Act of 2020;

“(B) heat for community heating, industrial purposes, heat storage, or synthetic fuel production;

“(C) remote or off-grid energy supply; or

“(D) backup or mission-critical power supplies;

“(2) identifying research areas that the private sector is unable or unwilling to undertake due to the cost of, or risks associated with, the research; and

“(3) facilitating the access of the private sector—

“(A) to Federal research facilities and personnel; and

“(B) to the results of research relating to civil nuclear technology funded by the Federal Government.

“(c) DEMONSTRATION PROJECTS.—In carrying out demonstration projects under the program established in subsection (b), the Secretary shall—

“(1) include, as an evaluation criterion, diversity in designs for the advanced nuclear reactors demonstrated under this section, including designs using various—

“(A) primary coolants;

“(B) fuel types and compositions; and

“(C) neutron spectra;

“(2) consider, as evaluation criteria—

“(A) the likelihood that the operating cost for future commercial units for each design implemented through a demonstration project under this subsection is cost-competitive in the applicable market, including those designs

configured as integrated energy systems as described in section 952(c);

“(B) the technology readiness level of a proposed advanced nuclear reactor technology;

“(C) the technical abilities and qualifications of teams desiring to demonstrate a proposed advanced nuclear reactor technology; and

“(D) the capacity to meet cost-share requirements of the Department;

“(3) ensure that each evaluation of candidate technologies for the demonstration projects is completed through an external review of proposed designs, which review shall—

“(A) be conducted by a panel that includes not fewer than 1 representative that does not have a conflict of interest of each within the applicable market of the design of—

“(i) an electric utility;

“(ii) an entity that uses high-temperature process heat for manufacturing or industrial processing, such as a petrochemical or synthetic fuel company, a manufacturer of metals or chemicals, or a manufacturer of concrete;

“(iii) an expert from the investment community;

“(iv) a project management practitioner; and

“(v) an environmental health and safety expert;

and

“(B) include a review of each demonstration project under this subsection which shall include consideration of cost-competitiveness and other value streams, together with the technology readiness level, the technical abilities and qualifications of teams desiring to demonstrate a proposed advanced nuclear reactor technology, the capacity to meet cost-share requirements of the Department, if Federal funding is provided, and environmental impacts;

“(4) for federally funded demonstration projects, enter into cost-sharing agreements with private sector partners in accordance with section 988 for the conduct of activities relating to the research, development, and demonstration of advanced nuclear reactor designs under the program;

“(5) consult with—

“(A) National Laboratories;

“(B) institutions of higher education;

“(C) traditional end users (such as electric utilities);

“(D) potential end users of new technologies (such as users of high-temperature process heat for manufacturing processing, including petrochemical or synthetic fuel companies, manufacturers of metals or chemicals, or manufacturers of concrete);

“(E) developers of advanced nuclear reactor technology;

“(F) environmental and public health and safety experts; and

“(G) non-proliferation experts;

“(6) seek to ensure that the demonstration projects carried out under this section do not cause any delay in the progress of an advanced reactor project by private industry and the Department of Energy that is underway as of the date of enactment of this section;

“(7) establish a streamlined approval process for expedited contracting between awardees and the Department;

“(8) identify technical challenges to candidate technologies;

“(9) support near-term research and development to address the highest risk technical challenges to the successful demonstration of a selected advanced reactor technology, in accordance with—

“(A) paragraph (8);

“(B) the research and development activities under section 952(b); and

“(C) the research and development activities under section 958; and

“(10) establish such technology advisory working groups as the Secretary determines to be appropriate to advise the Secretary regarding the technical challenges identified under paragraph (8) and the scope of research and development programs to address the challenges, in accordance with paragraph (9), to be comprised of—

“(A) private sector advanced nuclear reactor technology developers;

“(B) technical experts with respect to the relevant technologies at institutions of higher education;

“(C) technical experts at the National Laboratories;

“(D) environmental and public health and safety experts;

“(E) non-proliferation experts; and

“(F) any other entities the Secretary determines appropriate.

“(d) MILESTONE-BASED DEMONSTRATION PROJECTS.—The Secretary may carry out demonstration projects under subsection (c) as a milestone-based demonstration project under section 9005 of the Energy Act of 2020.

“(e) NONDUPLICATION.—Entities may not receive funds under this program if receiving funds from another reactor demonstration program at the Department in the same fiscal year.

“(f) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the program under this subsection—

“(1) \$405,000,000 for fiscal year 2021;

“(2) \$405,000,000 for fiscal year 2022;

“(3) \$420,000,000 for fiscal year 2023;

“(4) \$455,000,000 for fiscal year 2024; and

“(5) \$455,000,000 for fiscal year 2025.”.

(2) TABLE OF CONTENTS.—The table of contents of the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 594) is amended—

(A) in the items relating to sections 957, 958, and 959, by inserting “Sec.” before “95” each place it appears; and

(B) by inserting after the item relating to section 959 the following:

“Sec. 959A. Advanced reactor demonstration program.”.

(h) INTERNATIONAL NUCLEAR ENERGY COOPERATION.—

(1) IN GENERAL.—Subtitle E of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16271 et seq.), as amended by subsection (g), is further amended by adding at the end the following:

“SEC. 959B. INTERNATIONAL NUCLEAR ENERGY COOPERATION.

“The Secretary shall carry out a program—

“(1) to collaborate in international efforts with respect to research, development, demonstration, and commercial application of nuclear technology that supports diplomatic, financing, nonproliferation, climate, and international economic objectives for the safe, secure, and peaceful use of such technology; and

“(2) to develop collaboration initiatives with respect to such efforts with a variety of countries through—

“(A) preparations for research and development agreements;

“(B) the development of coordinated action plans; and

“(C) new or existing multilateral cooperation commitments including—

“(i) the International Framework for Nuclear Energy Cooperation;

“(ii) the Generation IV International Forum;

“(iii) the International Atomic Energy Agency;

“(iv) the Organization for Economic Co-operation and Development Nuclear Energy Agency; and

“(v) any other international collaborative effort with respect to advanced nuclear reactor operations and safety.”.

(2) TABLE OF CONTENTS.—The table of contents of the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 594), as amended by subsection (g), is further amended by inserting after the item relating to section 959A the following:

“Sec. 959B. International nuclear energy cooperation.”.

SEC. 2004. HIGH-PERFORMANCE COMPUTATION COLLABORATIVE RESEARCH PROGRAM.

Section 957 of the Energy Policy Act of 2005 (42 U.S.C. 16277) is amended by adding at the end the following:

“(d) DUPLICATION.—The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of the program under subsection (a) with the activities of—

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

“(2) industry.”.

SEC. 2005. NUCLEAR ENERGY BUDGET PLAN.

Section 959 of the Energy Policy Act of 2005 (42 U.S.C. 16279) is amended—

(1) by amending subsection (b) to read as follows:

“(b) BUDGET PLAN ALTERNATIVE 1.—One of the budget plans submitted under subsection (a) shall assume constant annual funding for 10 years at the appropriated level for the current fiscal year for the civilian nuclear energy research and development of the Department.”;

(2) in subsection (d)(2) by striking “; and” and inserting “,”;

(3) in subsection (d)(3) by striking the period at the end and inserting “; and”

(4) by inserting at the end of subsection (d) the following:

“(4) a description of the progress made under the programs described in section 959A.”; and

(5) by inserting after subsection (d) the following:

“(e) UPDATES.—Not less frequently than once every 2 years, 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 updated 10-year budget plans which shall identify, and provide a justification for, any major deviation from a previous budget plan submitted under this section.”.

SEC. 2006. ORGANIZATION AND ADMINISTRATION OF PROGRAMS.

(a) IN GENERAL.—Subtitle E of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16271 et seq.), as amended by this Act, is further amended by adding at the end of the following:

“SEC. 959C. ORGANIZATION AND ADMINISTRATION OF PROGRAMS.

“(a) COORDINATION.—In carrying out this subtitle, the Secretary shall coordinate activities, and effectively manage crosscutting research priorities across programs of the Department and other relevant Federal agencies, including the National Laboratories.

“(b) COLLABORATION.—

“(1) IN GENERAL.—In carrying out this subtitle, the Secretary shall collaborate with industry, National Laboratories, other relevant Federal agencies, institutions of higher education, including minority-serving institutions and research reactors, Tribal entities, including Alaska Native Corporations, and international bodies with relevant scientific and technical expertise.

“(2) PARTICIPATION.—To the extent practicable, the Secretary shall encourage research projects that promote collaboration between entities specified in paragraph (1).

“(c) DISSEMINATION OF RESULTS AND PUBLIC AVAILABILITY.—The Secretary shall, except to the extent protected from disclosure under section 552(b) of title 5, United States Code, publish the results of projects supported under this subtitle through Department websites, reports, databases, training materials, and industry conferences, including information discovered after the completion of such projects.

“(d) EDUCATION AND OUTREACH.—In carrying out the activities described in this subtitle, the Secretary shall support education and outreach activities to disseminate information and promote public understanding of nuclear energy.

“(e) TECHNICAL ASSISTANCE.—In carrying out this subtitle, for the purposes of supporting technical, nonhardware, and information-based advances in nuclear energy development and operations, the Secretary shall also conduct technical assistance and analysis activities, including activities that support commercial application of nuclear energy in rural, Tribal, and low-income communities.

“(f) PROGRAM REVIEW.—At least annually, all programs in this subtitle shall be subject to an annual review by the Nuclear Energy Advisory Committee of the Department or other independent entity, as appropriate.

“(g) SENSITIVE INFORMATION.—The Secretary shall not publish any information generated under this subtitle that is detrimental to national security, as determined by the Secretary.”.

(b) TABLE OF CONTENTS.—The table of contents of the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 594), as amended

by this Act, is further amended by inserting after the item relating to section 959B the following:

“Sec. 959C. Organization and administration of programs.”.

SEC. 2007. EXTENSION AND EXPANSION OF LIMITATIONS ON IMPORTATION OF URANIUM FROM RUSSIAN FEDERATION.

(a) **IN GENERAL.**—Section 3112A of the USEC Privatization Act (42 U.S.C. 2297h–10a) is amended—

(1) in subsection (a)—

(A) by redesignating paragraph (7) as paragraph (8);

and

(B) by inserting after paragraph (6) the following:

“(7) **SUSPENSION AGREEMENT.**—The term ‘Suspension Agreement’ has the meaning given that term in section 3102(13).”;

(2) in subsection (b)—

(A) by striking “United States to support” and inserting the following: “United States—

“(1) to support”;

(B) by striking the period at the end and inserting a semicolon; and

(C) by adding at the end the following:

“(2) to reduce reliance on uranium imports in order to protect essential national security interests;

“(3) to revive and strengthen the supply chain for nuclear fuel produced and used in the United States; and

“(4) to expand production of nuclear fuel in the United States.”; and

(3) in subsection (c)—

(A) in paragraph (2)—

(i) in subparagraph (A)—

(I) in clause (vi), by striking “; and” and inserting a semicolon;

(II) in clause (vii), by striking the period at the end and inserting a semicolon; and

(III) by adding at the end the following:

“(viii) in calendar year 2021, 596,682 kilograms;

“(ix) in calendar year 2022, 489,617 kilograms;

“(x) in calendar year 2023, 578,877 kilograms;

“(xi) in calendar year 2024, 476,536 kilograms;

“(xii) in calendar year 2025, 470,376 kilograms;

“(xiii) in calendar year 2026, 464,183 kilograms;

“(xiv) in calendar year 2027, 459,083 kilograms;

“(xv) in calendar year 2028, 344,312 kilograms;

“(xvi) in calendar year 2029, 340,114 kilograms;

“(xvii) in calendar year 2030, 332,141 kilograms;

“(xviii) in calendar year 2031, 328,862 kilograms;

“(xix) in calendar year 2032, 322,255 kilograms;

“(xx) in calendar year 2033, 317,536 kilograms;

“(xxi) in calendar year 2034, 298,088 kilograms;

“(xxii) in calendar year 2035, 294,511 kilograms;

“(xxiii) in calendar year 2036, 286,066 kilograms;

“(xxiv) in calendar year 2037, 281,272 kilograms;

“(xxv) in calendar year 2038, 277,124 kilograms;

“(xxvi) in calendar year 2039, 277,124 kilograms;

and

“(xxvii) in calendar year 2040, 267,685 kilograms.”;
(ii) by redesignating subparagraph (B) as subparagraph (C); and

(iii) by inserting after subparagraph (A) the following:

“(B) ADMINISTRATION.—

“(i) IN GENERAL.—The Secretary of Commerce shall administer the import limitations described in subparagraph (A) in accordance with the provisions of the Suspension Agreement, including—

“(I) the limitations on sales of enriched uranium product and separative work units plus conversion, in amounts determined in accordance with Section IV.B.1 of the Suspension Agreement (as amended by the amendment published in the Federal Register on October 9, 2020 (85 Fed. Reg. 64112));

“(II) the export limit allocations set forth in Appendix 5 of the Suspension Agreement (as so amended);

“(III) the requirements for natural uranium returned feed associated with imports of low-enriched uranium, including pursuant to sales of enrichment, with or without conversion, from the Russian Federation, as set forth in Section IV.B.1 of the Suspension Agreement (as so amended);

“(IV) any other provisions of the Suspension Agreement (as so amended); and

“(V) any related administrative guidance issued by the Department of Commerce.

“(ii) EFFECT OF TERMINATION OF SUSPENSION AGREEMENT.—Clause (i) shall remain in effect if the Suspension Agreement is terminated.”;

(B) in paragraph (3)—

(i) in subparagraph (A), by striking the semicolon and inserting “; or”;

(ii) in subparagraph (B), by striking “; or” and inserting a period; and

(iii) by striking subparagraph (C);

(C) in paragraph (5)—

(i) in subparagraph (A), by striking “reference data” and all that follows through “2019” and inserting the following: “lower scenario data in the report of the World Nuclear Association entitled ‘The Nuclear Fuel Report: Global Scenarios for Demand and Supply Availability 2019–2040’. In each of calendar years 2023, 2029, and 2035”; and

(ii) by redesignating subparagraphs (B) and (C) as subparagraphs (C) and (D), respectively;

(iii) by inserting after subparagraph (A) the following:

“(B) REPORT REQUIRED.—Not later than one year after the date of the enactment of the Energy Act of 2020, and every 3 years thereafter, the Secretary shall submit to Congress a report that includes—

“(i) a recommendation on the use of all publicly available data to ensure accurate forecasting by scenario data to comport to actual demand for low-enriched uranium for nuclear reactors in the United States; and

“(ii) an identification of the steps to be taken to adjust the import limitations described in paragraph (2)(A) based on the most accurate scenario data.”; and

(iv) in subparagraph (D), as redesignated by clause (ii), by striking “subparagraph (B)” and inserting “subparagraph (C)”;

(D) in paragraph (9), by striking “2020” and inserting “2040”;

(E) in paragraph (12)(B), by inserting “or the Suspension Agreement” after “the Russian HEU Agreement”; and

(F) by striking “(2)(B)” each place it appears and inserting “(2)(C)”.

(b) APPLICABILITY.—The amendments made by subsection (a) apply with respect to uranium imported from the Russian Federation on or after January 1, 2021.

SEC. 2008. FUSION ENERGY RESEARCH.

(a) PROGRAM.—Section 307 of the Department of Energy Research and Innovation Act (42 U.S.C. 18645) is amended—

(1) by redesignating subsections (a) through (g) as subsections (b) through (h), respectively;

(2) by inserting before subsection (b), as so redesignated, the following:

“(a) PROGRAM.—As part of the activities authorized under section 209 of the Department of Energy Organization Act (42 U.S.C. 7139) and section 972 of the Energy Policy Act of 2005 (42 U.S.C. 16312), the Director shall carry out a fusion energy sciences research and enabling technology development program to effectively address the scientific and engineering challenges to building a cost competitive fusion power plant and to support the development of a competitive fusion power industry in the United States. As part of this program, the Director shall carry out research activities to expand the fundamental understandings of plasma and matter at very high temperatures and densities for fusion applications and for other engineering and plasma science applications.”;

(3) by amending subsection (d) to read as follows:

“(d) INERTIAL FUSION RESEARCH AND DEVELOPMENT.—

“(1) IN GENERAL.—The Director shall carry out a program of research and technology development in inertial fusion for energy applications, including ion beam, laser, and pulsed power fusion systems.

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

“(A) develop novel target designs;

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

“(C) develop diagnostic tools; and

“(D) improve inertial fusion energy driver technologies.

“(3) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated under subsection (o), there are

authorized to be appropriated to the Secretary to carry out the activities described in subsection (d) \$25,000,000 for each of fiscal years 2021 through 2025.”;

(4) by amending subsection (e) to read as follows:

“(e) ALTERNATIVE AND ENABLING CONCEPTS.—

“(1) IN GENERAL.—The Director shall support research and development activities and facility operations at institutions of higher education, National Laboratories, and private facilities in the United States for a portfolio of alternative and enabling fusion energy concepts that may provide solutions to significant challenges to the establishment of a commercial magnetic fusion power plant, prioritized based on the ability of the United States to play a leadership role in the international fusion research community.

“(2) ACTIVITIES.—Fusion energy concepts and activities explored under paragraph (1) may include—

“(A) alternative fusion energy concepts, including—

“(i) advanced stellarator concepts;

“(ii) non-tokamak confinement configurations operating at low magnetic fields;

“(iii) magnetized target fusion energy concepts; or

“(iv) other promising fusion energy concepts identified by the Director;

“(B) enabling fusion technology development activities, including—

“(i) high magnetic field approaches facilitated by high temperature superconductors;

“(ii) liquid metals to address issues associated with fusion plasma interactions with the inner wall of the encasing device; and

“(iii) advanced blankets for heat management and fuel breeding; and

“(C) advanced scientific computing activities.

“(3) INNOVATION NETWORK FOR FUSION ENERGY.—

“(A) IN GENERAL.—The Secretary, acting through the Office of Science, shall support a program to provide fusion energy researchers with access to scientific and technical resources and expertise at facilities supported by the Department, including such facilities at National Laboratories and universities, to advance innovative fusion energy technologies toward commercial application.

“(B) AWARDS.—Financial assistance under the program established in subsection (a)—

“(i) shall be awarded on a competitive, merit-reviewed basis; and

“(ii) may be in the form of grants, vouchers, equipment loans, or contracts to private entities.

“(4) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated under subsection (o), there are authorized to be appropriated to the Secretary to carry out the activities described in subsection (e) \$50,000,000 for each of fiscal years 2021 through 2025.”; and

(5) by adding at the end the following:

“(i) MILESTONE-BASED DEVELOPMENT PROGRAM.—

“(1) IN GENERAL.—Using the authority of the Secretary under section 646(g) of the Department of Energy Organization Act (42 U.S.C. 7256(g)), notwithstanding paragraph (10) of such

section, the Secretary shall establish, not later than 6 months after the date of enactment of this section, a milestone-based fusion energy development program that requires projects to meet particular technical milestones before a participant is awarded funds by the Department.

“(2) PURPOSE.—The purpose of the program established by paragraph (1) shall be to support the development of a U.S.-based fusion power industry through the research and development of technologies that will enable the construction of new full-scale fusion systems capable of demonstrating significant improvements in the performance of such systems, as defined by the Secretary, within 10 years of the enactment of this section.

“(3) ELIGIBILITY.—Any entity is eligible to participate in the program provided that the Secretary has deemed it as having the necessary resources and expertise.

“(4) REQUIREMENTS.—In carrying out the milestone-based program under paragraph (1), the Secretary shall, for each relevant project—

“(A) request proposals from eligible entities, as determined by the Secretary, that include proposed technical milestones, including estimated project timelines and total costs;

“(B) set milestones based on a rigorous technical review process;

“(C) award funding of a predetermined amount to projects that successfully meet proposed milestones under paragraph (1), or for expenses deemed reimbursable by the Secretary, in accordance with terms negotiated for an individual award; and

“(D) communicate regularly with selected eligible entities and, if the Secretary deems appropriate, exercise small amounts of flexibility for technical milestones as projects mature.

“(5) AWARDS.—For the program established under paragraph (1)—

“(A) an award recipient shall be responsible for all costs until milestones are achieved, or reimbursable expenses are reviewed and verified by the Department;

“(B) should an awardee not meet the milestones described in paragraph (4), the Secretary may end the partnership with an award recipient and use the remaining funds in the ended agreement for new or existing projects carried out under this section; and

“(C) consistent with the existing authorities of the Department, the Secretary may end the partnership with an award recipient for cause during the performance period.

“(6) APPLICATIONS.—Any project proposal submitted to the program under paragraph (1) shall be evaluated based upon its scientific, technical, and business merits through a peer-review process, which shall include reviewers with appropriate expertise from the private sector, the investment community, and experts in the science and engineering of fusion and plasma physics.

“(7) PROJECT MANAGEMENT.—In carrying out projects under this program and assessing the completion of their milestones in accordance with paragraph (4), the Secretary shall consult

with experts that represent diverse perspectives and professional experiences, including those from the private sector, to ensure a complete and thorough review.

“(8) PROGRAMMATIC REVIEW.—Not later than 4 years after the Secretary has established 3 milestones under this program, the Secretary shall enter into a contractual arrangement with the National Academy of Sciences to review and provide a report describing the findings of this review to the House Committee on Science, Space, and Technology and the Senate Committee on Energy and Natural Resources on the program established under this paragraph (1) that assesses—

“(A) the benefits and drawbacks of a milestone-based fusion program as compared to traditional program structure funding models at the Department;

“(B) lessons-learned from program operations; and

“(C) any other matters the Secretary determines regarding the program.

“(9) ANNUAL REPORT.—As part of the annual budget request submitted for each fiscal year, the Secretary shall provide the House Committee on Science, Space, and Technology and the Senate Committee on Energy and Natural Resources a report describing partnerships supported by the program established under paragraph (1) during the previous fiscal year.

“(10) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated under subsection (o), there are authorized to be appropriated to the Secretary to carry out the activities described in subsection (i), to remain available until expended—

“(A) \$45,000,000 for fiscal year 2021;

“(B) \$65,000,000 for fiscal year 2022;

“(C) \$105,000,000 for fiscal year 2023;

“(D) \$65,000,000 for fiscal year 2024; and

“(E) \$45,000,000 for fiscal year 2025.

“(j) FUSION REACTOR SYSTEM DESIGN.—The Director shall support research and development activities to design future fusion reactor systems and examine and address the technical drivers for the cost of these systems.

“(k) GENERAL PLASMA SCIENCE AND APPLICATIONS.—The Director shall support research in general plasma science and high energy density physics that advance the understanding of the scientific community of fundamental properties and complex behavior of matter to control and manipulate plasmas for a broad range of applications, including support for research relevant to advancements in chip manufacturing and microelectronics.

“(l) SENSE OF CONGRESS.—It is the sense of Congress that the United States should support a robust, diverse program in addition to providing sufficient support to, at a minimum, meet its commitments to ITER and maintain the schedule of the project as determined by the Secretary in coordination with the ITER Organization at the time of the enactment of this section. It is further the sense of Congress that developing the scientific basis for fusion, providing research results key to the success of ITER, and training the next generation of fusion scientists are of critical importance to the United States and should in no way be diminished by participation of the United States in the ITER project.

“(m) 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 fusion research facilities and research capabilities in the world, including ITER;

“(2) to the maximum extent practicable, continue to leverage United States participation ITER, and prioritize expanding international partnerships and investments in current and future fusion research facilities within the United States; and

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

“(n) FISSION AND FUSION RESEARCH COORDINATION REPORT.—

“(1) IN GENERAL.—Not later than 6 months after the date of enactment of this section, the Secretary shall transmit to Congress a report addressing opportunities for coordinating fusion energy research and development activities between the Office of Nuclear Energy, the Office of Science, and the Advanced Research Projects Agency—Energy.

“(2) COMPONENTS.—The report shall assess opportunities for collaboration on research and development of—

“(A) liquid metals to address issues associated with fusion plasma interactions with the inner wall of the encasing device and other components within the reactor;

“(B) immersion blankets for heat management and fuel breeding;

“(C) technologies and methods for instrumentation and control;

“(D) computational methods and codes for system operation and maintenance;

“(E) codes and standard development;

“(F) radioactive waste handling;

“(G) radiological safety;

“(H) potential for non-electricity generation applications; and

“(I) any other overlapping priority as identified by the Director of the Office of Science or the Assistant Secretary of Energy for Nuclear Energy.

“(o) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the activities described in this section—

“(1) \$996,000,000 for fiscal year 2021;

“(2) \$921,000,000 for fiscal year 2022;

“(3) \$961,000,000 for fiscal year 2023;

“(4) \$921,000,000 for fiscal year 2024; and

“(5) \$901,000,000 for fiscal year 2025.”.

(b) ITER.—Section 972(c) of the Energy Policy Act of 2005 (42 U.S.C. 16312) is amended to read as follows:

“(c) UNITED STATES PARTICIPATION IN ITER.—

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

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

“(3) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated under section 307(o) of the Department of Energy Research and Innovation Act (42 U.S.C. 18645), there shall be made available to the Secretary to carry out the construction of ITER—

“(A) \$374,000,000 for fiscal year 2021; and

“(B) \$281,000,000 for each of fiscal years 2022 through 2025.”.

TITLE III—RENEWABLE ENERGY AND STORAGE

Subtitle A—Renewable Energy Research and Development

SEC. 3001. WATER POWER RESEARCH AND DEVELOPMENT.

(a) IN GENERAL.—Subtitle C of title VI of the Energy Independence and Security Act of 2007 (42 U.S.C. 17211 et seq.) is amended to read as follows:

“Subtitle C—Water Power Research and Development

“SEC. 632. DEFINITIONS.

“In this subtitle:

“(1) ELIGIBLE ENTITY.—The term ‘eligible entity’ means any of the following entities:

“(A) An institution of higher education.

“(B) A National Laboratory.

“(C) A Federal research agency.

“(D) A State research agency.

“(E) A nonprofit research organization.

“(F) An industrial entity or a multi-institutional consortium thereof.

“(2) INSTITUTION OF HIGHER EDUCATION.—The term ‘institution of higher education’ means—

“(A) an institution of higher education (as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a))); or

“(B) a postsecondary vocational institution (as defined in section 102(c) of the Higher Education Act of 1965 (20 U.S.C. 1002(c))).

“(3) MARINE ENERGY.—The term ‘marine energy’ means energy from—

“(A) waves, tides, and currents in oceans, estuaries, and tidal areas;

“(B) free flowing water in rivers, lakes, streams, and man-made channels;

“(C) differentials in salinity and pressure gradients;
and

“(D) differentials in water temperature, including ocean thermal energy conversion.

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

“(5) WATER POWER.—The term ‘water power’ refers to hydropower, including conduit power, pumped storage, and marine energy technologies.

“(6) MICROGRID.—The term ‘microgrid’ has the meaning given such term in section 641 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17231).

“SEC. 633. WATER POWER TECHNOLOGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION.

“The Secretary shall carry out a program to conduct research, development, demonstration, and commercial application of water power technologies in support of each of the following purposes:

“(1) To promote research, development, demonstration, and commercial application of water power generation technologies in order to increase capacity and reduce the cost of those technologies.

“(2) To promote research and development to improve the environmental impact of water power technologies.

“(3) To provide grid reliability and resilience, including through technologies that facilitate new market opportunities, such as ancillary services, for water power.

“(4) To promote the development of water power technologies to improve economic growth and enhance cross-institutional foundational workforce development in the water power sector, including in coastal communities.

“SEC. 634. HYDROPOWER RESEARCH, DEVELOPMENT, AND DEMONSTRATION.

“The Secretary shall conduct a program of research, development, demonstration, and commercial application for technologies that improve the capacity, efficiency, resilience, security, reliability, affordability, and environmental impact, including potential cumulative environmental impacts, of hydropower systems. In carrying out such program, the Secretary shall prioritize activities designed to—

“(1) develop technology for—

“(A) non-powered dams, including aging and potentially hazardous dams;

“(B) pumped storage;

“(C) constructed waterways;

“(D) new stream-reach development;

“(E) modular and small dams;

“(F) increased operational flexibility; and

“(G) enhancement of relevant existing facilities;

“(2) develop new strategies and technologies, including analytical methods, physical and numerical tools, and advanced computing, as well as methods to validate such methods and tools, in order to—

“(A) extend the operational lifetime of hydropower systems and their physical structures, while improving

environmental impact, including potential cumulative environmental impacts;

“(B) assist in device and system design, installation, operation, and maintenance; and

“(C) reduce costs, limit outages, and increase unit and plant efficiencies, including by examining the impact of changing water and electricity demand on hydropower generation, flexibility, and provision of grid services;

“(3) study, in conjunction with other relevant Federal agencies as appropriate, methods to improve the hydropower licensing process, including by compiling current and accepted best practices, public comments, and methodologies to assess the full range of potential environmental and economic impacts;

“(4) identify opportunities for joint research, development, and demonstration programs between hydropower systems, which may include—

“(A) pumped storage systems and other renewable energy systems;

“(B) small hydro facilities and other energy storage systems;

“(C) other hybrid energy systems;

“(D) small hydro facilities and critical infrastructure, including water infrastructure; and

“(E) hydro facilities and responsive load technologies, which may include smart buildings and city systems;

“(5) improve the reliability of hydropower technologies, including during extreme weather events;

“(6) develop methods and technologies to improve environmental impact, including potential cumulative environmental impacts, of hydropower and pumped storage technologies, including potential impacts on wildlife, such as—

“(A) fisheries;

“(B) aquatic life and resources;

“(C) navigation of waterways; and

“(D) upstream and downstream environmental conditions, including sediment movement, water quality, and flow volumes;

“(7) identify ways to increase power generation by—

“(A) diversifying plant configuration options;

“(B) improving pump-back efficiencies;

“(C) investigating multi-phase systems;

“(D) developing, testing, and monitoring advanced generators with faster cycling times, variable speeds, and improved efficiencies;

“(E) developing, testing, and monitoring advanced turbines capable of improving environmental impact, including potential cumulative environmental impacts, including small turbine designs;

“(F) developing standardized powertrain components;

“(G) developing components with advanced materials and manufacturing processes, including additive manufacturing; and

“(H) developing analytical tools that enable hydropower to provide grid services that, amongst other services, improve grid integration of other energy sources;

“(8) advance new pumped storage technologies, including—

“(A) systems with adjustable speed and other new pumping and generating equipment designs;

“(B) modular systems;

“(C) alternative closed-loop systems, including mines and quarries; and

“(D) other innovative equipment and materials as determined by the Secretary;

“(9) reduce civil works costs and construction times for hydropower and pumped storage systems, including comprehensive data and systems analysis of hydropower and pumped storage construction technologies and processes in order to identify areas for whole-system efficiency gains;

“(10) advance efficient and reliable integration of hydropower and pumped storage systems with the electric grid by—

“(A) improving methods for operational forecasting of renewable energy systems to identify opportunities for hydropower applications in pumped storage and hybrid energy systems, including forecasting of seasonal and annual energy storage;

“(B) considering aggregating small distributed hydropower assets; and

“(C) identifying barriers to grid scale implementation of hydropower and pumped storage technologies;

“(11) improve computational fluid dynamic modeling methods;

“(12) improve flow measurement methods, including maintenance of continuous flow measurement equipment;

“(13) identify best methods for compiling data on all hydropower resources and assets, including identifying potential for increased capacity; and

“(14) identify mechanisms to test and validate performance of hydropower and pumped storage technologies.

“SEC. 635. MARINE ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION.

“(a) IN GENERAL.—The Secretary, in consultation with the Secretary of Defense, Secretary of Commerce (acting through the Under Secretary of Commerce for Oceans and Atmosphere) and other relevant Federal agencies, shall conduct a program of research, development, demonstration, and commercial application of marine energy technology, including activities to—

“(1) assist technology development to improve the components, processes, and systems used for power generation from marine energy resources at a variety of scales;

“(2) establish and expand critical testing infrastructure and facilities necessary to—

“(A) demonstrate and prove marine energy devices at a range of scales in a manner that is cost-effective and efficient; and

“(B) accelerate the technological readiness and commercial application of such devices;

“(3) address marine energy resource variability issues, including through the application of energy storage technologies;

“(4) advance efficient and reliable integration of marine energy with the electric grid, which may include smart building systems;

“(5) identify and study critical short-term and long-term needs to maintaining a sustainable marine energy supply chain based in the United States;

“(6) increase the reliability, security, and resilience of marine energy technologies;

“(7) validate the performance, reliability, maintainability, and cost of marine energy device designs and system components in an operating environment;

“(8) consider the protection of critical infrastructure, such as adequate separation between marine energy devices and submarine telecommunications cables, including through the development of voluntary, consensus-based standards for such purposes;

“(9) identify opportunities for crosscutting research, development, and demonstration programs between existing energy research programs;

“(10) identify and improve, in conjunction with the Secretary of Commerce, acting through the Under Secretary of Commerce for Oceans and Atmosphere, and other relevant Federal agencies as appropriate, the environmental impact, including potential cumulative environmental impacts, of marine energy technologies, including—

“(A) potential impacts on fisheries and other marine resources; and

“(B) developing technologies, including mechanisms for self-evaluation, and other means available for improving environmental impact, including potential cumulative environmental impacts;

“(11) identify, in consultation with relevant Federal agencies, potential navigational impacts of marine energy technologies and strategies to prevent possible adverse impacts, in addition to opportunities for marine energy systems to aid the United States Coast Guard, such as remote sensing for coastal border security;

“(12) develop numerical and physical tools, including models and monitoring technologies, to assist industry in device and system design, installation, operation, and maintenance, including methods to validate such tools;

“(13) support materials science as it relates to marine energy technology, such as the development of corrosive-resistant materials;

“(14) improve marine energy resource forecasting and general understanding of aquatic system behavior, including turbulence and extreme conditions;

“(15) develop metrics and voluntary, consensus-based standards, in coordination with the National Institute of Standards and Technology and appropriate standard development organizations, for marine energy components, systems, and projects, including—

“(A) measuring performance of marine energy technologies; and

“(B) characterizing environmental conditions;

“(16) enhance integration with hybrid energy systems, including desalination;

“(17) identify opportunities to integrate marine energy technologies into new and existing infrastructure; and

“(18) to develop technology necessary to support the use of marine energy—

“(A) for the generation and storage of power at sea; and

“(B) for the generation and storage of power to promote the resilience of coastal communities, including in applications relating to—

“(i) desalination;

“(ii) disaster recovery and resilience; and

“(iii) community microgrids in isolated power systems.

“(b) STUDY OF NON-POWER SECTOR APPLICATIONS FOR ADVANCED MARINE ENERGY TECHNOLOGIES.—

“(1) IN GENERAL.—The Secretary, in consultation with the Secretary of Transportation and the Secretary of Commerce, shall conduct a study to examine opportunities for research and development in advanced marine energy technologies for non-power sector applications, including applications with respect to—

“(A) the maritime transportation sector;

“(B) associated maritime energy infrastructure, including infrastructure that serves ports, to improve system resilience and disaster recovery; and

“(C) enabling scientific missions at sea and in extreme environments, including the Arctic.

“(2) REPORT.—Not later than 1 year after the date of enactment of this section, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report that describes the results of the study conducted under paragraph (1).

“SEC. 636. NATIONAL MARINE ENERGY CENTERS.

“(a) IN GENERAL.—The Secretary shall award grants, each such grant up to \$10,000,000 per year, to institutions of higher education (or consortia thereof) for—

“(1) the continuation and expansion of the research, development, demonstration, testing, and commercial application activities at the National Marine Energy Centers (referred to in this section as ‘Centers’) established as of January 1, 2020; and

“(2) the establishment of new National Marine Energy Centers.

“(b) LOCATION SELECTION.—In selecting institutions of higher education for new Centers, the Secretary shall consider the following criteria:

“(1) Whether the institution hosts an existing marine energy research and development program.

“(2) Whether the institution has proven technical expertise to support marine energy research.

“(3) Whether the institution has access to marine resources.

“(c) PURPOSES.—The Centers shall coordinate among themselves, the Department, and National Laboratories to—

“(1) advance research, development, demonstration, and commercial application of marine energy technologies in response to industry and commercial needs;

“(2) support in-water testing and demonstration of marine energy technologies, including facilities capable of testing—

“(A) marine energy systems of various technology readiness levels and scales;

“(B) a variety of technologies in multiple test berths at a single location;

“(C) arrays of technology devices; and

“(D) interconnectivity to an electrical grid, including microgrids; and

“(3) collect and disseminate information on best practices in all areas relating to developing and managing marine energy resources and energy systems.

“(d) COORDINATION.—To the extent practicable, the Centers shall coordinate their activities with the Secretary of Commerce, acting through the Undersecretary of Commerce for Oceans and Atmosphere, and other relevant Federal agencies.

“(e) TERMINATION.—To the extent otherwise authorized by law, the Secretary may terminate funding for a Center described in paragraph (a) if such Center is under-performing.

“SEC. 637. ORGANIZATION AND ADMINISTRATION OF PROGRAMS.

“(a) COORDINATION.—In carrying out this subtitle, the Secretary shall coordinate activities, and effectively manage cross-cutting research priorities across programs of the Department and other relevant Federal agencies, including the National Laboratories and the National Marine Energy Centers.

“(b) COLLABORATION.—

“(1) IN GENERAL.—In carrying out this subtitle, the Secretary shall collaborate with industry, National Laboratories, other relevant Federal agencies, institutions of higher education, including Minority Serving Institutions, National Marine Energy Centers, Tribal entities, including Alaska Native Corporations, and international bodies with relevant scientific and technical expertise.

“(2) PARTICIPATION.—To the extent practicable, the Secretary shall encourage research projects that promote collaboration between entities specified in paragraph (1) and include entities not historically associated with National Marine Energy Centers, such as Minority Serving Institutions.

“(3) INTERNATIONAL COLLABORATION.—The Secretary, in coordination with other appropriate Federal and multilateral agencies (including the United States Agency for International Development) shall support collaborative efforts with international partners to promote the research, development, and demonstration of water power technologies used to develop hydropower, pump storage, and marine energy resources.

“(c) DISSEMINATION OF RESULTS AND PUBLIC AVAILABILITY.—The Secretary shall—

“(1) publish the results of projects supported under this subtitle through Department websites, reports, databases, training materials, and industry conferences, including information discovered after the completion of such projects, withholding any industrial proprietary information; and

“(2) share results of such projects with the public except to the extent that the information is protected from disclosure under section 552(b) of title 5, United States Code.

“(d) AWARD FREQUENCY.—The Secretary shall solicit applications for awards under this subtitle no less frequently than once per fiscal year.

“(e) EDUCATION AND OUTREACH.—In carrying out the activities described in this subtitle, the Secretary shall support education and outreach activities to disseminate information and promote public understanding of water power technologies and the water power workforce, including activities at the National Marine Energy Centers.

“(f) TECHNICAL ASSISTANCE AND WORKFORCE DEVELOPMENT.—In carrying out this subtitle, the Secretary may also conduct, for purposes of supporting technical, non-hardware, and information-based advances in water power systems development and operations—

“(1) technical assistance and analysis activities with eligible entities, including activities that support expanding access to advanced water power technologies for rural, Tribal, and low-income communities; and

“(2) workforce development and training activities, including to support the dissemination of standards and best practices for enabling water power production.

“(g) STRATEGIC PLAN.—In carrying out the activities described in this subtitle, the Secretary shall—

“(1) not later than one year after the date of the enactment of the Energy Act of 2020, draft a plan, considering input from relevant stakeholders such as industry and academia, to implement the programs described in this subtitle and update the plan on an annual basis; and

“(2) the plan shall address near-term (up to 2 years), mid-term (up to 7 years), and long-term (up to 15 years) challenges to the advancement of water power systems.

“(h) REPORT TO CONGRESS.—Not later than 1 year after the date of the enactment of the Energy Act of 2020, and at least once every 2 years thereafter, the Secretary shall provide, and make available to the public and the relevant authorizing and appropriations committees of Congress, a report on the findings of research conducted and activities carried out pursuant to this subtitle, including the most current strategic plan under subsection (g) and the progress made in implementing such plan.

“SEC. 638. APPLICABILITY OF OTHER LAWS.

“Nothing in this subtitle shall be construed as waiving, modifying, or superseding the applicability of any requirement under any environmental or other Federal or State law.

“SEC. 639. AUTHORIZATION OF APPROPRIATIONS.

“There are authorized to be appropriated to the Secretary to carry out this subtitle \$186,600,000 for each of fiscal years 2021 through 2025, including \$137,428,378 for marine energy and \$49,171,622 for hydropower research, development, and demonstration activities.”

(b) CONFORMING TABLE OF CONTENTS AMENDMENT.—The table of contents for the Energy Independence and Security Act of 2007 is amended by striking the items relating to subtitle C of title VI and inserting the following:

“Subtitle C—Water Power Research and Development

“Sec. 632. Definitions.

H. R. 133—1306

- “Sec. 633. Water power technology research, development, and demonstration.
- “Sec. 634. Hydropower research, development, and demonstration.
- “Sec. 635. Marine energy research, development, and demonstration.
- “Sec. 636. National Marine Energy Centers.
- “Sec. 637. Organization and administration of programs.
- “Sec. 638. Applicability of other laws.
- “Sec. 639. Authorization of appropriations.”.

SEC. 3002. ADVANCED GEOTHERMAL INNOVATION LEADERSHIP.

(a) **DEFINITIONS.**—Section 612 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17191) is amended—

(1) by amending paragraph (1) to read as follows:

“(1) **ENGINEERED.**—When referring to enhanced geothermal systems, the term ‘engineered’ means designed to access subsurface heat, including stimulation and nonstimulation technologies to address one or more of the following issues:

“(A) Lack of effective permeability, porosity or open fracture connectivity within the heat reservoir.

“(B) Insufficient contained geofluid in the heat reservoir.

“(C) A low average geothermal gradient which necessitates deeper drilling, or the use of alternative heat sources or heat generation processes.”;

(2) by redesignating paragraphs (2) through (7) as paragraphs (3) through (8), respectively; and

(3) by adding after paragraph (1) the following:

“(2) **ELIGIBLE ENTITY.**—The term ‘eligible entity’ means any of the following entities:

“(A) An institution of higher education.

“(B) A National laboratory.

“(C) A Federal research agency.

“(D) A State research agency.

“(E) A nonprofit research organization.

“(F) An industrial entity.

“(G) A consortium of 2 or more entities described in subparagraphs (A) through (F).”.

(b) **HYDROTHERMAL RESEARCH AND DEVELOPMENT.**—Section 613 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17192) is amended to read as follows:

“SEC. 613. HYDROTHERMAL RESEARCH AND DEVELOPMENT.

“(a) **IN GENERAL.**—The Secretary shall carry out a program of research, development, demonstration, and commercial application for geothermal energy production from hydrothermal systems.

“(b) **PROGRAMS.**—The program authorized in subsection (a) shall include the following:

“(1) **ADVANCED HYDROTHERMAL RESOURCE TOOLS.**—The research and development of advanced geologic tools to assist in locating hydrothermal resources, and to increase the reliability of site characterization, including the development of new imaging and sensing technologies and techniques to assist in prioritization of targets for characterization;

“(2) **EXPLORATORY DRILLING FOR GEOTHERMAL RESOURCES.**—The demonstration of advanced technologies and techniques of siting and exploratory drilling for undiscovered resources in a variety of geologic settings, carried out in collaboration with industry partners that will assist in the acquisition of high quality data sets relevant for hydrothermal subsurface characterization activities.”.

(c) GENERAL GEOTHERMAL SYSTEMS RESEARCH AND DEVELOPMENT.—Section 614 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17193) is amended to read as follows:

“SEC. 614. GENERAL GEOTHERMAL SYSTEMS RESEARCH AND DEVELOPMENT.

“(a) SUBSURFACE COMPONENTS AND SYSTEMS.—The Secretary shall support a program of research, development, demonstration, and commercial application of components and systems capable of withstanding geothermal environments and necessary to develop, produce, and monitor geothermal reservoirs and produce geothermal energy.

“(b) ENVIRONMENTAL IMPACTS.—The Secretary shall—

“(1) support a program of research, development, demonstration, and commercial application of technologies and practices designed to mitigate or preclude potential adverse environmental impacts of geothermal energy development, production or use;

“(2) support a research program to identify potential environmental impacts, including induced seismicity, and environmental benefits of geothermal energy development, production, and use, and ensure that the program described in paragraph (1) addresses such impacts, including water use and effects on groundwater and local hydrology;

“(3) support a program of research to compare the potential environmental impacts and environmental benefits identified as part of the development, production, and use of geothermal energy with the potential emission reductions of greenhouse gases gained by geothermal energy development, production, and use; and

“(4) in carrying out this section, the Secretary shall, to the maximum extent practicable, consult with relevant federal agencies, including the Environmental Protection Agency.

“(c) RESERVOIR THERMAL ENERGY STORAGE.—The Secretary shall support a program of research, development, and demonstration of reservoir thermal energy storage, emphasizing cost-effective improvements through deep direct use engineering, design, and systems research.

“(d) OIL AND GAS TECHNOLOGY TRANSFER INITIATIVE.—

“(1) IN GENERAL.—The Secretary shall support an initiative among the Office of Fossil Energy, the Office of Energy Efficiency and Renewable Energy, and the private sector to research, develop, and demonstrate relevant advanced technologies and operation techniques used in the oil and gas sector for use in geothermal energy development.

“(2) PRIORITIES.—In carrying out paragraph (1), the Secretary shall prioritize technologies with the greatest potential to significantly increase the use and lower the cost of geothermal energy in the United States, including the cost and speed of geothermal drilling surface technologies, large- and small-scale drilling, and well construction.

“(e) COPRODUCTION OF GEOTHERMAL ENERGY AND MINERALS PRODUCTION RESEARCH AND DEVELOPMENT INITIATIVE.—

“(1) IN GENERAL.—The Secretary shall carry out a research and development initiative under which the Secretary shall provide financial assistance to demonstrate the coproduction of critical minerals from geothermal resources.

“(2) REQUIREMENTS.—An award made under paragraph (1) shall—

“(A) improve the cost effectiveness of removing minerals from geothermal brines as part of the coproduction process;

“(B) increase recovery rates of the targeted mineral commodity;

“(C) decrease water use and other environmental impacts, as determined by the Secretary; and

“(D) demonstrate a path to commercial viability.

“(f) FLEXIBLE OPERATIONS.—The Secretary shall support a research initiative on flexible operation of geothermal power plants.

“(g) INTEGRATED ENERGY SYSTEMS.—The Secretary shall identify opportunities for joint research, development, and demonstration programs between geothermal systems and other energy generation or storage systems.

“(h) DRILLING DATA REPOSITORY.—

“(1) IN GENERAL.—The Secretary shall, in consultation with the Secretary of the Interior, establish and operate a voluntary, industry-wide repository of geothermal drilling information to lower the cost of future geothermal drilling.

“(2) REPOSITORY.—

“(A) IN GENERAL.—In carrying out paragraph (1), the Secretary shall collaborate with countries utilizing a significant amount of geothermal energy, as determined by the Secretary.

“(B) DATA SYSTEM.—The repository established under paragraph (1) shall be integrated with the National Geothermal Data System.”

(d) ENHANCED GEOTHERMAL SYSTEMS RESEARCH AND DEVELOPMENT.—Section 615 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17194) is amended to read as follows:

“SEC. 615. ENHANCED GEOTHERMAL SYSTEMS RESEARCH AND DEVELOPMENT.

“(a) IN GENERAL.—The Secretary shall support a program of research, development, demonstration, and commercial application for enhanced geothermal systems, including the programs described in subsection (b).

“(b) ENHANCED GEOTHERMAL SYSTEMS TECHNOLOGIES.—In collaboration with industry partners, institutions of higher education, and the national laboratories, the Secretary shall support a program of research, development, demonstration, and commercial application of the technologies to achieve higher efficiency and lower cost enhanced geothermal systems, including—

“(1) reservoir stimulation;

“(2) drilled, non-stimulated (e.g. closed-loop) reservoir technologies;

“(3) reservoir characterization, monitoring, and modeling and understanding of the surface area and volume of fractures;

“(4) stress and fracture mapping including real time monitoring and modeling;

“(5) tracer development;

“(6) three and four-dimensional seismic imaging and tomography;

“(7) well placement and orientation;

“(8) long-term reservoir management;

“(9) drilling technologies, methods, and tools;

“(10) improved exploration tools;

“(11) zonal isolation; and

“(12) understanding induced seismicity risks from reservoir engineering and stimulation.

“(c) FRONTIER OBSERVATORY FOR RESEARCH IN GEOTHERMAL ENERGY.—

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

“(2) DUTIES.—The Secretary shall—

“(A) provide financial assistance in support of research and development projects focused on advanced monitoring technologies, new technologies and approaches for implementing multi-zone stimulations, nonstimulation techniques, and dynamic reservoir modeling that incorporates all available high-fidelity characterization data; and

“(B) seek opportunities to coordinate efforts and share information with domestic and international partners engaged in research and development of geothermal systems and related technology, including coordination between FORGE sites.

“(3) SITE SELECTION.—Of the FORGE sites referred to in paragraph (1), the Secretary shall—

“(A) 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 this subsection;

“(B) prioritize existing field sites and facilities with capabilities relevant to the duties enumerated under this subsection;

“(C) determine the mission need for and potential location of subsequent FORGE sites following the completion of construction and one year of operation of two FORGE sites; and

“(D) ensure geologic diversity among FORGE sites when developing subsequent sites, to the maximum extent practicable.

“(4) EXISTING FORGE SITES.—A FORGE site already in existence on the date of enactment of this Act may continue to receive support.

“(5) SITE OPERATION.—

“(A) INITIAL DURATION.—FORGE sites selected under paragraph (3) shall operate for an initial term of not more than 7 years after the date on which site operation begins.

“(B) PERFORMANCE METRICS.—The Secretary shall establish performance metrics for each FORGE site supported under this paragraph, which may be used by the Secretary to determine whether a FORGE site should continue to receive funding.

“(6) ADDITIONAL TERMS.—

“(A) IN GENERAL.—At the end of an operational term described in subparagraph (B), a FORGE site may—

“(i) be transferred to other public or private entities for further enhanced geothermal testing; or

“(ii) subject to appropriations and a merit review by the Secretary, operate for an additional term of not more than 7 years.

“(B) OPERATIONAL TERM DESCRIBED.—An operational term referred to in subparagraph (A)—

“(i) in the case of an existing FORGE site, is the existing operational term; and

“(ii) in the case of new FORGE sites selected under paragraph (3), is the initial term under paragraph (5)(A) or an additional term under subparagraph (A)(ii) of this paragraph.

“(7) FUNDING.—

“(A) IN GENERAL.—Out of funds authorized to be appropriated under section 623, there shall be made available to the Secretary to carry out the FORGE activities under this paragraph—

“(i) \$45,000,000 for fiscal year 2021;

“(ii) \$55,000,000 for fiscal year 2022;

“(iii) \$65,000,000 for fiscal year 2023;

“(iv) \$70,000,000 for fiscal year 2024; and

“(v) \$70,000,000 for fiscal year 2025.

“(B) CONSIDERATIONS.—In carrying out this subsection, the Secretary shall consider the balance between funds dedicated to construction and operations and research activities to reflect the state of site development.

“(d) ENHANCED GEOTHERMAL SYSTEMS DEMONSTRATIONS.—

“(1) IN GENERAL.—Beginning on the date of enactment of this section, the Secretary, in collaboration with industry partners, institutions of higher education, and the national laboratories, shall support an initiative for demonstration of enhanced geothermal systems for power production or direct use.

“(2) PROJECTS.—

“(A) IN GENERAL.—Under the initiative described in paragraph (1), 4 demonstration projects shall be carried out in locations that are potentially commercially viable for enhanced geothermal systems development, while also considering environmental impacts to the maximum extent practicable, as determined by the Secretary.

“(B) REQUIREMENTS.—Demonstration projects under subparagraph (A) shall—

“(i) collectively demonstrate—

“(I) different geologic settings, such as hot sedimentary aquifers, layered geologic systems, supercritical systems, and basement rock systems; and

“(II) a variety of development techniques, including open hole and cased hole completions, differing well orientations, and stimulation and nonstimulation mechanisms; and

“(ii) to the extent practicable, use existing sites where subsurface characterization or geothermal energy integration analysis has been conducted.

“(C) EASTERN DEMONSTRATION.—Not fewer than 1 of the demonstration projects carried out under subparagraph (A) shall be located an area east of the Mississippi River that is suitable for enhanced geothermal demonstration for power, heat, or a combination of power and heat.

“(D) MILESTONE-BASED DEMONSTRATION PROJECTS.—The Secretary may carry out demonstration projects under this subsection as a milestone-based demonstration project under section 9005 of the Energy Act of 2020.

“(3) FUNDING.—Out of funds authorized to be appropriated under section 623, there shall be made available to the Secretary to carry out the demonstration activities under this subsection \$21,000,000 for each of fiscal years 2021 through 2025.”

(e) GEOTHERMAL HEAT PUMPS AND DIRECT USE.—

(1) IN GENERAL.—Title VI of the Energy Independence and Security Act of 2007 is amended by inserting after section 616 (42 U.S.C. 17195) the following:

“SEC. 616A. GEOTHERMAL HEAT PUMPS AND DIRECT USE RESEARCH AND DEVELOPMENT.

“(a) PURPOSES.—The purposes of this section are—

“(1) to improve the understanding of related earth sciences, components, processes, and systems used for geothermal heat pumps and the direct use of geothermal energy; and

“(2) to increase the energy efficiency, lower the cost, increase the use, and improve and demonstrate the effectiveness of geothermal heat pumps and the direct use of geothermal energy.

“(b) DEFINITIONS.—In this section:

“(1) DIRECT USE OF GEOTHERMAL ENERGY.—The term ‘direct use of geothermal energy’ means geothermal systems that use water directly or through a heat exchanger to provide—

“(A) heating and cooling to buildings, commercial districts, residential communities, and large municipal, or industrial projects; or

“(B) heat required for industrial processes, agriculture, aquaculture, and other facilities.

“(2) ECONOMICALLY DISTRESSED AREA.—The term ‘economically distressed area’ means an area described in section 301(a) of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3161(a)).

“(3) GEOTHERMAL HEAT PUMP.—The term ‘geothermal heat pump’ means a system that provides heating and cooling by exchanging heat from shallow geology, groundwater, or surface water using—

“(A) a closed loop system, which transfers heat by way of buried or immersed pipes that contain a mix of water and working fluid; or

“(B) an open loop system, which circulates ground or surface water directly into the building and returns the water to the same aquifer or surface water source.

“(c) PROGRAM.—

“(1) IN GENERAL.—The Secretary shall support within the Geothermal Technologies Office a program of research, development, and demonstration for geothermal heat pumps and the direct use of geothermal energy.

“(2) AREAS.—The program under paragraph (1) may include research, development, demonstration, and commercial application of—

“(A) geothermal ground loop efficiency improvements, cost reductions, and improved installation and operations methods;

“(B) the use of geothermal energy for building-scale energy storage;

“(C) the use of geothermal energy as a grid management resource or seasonal energy storage;

“(D) geothermal heat pump efficiency improvements;

“(E) the use of alternative fluids as a heat exchange medium, such as hot water found in mines and mine shafts, graywater, or other fluids that may improve the economics of geothermal heat pumps;

“(F) heating of districts, neighborhoods, communities, large commercial or public buildings, and industrial and manufacturing facilities;

“(G) the use of low temperature groundwater for direct use; and

“(H) system integration of direct use with geothermal electricity production.

“(3) ENVIRONMENTAL IMPACTS.—In carrying out the program, the Secretary shall identify and mitigate potential environmental impacts in accordance with section 614(b).

“(d) FINANCIAL ASSISTANCE.—

“(1) IN GENERAL.—The Secretary shall carry out the program established in subsection (c) by making financial assistance available to State, local, and Tribal governments, institutions of higher education, nonprofit entities, National Laboratories, utilities, and for-profit companies.

“(2) PRIORITY.—In providing financial assistance under this subsection, the Secretary may give priority to proposals that apply to large buildings, commercial districts, and residential communities that are located in economically distressed areas and areas that the Secretary determines to have high economic potential for geothermal district heating based on the report, ‘Geovision: Harnessing the Heat Beneath our Feet’ published by the Department in 2019, or a successor report.”.

(2) CONFORMING AMENDMENT.—Section 1(b) of the Energy Independence and Security Act of 2007 (42 U.S.C. 17001 note) is amended in the table of contents by inserting after the item relating to section 616 the following:

“Sec. 616A. Geothermal heat pumps and direct use research and development.”.

(f) ORGANIZATION AND ADMINISTRATION OF PROGRAMS.—

(1) IN GENERAL.—Section 617 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17196) is amended—

(A) by striking the section heading and inserting “organization and administration of programs”;

(B) in subsection (b), by striking paragraph (2) and redesignating paragraphs (3) and (4) as paragraphs (2) and (3), respectively; and

(C) by adding at the end the following:

“(c) EDUCATION AND OUTREACH.—In carrying out the activities described in this subtitle, the Secretary shall support education and outreach activities to disseminate information on geothermal

energy technologies and the geothermal energy workforce, including activities at the Frontier Observatory for Research in Geothermal Energy site or sites.

“(d) TECHNICAL ASSISTANCE.—In carrying out this subtitle, the Secretary shall also conduct technical assistance and analysis activities with eligible entities for the purpose of supporting the commercial application of advances in geothermal energy systems development and operations, which may include activities that support expanding access to advanced geothermal energy technologies for rural, Tribal, and low-income communities.

“(e) REPORT.—Every 5 years after the date of enactment of this subsection, the Secretary shall report to the Committee on Science and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate on advanced concepts and technologies to maximize the geothermal resource potential of the United States.

“(f) PROGRESS REPORTS.—Not later than 1 year after the date of enactment of this subsection, and every 2 years thereafter, the Secretary shall submit to the Committee on Science and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on the results of projects undertaken under this part and other such information the Secretary considers appropriate.”

(2) CONFORMING AMENDMENT.—Section 1(b) of the Energy Independence and Security Act of 2007 (42 U.S.C. 17001 note) is amended in the table of contents by amending the item related to section 617 to read as follows:

“Sec. 617. Organization and administration of programs.”

(g) ADVANCED GEOTHERMAL COMPUTING AND DATA SCIENCE RESEARCH AND DEVELOPMENT.—

(1) IN GENERAL.—Section 618 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17197) is amended to read as follows:

“SEC. 618. ADVANCED GEOTHERMAL COMPUTING AND DATA SCIENCE RESEARCH AND DEVELOPMENT.

“(a) IN GENERAL.—The Secretary shall carry out a program of research and development of advanced computing and data science tools for geothermal energy.

“(b) PROGRAMS.—The program authorized in subsection (a) shall include the following:

“(1) ADVANCED COMPUTING FOR GEOTHERMAL SYSTEMS TECHNOLOGIES.—Research, development, and demonstration of technologies to develop advanced data, machine learning, artificial intelligence, and related computing tools to assist in locating geothermal resources, to increase the reliability of site characterization, to increase the rate and efficiency of drilling, to improve induced seismicity mitigation, and to support enhanced geothermal systems technologies.

“(2) GEOTHERMAL SYSTEMS RESERVOIR MODELING.—Research, development, and demonstration of models of geothermal reservoir performance and enhanced geothermal systems reservoir stimulation technologies and techniques, with an emphasis on accurately modeling fluid and heat flow, permeability evolution, geomechanics, geochemistry, seismicity, and

operational performance over time, including collaboration with industry and field validation.

“(c) COORDINATION.—In carrying out these programs, the Secretary shall ensure coordination and consultation with the Department of Energy’s Office of Science. The Secretary shall ensure, to the maximum extent practicable, coordination of these activities with the Department of Energy National Laboratories, institutes of higher education, and the private sector.”

(2) CONFORMING AMENDMENT.—Section 1(b) of the Energy Independence and Security Act of 2007 (42 U.S.C. 17001 note) is amended in the table of contents by amending the item related to section 618 to read as follows:

“Sec. 618. Advanced geothermal computing and data science research and development.”

(h) GEOTHERMAL WORKFORCE DEVELOPMENT.—

(1) IN GENERAL.—Section 619 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17198) is amended to read as follows:

“SEC. 619. GEOTHERMAL WORKFORCE DEVELOPMENT.

“The Secretary shall support the development of a geothermal energy workforce through a program that—

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

“(2) prioritizes science in areas relevant to the mission of the Department through the application of geothermal energy tools and technologies.”

(2) CONFORMING AMENDMENT.—Section 1(b) of the Energy Independence and Security Act of 2007 (42 U.S.C. 17001 note) is amended in the table of contents by amending the item related to section 619 to read as follows:

“Sec. 619. Geothermal workforce development.”

(i) REPEALS.—

(1) EISA REPEAL.—Subtitle B of title VI of the Energy Independence and Security Act of 2007 (42 U.S.C. 17191 et seq.) is amended by striking sections 620 and 621.

(2) CONFORMING AMENDMENT.—Section 1(b) of the Energy Independence and Security Act of 2007 (42 U.S.C. 17001 note) is amended in the table of contents by striking the item related to section 620 and 621.

(3) ADDITIONAL REPEAL.—The Geothermal Energy Research, Development, and Demonstration Act of 1974 (30 U.S.C. 1101 et seq.) is repealed.

(j) AUTHORIZATION OF APPROPRIATIONS.—Section 623 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17202) is amended to read as follows:

“SEC. 623. AUTHORIZATION OF APPROPRIATIONS.

“There are authorized to be appropriated to the Secretary to carry out the programs under this subtitle \$170,000,000 for each of fiscal years 2021 through 2025.”

(k) INTERNATIONAL GEOTHERMAL ENERGY DEVELOPMENT.—Section 624 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17203) is amended—

(1) by amending subsection (a) to read as follows:

“(a) IN GENERAL.—The Secretary of Energy, in coordination with other appropriate Federal and multilateral agencies (including the United States Agency for International Development) shall support collaborative efforts with international partners to promote the research, development, and demonstration of geothermal technologies used to develop hydrothermal and enhanced geothermal system resources.”; and

(2) by striking subsection (c).

(l) REAUTHORIZATION OF HIGH COST REGION GEOTHERMAL ENERGY GRANT PROGRAM.—Section 625 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17204) is amended—

(1) in subsection (a)(2), by inserting “or heat” after “electrical power”; and

(2) by amending subsection (e) to read as follows:

“(e) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized under section 623, there is authorized to be appropriated to carry out this section \$5,000,000 for each of fiscal years 2021 through 2025.”.

(m) UPDATE TO GEOTHERMAL RESOURCE ASSESSMENT.—Section 2501 of the Energy Policy Act of 1992 (30 U.S.C. 1028) is amended—

(1) by redesignating subsections (a) and (b) as subsections (b) and (d), respectively;

(2) by inserting before subsection (b) (as so redesignated) the following:

“(a) DEFINITION OF ENHANCED GEOTHERMAL SYSTEMS.—In this section, the term ‘enhanced geothermal systems’ has the meaning given the term in section 612 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17191).”;

(3) by inserting after subsection (b) (as so redesignated) the following:

“(c) UPDATE TO GEOTHERMAL RESOURCE ASSESSMENT.—The Secretary of the Interior, acting through the United States Geological Survey, and in consultation with the Secretary of Energy, shall update the 2008 United States geothermal resource assessment carried out by the United States Geological Survey, including—

“(1) with respect to areas previously identified by the Department of Energy or the United States Geological Survey as having significant potential for hydrothermal energy or enhanced geothermal systems energy, by focusing on—

“(A) improving the resolution of resource potential at systematic temperatures and depths, including temperatures and depths appropriate for power generation and direct use applications;

“(B) quantifying the total potential to coproduce geothermal energy and minerals;

“(C) incorporating data relevant to underground thermal energy storage and exchange, such as aquifer and soil properties; and

“(D) producing high resolution maps, including—

“(i) maps that indicate key subsurface parameters for electric and direct use resources; and

“(ii) risk maps for induced seismicity based on geologic, geographic, and operational parameters; and

“(2) to the maximum extent practicable, by coordinating with relevant State officials and institutions of higher education to expand geothermal assessments, including enhanced geothermal systems assessments, to include assessments for the

Commonwealth of Puerto Rico and the States of Alaska and Hawaii.”; and

(4) in subsection (d) (as so redesignated), by striking “necessary” and inserting “necessary”.

(n) MODIFYING THE DEFINITION OF RENEWABLE ENERGY TO INCLUDE THERMAL ENERGY.—

(o) MODIFYING THE DEFINITION OF RENEWABLE ENERGY TO INCLUDE THERMAL ENERGY.—Section 203 of the Energy Policy Act of 2005 (42 U.S.C. 15852) is amended—

(1) in subsection (b)(2), by striking “generated” and inserting “produced”; and

(2) in subsection (c)—

(A) by redesignating paragraphs (1) through (3) as subparagraphs (A) through (C), respectively, and indenting appropriately;

(B) in the matter preceding subparagraph (A) (as so redesignated), by striking “For purposes” and inserting the following:

“(1) IN GENERAL.—For purposes”; and

(C) by adding at the end the following:

“(2) SEPARATE CALCULATION.—

“(A) IN GENERAL.—For purposes of determining compliance with the requirement of this section, any energy consumption that is avoided through the use of geothermal energy shall be considered to be renewable energy produced.

“(B) EFFICIENCY ACCOUNTING.—Energy consumption that is avoided through the use of geothermal energy that is considered to be renewable energy under this section shall not be considered energy efficiency for the purpose of compliance with Federal energy efficiency goals, targets, and incentives.”.

SEC. 3003. WIND ENERGY RESEARCH AND DEVELOPMENT.

(a) DEFINITIONS.—In this section:

(1) CRITICAL MATERIAL.—The term “critical material” has the meaning given the term in section 7002 of this Act.

(2) ECONOMICALLY DISTRESSED AREA.—The term “economically distressed area” means an area described in section 301(a) of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3161(a)).

(3) ELIGIBLE ENTITY.—The term “eligible entity” means—

(A) an institution of higher education, including a minority-serving institution;

(B) a National Laboratory;

(C) a Federal research agency;

(D) a State research agency;

(E) a research agency associated with a territory or freely associated state;

(F) a Tribal energy development organization;

(G) an Indian Tribe;

(H) a Tribal organization;

(I) a Native Hawaiian community-based organization;

(J) a nonprofit research organization;

(K) an industrial entity;

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

and

(M) a consortium of 2 or more entities described in subparagraphs (A) through (L).

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

(5) INSTITUTION OF HIGHER EDUCATION.—The term “institution of higher education” means—

(A) an institution of higher education (as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a))); or

(B) a postsecondary vocational institution (as defined in section 102(c) of the Higher Education Act of 1965 (20 U.S.C. 1002(c))).

(6) MINORITY SERVING INSTITUTION.—The term “minority-serving institution” has the meaning given the term “eligible institution” in section 371(a) of the Higher Education Act of 1965 (20 U.S.C. 1067q(a)).

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

(8) NATIVE HAWAIIAN COMMUNITY-BASED ORGANIZATION.—The term “Native Hawaiian community-based organization” has the meaning given the term in section 6207 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7517).

(9) PROGRAM.—The term “program” means the program established under subsection (b)(1).

(10) SECRETARY.—The term “Secretary” means the Secretary of Energy.

(11) TERRITORY OR FREELY ASSOCIATED STATE.—The term “territory or freely associated state” has the meaning given the term “insular area” in section 1404 of the Food and Agriculture Act of 1977 (7 U.S.C. 3103).

(12) TRIBAL ENERGY DEVELOPMENT ORGANIZATION.—The term “Tribal energy development organization” has the meaning given the term “tribal energy development organization” in section 2601 of the Energy Policy Act of 1992 (25 U.S.C. 3501).

(13) TRIBAL ORGANIZATION.—The term “Tribal organization” has the meaning given the term in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5304).

(b) WIND ENERGY TECHNOLOGY PROGRAM.—

(1) ESTABLISHMENT.—

(A) IN GENERAL.—The Secretary shall establish a program to conduct research, development, demonstration, and commercialization of wind energy technologies in accordance with this subsection.

(B) PURPOSES.—The purposes of the program are the following:

(i) To improve the energy efficiency, cost effectiveness, reliability, resilience, security, siting, integration, manufacturability, installation, decommissioning, and recyclability of wind energy technologies.

(ii) To optimize the performance and operation of wind energy components, turbines, and systems, including through the development of new materials, hardware, and software.

(iii) To optimize the design and adaptability of wind energy technologies to the broadest practical range of geographic, atmospheric, offshore, and other site conditions, including—

(I) at varying hub heights; and

(II) through the use of computer modeling.

(iv) To support the integration of wind energy technologies with the electric grid and other energy technologies and systems.

(v) To reduce the cost, risk, and other potential negative impacts across the lifespan of wind energy technologies, including—

(I) manufacturing, siting, permitting, installation, operations, maintenance, decommissioning, and recycling; and

(II) through the development of solutions to transportation barriers to wind components.

(vi) To reduce and mitigate potential negative impacts of wind energy technologies on human communities, the environment, or commerce.

(vii) To address barriers to the commercialization and export of wind energy technologies.

(viii) To support the domestic wind industry, workforce, and supply chain.

(C) TARGETS.—Not later than 180 days after the date of enactment of this Act, the Secretary shall establish targets for the program relating to near-term (up to 2 years), mid-term (up to 7 years), and long-term (up to 15 years) challenges to the advancement of wind energy technologies, including onshore, offshore, distributed, and off-grid technologies.

(2) ACTIVITIES.—

(A) TYPES OF ACTIVITIES.—In carrying out the program, the Secretary shall carry out research, development, demonstration, and commercialization activities, including—

(i) awarding grants and awards, on a competitive, merit-reviewed basis;

(ii) performing precompetitive research and development;

(iii) establishing or maintaining demonstration facilities and projects, including through stewardship of existing facilities such as the National Wind Test Center;

(iv) providing technical assistance;

(v) entering into contracts and cooperative agreements;

(vi) providing small business vouchers;

(vii) establishing prize competitions;

(viii) conducting education and outreach activities;

(ix) conducting professional development activities;

and

(x) conducting analyses, studies, and reports.

(B) SUBJECT AREAS.—The Secretary shall carry out research, development, demonstration, and commercialization activities in the following subject areas:

(i) Wind power plant siting, performance, operations, and security.

(ii) New materials and designs relating to all hardware, software, and components of wind energy technologies, including technologies and strategies that reduce the use of energy, water, critical materials, and other commodities that are determined to be vulnerable to disruption.

(iii) Advanced wind energy manufacturing and installation technologies and practices, including materials, processes, such as onsite or near site manufacturing, and design.

(iv) Offshore wind-specific projects and plants, including—

(I) fixed and floating substructure systems, materials, and components;

(II) the operation of offshore facilities, such as—

(aa) an offshore research facility to conduct research for oceanic, biological, geological, and atmospheric resource characterization relevant to offshore wind energy development in coordination with the ocean and atmospheric science communities; and

(bb) an offshore support structure testing facility to conduct development, demonstration, and commercialization of large-scale and full-scale offshore wind energy support structure components and systems;

(III) the monitoring and analysis of site and environmental considerations unique to offshore sites, including freshwater environments.

(v) Integration of wind energy technologies with—

(I) the electric grid, including transmission, distribution, microgrids, and distributed energy systems; and

(II) other energy technologies, including—

(aa) other generation sources;

(bb) demand response technologies; and

(cc) energy storage technologies.

(vi) Methods to improve the lifetime, maintenance, decommissioning, recycling, reuse, and sustainability of wind energy components and systems, including technologies and strategies to reduce the use of energy, water, critical materials, and other valuable or harmful inputs.

(vii) Wind power forecasting and atmospheric measurement systems, including for turbines and plant systems of varying height.

(viii) Integrated wind energy systems, grid-connected and off-grid, that incorporate diverse—

(I) generation sources;

(II) loads; and

(III) storage technologies.

(ix) Reducing market barriers, including non-hardware and information-based barriers, to the adoption of wind energy technologies, such as impacts on, or challenges relating to—

(I) distributed wind technologies, including the development of best practices, models, and voluntary streamlined processes for local siting and permitting of distributed wind energy systems to reduce costs;

(II) airspace;

(III) military operations;

(IV) radar;

(V) local communities, with special consideration given to economically distressed areas, previously disturbed lands such as landfills and former mines, and other areas disproportionately impacted by environmental pollution;

(VI) wildlife and wildlife habitats; and

(VII) any other appropriate matter, as determined by the Secretary.

(x) Technologies or strategies to avoid, minimize, and offset the potential impacts of wind energy facilities on bird species, bat species, marine wildlife, and other sensitive species and habitats.

(xi) Advanced physics-based and data analysis computational tools, in coordination with the high-performance computing programs of the Department, to more efficiently design, site, permit, manufacture, install, operate, decommission, and recycle wind energy systems.

(xii) Technologies for distributed wind, including micro, small, and medium turbines and the components of those turbines and their microgrid applications.

(xiii) Transformational technologies for harnessing wind energy.

(xiv) Other research areas that advance the purposes of the program, as determined by the Secretary.

(C) PRIORITIZATION.—In carrying out activities under the program, the Secretary shall, to the maximum extent practicable, give special consideration to—

(i) projects that—

(I) are located in a geographically diverse range of eligible entities;

(II) support the development or demonstration of projects—

(aa) in economically distressed areas and areas disproportionately impacted by pollution; and

(bb) that provide the greatest potential to reduce energy costs, as well as promote accessibility and community implementation of demonstrated technologies;

(III) can be replicated in a variety of regions and climates;

(IV) include business commercialization plans that have the potential for—

(aa) domestic manufacturing and production of wind energy technologies; or

(bb) exports of wind energy technologies; and

(V) are carried out in collaboration with Tribal energy development organizations, Indian Tribes, Tribal organizations, Native Hawaiian community-based organizations, minority-serving institutions, or territories or freely associated States; and

(ii) with regards to professional development, activities that expand the number of individuals from underrepresented groups pursuing and attaining skills relevant to wind energy.

(D) COORDINATION.—To the maximum extent practicable, the Secretary shall coordinate activities under the program with other relevant programs and capabilities of the Department and other Federal research programs.

(E) USE OF FUNDS.—To the extent that funding is not otherwise available through other Federal programs or power purchase agreements, funding awarded for demonstration projects may be used for additional nontechnology costs, as determined to be appropriate by the Secretary, such as engineering or feasibility studies.

(F) SOLICITATION.—Not less than once every two years, the Secretary shall conduct a national solicitation for applications for demonstration projects under this section.

(G) REPORT.—

(i) IN GENERAL.—Not later than 180 days 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 potential for, and technical viability of, airborne wind energy systems to provide a significant source of energy in the United States.

(ii) CONTENTS.—The report under paragraph (1) shall include a summary of research, development, demonstration, and commercialization needs, including an estimate of Federal funding requirements, to further examine and validate the technical and economic viability of airborne wind energy concepts over the 10-year period beginning on the date of the enactment of this Act.

(3) WIND TECHNICIAN TRAINING GRANT PROGRAM.—The Secretary may award grants, on a competitive basis, to eligible entities to purchase large pieces of wind component equipment, such as nacelles, towers, and blades, for use in training wind technician students in onshore or offshore wind applications.

(4) WIND ENERGY TECHNOLOGY RECYCLING RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.—

(A) IN GENERAL.—In addition to the program activities described in paragraph (2), in carrying out the program, the Secretary shall award financial assistance to eligible entities for research, development, and demonstration, and commercialization projects to create innovative and practical approaches to increase the reuse and recycling of wind energy technologies, including—

(i) by increasing the efficiency and cost effectiveness of the recovery of raw materials from wind energy technology components and systems, including enabling technologies such as inverters;

(ii) by minimizing potential environmental impacts from the recovery and disposal processes;

(iii) by advancing technologies and processes for the disassembly and recycling of wind energy devices;

(iv) by developing alternative materials, designs, manufacturing processes, and other aspects of wind energy technologies and the disassembly and resource recovery process that enable efficient, cost effective, and environmentally responsible disassembly of, and resource recovery from, wind energy technologies; and

(v) strategies to increase consumer acceptance of, and participation in, the recycling of wind energy technologies.

(B) DISSEMINATION OF RESULTS.—The Secretary shall make available to the public and the relevant committees of Congress the results of the projects carried out through financial assistance awarded under subparagraph (A), including—

(i) development of best practices or training materials for use in the wind energy technology manufacturing, design, installation, decommissioning, or recycling industries;

(ii) dissemination at industry conferences;

(iii) coordination with information dissemination programs relating to recycling of electronic devices in general;

(iv) demonstration projects; and

(v) educational materials.

(C) PRIORITY.—In carrying out the activities authorized under this subsection, the Secretary shall give special consideration to projects that recover critical materials.

(D) SENSITIVE INFORMATION.—In carrying out the activities authorized under this subsection, the Secretary shall ensure proper security controls are in place to protect proprietary or sensitive information, as appropriate.

(5) WIND ENERGY TECHNOLOGY MATERIALS PHYSICAL PROPERTY DATABASE.—

(A) IN GENERAL.—Not later than September 1, 2022, the Secretary shall establish a comprehensive physical property database of materials for use in wind energy technologies, which shall identify the type, quantity, country of origin, source, significant uses, projected availability, and physical properties of materials used in wind energy technologies.

(B) COORDINATION.—In establishing the database described in subparagraph (A), the Secretary shall coordinate and, to the extent practicable, avoid duplication with—

(i) other Department activities, including those carried out by the Office of Science;

(ii) the Director of the National Institute of Standards and Technology;

(iii) the Administrator of the Environmental Protection Agency;

(iv) the Secretary of the Interior; and

(v) relevant industry stakeholders, as determined by the Secretary.

(6) WIND ENERGY PROGRAM STRATEGIC VISION.—

(A) IN GENERAL.—Not later than September 1, 2022, and every 6 years thereafter, the Secretary shall submit to Congress a report on the strategic vision, progress, goals, and targets of the program, including assessments of wind energy markets and manufacturing.

(B) PREPARATION.—The Secretary shall coordinate the preparation of the report under subparagraph (A) with—

- (i) existing peer review processes;
 - (ii) studies conducted by the National Laboratories;
- and
- (iii) the multiyear program planning required under section 994 of the Energy Policy Act of 2005 (42 U.S.C. 16358).

(7) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out the program \$125,000,000 for each of fiscal years 2021 through 2025.

SEC. 3004. SOLAR ENERGY RESEARCH AND DEVELOPMENT.

(a) DEFINITIONS.—In this section:

(1) CRITICAL MATERIAL.—The term “critical material” has the meaning given the term in section 7002 of this Act.

(2) ECONOMICALLY DISTRESSED AREA.—The term “economically distressed area” means an area described in section 301(a) of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3161(a)).

(3) ELIGIBLE ENTITY.—The term “eligible entity” means—

- (A) an institution of higher education, including a minority-serving institution;
 - (B) a National Laboratory;
 - (C) a Federal research agency;
 - (D) a State research agency;
 - (E) a research agency associated with a territory or freely associated state;
 - (F) a Tribal energy development organization;
 - (G) an Indian Tribe;
 - (H) a Tribal organization;
 - (I) a Native Hawaiian community-based organization;
 - (J) a nonprofit research organization;
 - (K) an industrial entity;
 - (L) any other entity, as determined by the Secretary;
- and

(M) a consortium of 2 or more entities described in subparagraphs (A) through (L).

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

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

(6) MINORITY-SERVING INSTITUTION.—The term “minority-serving institution” has the meaning given the term “eligible institution” in section 371(a) of the Higher Education Act of 1965 (20 U.S.C. 1067q(a)).

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

(8) NATIVE HAWAIIAN COMMUNITY-BASED ORGANIZATION.—The term “Native Hawaiian community-based organization” has the meaning given the term in section 6207 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7517).

(9) PHOTOVOLTAIC DEVICE.—The term “photovoltaic device” means—

(A) a device that converts light directly into electricity through a solid-state, semiconductor process;

(B) the photovoltaic cells of a device described in subparagraph (A); and

(C) the electronic and electrical components of a device described in subparagraph (A).

(10) PROGRAM.—The term “program” means the program established under subsection (b)(1)(A).

(11) SECRETARY.—The term “Secretary” means the Secretary of Energy.

(12) SOLAR ENERGY.—The term “solar energy” means—

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

(B) energy resulting from a chemical reaction caused by radiation recently originated in the Sun.

(13) TERRITORY OR FREELY ASSOCIATED STATE.—The term “territory or freely associated state” has the meaning given the term “insular area” in section 1404 of the Food and Agriculture Act of 1977 (7 U.S.C. 3103).

(14) TRIBAL ENERGY DEVELOPMENT ORGANIZATION.—The term “Tribal energy development organization” has the meaning given the term “tribal energy development organization” in section 2601 of the Energy Policy Act of 1992 (25 U.S.C. 3501).

(15) TRIBAL ORGANIZATION.—The term “Tribal organization” has the meaning given the term in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5304).

(b) SOLAR ENERGY TECHNOLOGY PROGRAM.—

(1) ESTABLISHMENT.—

(A) IN GENERAL.—The Secretary shall establish a program to conduct research, development, demonstration, and commercialization of solar energy technologies in accordance with this subsection.

(B) PURPOSES.—The purposes of the program are the following:

(i) To improve the energy efficiency, cost effectiveness, reliability, resilience, security, siting, integration, manufacturability, installation, decommissioning, and recyclability of solar energy technologies.

(ii) To optimize the performance and operation of solar energy components, cells, and systems, and enabling technologies, including through the development of new materials, hardware, and software.

(iii) To optimize the design and adaptability of solar energy systems to the broadest practical range of geographic and atmospheric conditions.

(iv) To support the integration of solar energy technologies with the electric grid and complementary energy technologies.

(v) To create and improve the conversion of solar energy to other useful forms of energy or other products.

(vi) To reduce the cost, risk, and other potential negative impacts across the lifespan of solar energy technologies, including manufacturing, siting, permitting, installation, operations, maintenance, decommissioning, and recycling.

(vii) To reduce and mitigate potential life cycle negative impacts of solar energy technologies on human communities, wildlife, and wildlife habitats.

(viii) To address barriers to the commercialization and export of solar energy technologies.

(ix) To support the domestic solar industry, workforce, and supply chain.

(C) TARGETS.—Not later than 180 days after the date of enactment of this Act, the Secretary shall establish targets for the program to address near-term (up to 2 years), mid-term (up to 7 years), and long-term (up to 15 years) challenges to the advancement of all types of solar energy systems.

(2) ACTIVITIES.—

(A) TYPES OF ACTIVITIES.—In carrying out the program, the Secretary shall carry out research, development, demonstration, and commercialization activities, including—

(i) awarding grants and awards, on a competitive, merit-reviewed basis;

(ii) performing precompetitive research and development;

(iii) establishing or maintaining demonstration facilities and projects, including through stewardship of existing facilities;

(iv) providing technical assistance;

(v) entering into contracts and cooperative agreements;

(vi) providing small business vouchers;

(vii) establishing prize competitions;

(viii) conducting education and outreach activities;

(ix) conducting workforce development activities;

and

(x) conducting analyses, studies, and reports.

(B) SUBJECT AREAS.—The Secretary shall carry out research, development, demonstration, and commercialization activities in the following subject areas:

(i) Advanced solar energy technologies of varying scale and power production, including—

(I) new materials, components, designs, and systems, including perovskites, cadmium telluride, and organic materials;

(II) advanced photovoltaic and thin-film devices;

(III) concentrated solar power;

(IV) solar heating and cooling; and

(V) enabling technologies for solar energy systems, including hardware and software.

(ii) Solar energy technology siting, performance, installation, operations, resilience, and security.

- (iii) Integration of solar energy technologies with—
 - (I) the electric grid, including transmission, distribution, microgrids, and distributed energy systems;
 - (II) other energy technologies, including—
 - (aa) other generation sources;
 - (bb) demand response technologies; and
 - (cc) energy storage technologies; and
 - (III) other applications, such as in the agriculture, transportation, buildings, industrial, and fuels sectors.
 - (iv) Advanced solar energy manufacturing technologies and practices, including materials, processes, and design.
 - (v) Methods to improve the lifetime, maintenance, decommissioning, recycling, reuse, and sustainability of solar energy components and systems, including technologies and strategies that reduce the use of energy, water, critical materials, and other commodities that are determined to be vulnerable to disruption.
 - (vi) Solar energy forecasting, modeling, and atmospheric measurement systems, including for small-scale, large-scale, and aggregated systems.
 - (vii) Integrated solar energy systems that incorporate diverse—
 - (I) generation sources;
 - (II) loads; and
 - (III) storage technologies.
 - (viii) Reducing market barriers, including nonhardware and information-based barriers, to the adoption of solar energy technologies, including impacts on, or challenges relating to—
 - (I) distributed and community solar technologies, including the development of best practices, models, and voluntary streamlined processes for local siting and permitting of distributed solar energy systems to reduce costs;
 - (II) local communities, with special consideration given to economically distressed areas, previously disturbed lands such as landfills and former mines, and other areas disproportionately impacted by environmental pollution;
 - (III) wildlife and wildlife habitats; and
 - (IV) any other appropriate matter, as determined by the Secretary.
 - (ix) Transformational technologies for harnessing solar energy.
 - (x) Other research areas that advance the purposes of the program, as determined by the Secretary.
- (C) PRIORITIZATION.—In carrying out activities under the program, the Secretary shall, to the maximum extent practicable, give priority to projects that—
- (i) are located in a geographically diverse range of eligible entities;
 - (ii) support the development or demonstration of projects—

- (I) in economically distressed areas and areas disproportionately impacted by pollution; or
- (II) that provide the greatest potential to reduce energy costs, as well as promote accessibility and community implementation of demonstrated technologies;
- (iii) can be replicated in a variety of regions and climates;
- (iv) include business commercialization plans that have the potential for—
 - (I) domestic manufacturing and production of solar energy technologies; or
 - (II) exports of solar energy technologies;
- (v) are carried out in collaboration with Tribal energy development organizations, Indian Tribes, Tribal organizations, Native Hawaiian community-based organizations, minority-serving institutions, or territories or freely associated States; and
- (vi) with regards to workforce development, activities that expand the number of individuals from underrepresented groups pursuing and attaining skills relevant to solar energy.

(D) COORDINATION.—To the maximum extent practicable, the Secretary shall coordinate activities under the program with other relevant programs and capabilities of the Department and other Federal research programs.

(E) USE OF FUNDS.—To the extent that funding is not otherwise available through other Federal programs or power purchase agreements, funding awarded for demonstration projects may be used for additional nontechnology costs, as determined to be appropriate by the Secretary, such as engineering or feasibility studies.

(F) SOLICITATION.—Not less than once every two years, the Secretary shall conduct a national solicitation for applications for demonstration projects under this section.

(3) ADVANCED SOLAR ENERGY MANUFACTURING INITIATIVE.—

(A) GRANTS.—In addition to the program activities described in paragraph (2), in carrying out the program, the Secretary shall award financial assistance to eligible entities for research, development, demonstration, and commercialization projects to advance new solar energy manufacturing technologies and techniques.

(B) PRIORITY.—In awarding grants under subparagraph (A), to the extent practicable, the Secretary shall give priority to solar energy manufacturing projects that—

- (i) increase efficiency and cost effectiveness in—
 - (I) the manufacturing process; and
 - (II) the use of resources, such as energy, water, and critical materials;
- (ii) support domestic supply chains for materials and components;
- (iii) identify and incorporate nonhazardous alternative materials for components and devices;
- (iv) operate in partnership with Tribal energy development organizations, Indian Tribes, Tribal organizations, Native Hawaiian community-based

organizations, minority-serving institutions, or territories or freely associated states; or

(v) are located in economically distressed areas.

(C) EVALUATION.—Not later than 3 years after the date of enactment of this Act, and every 4 years thereafter, the Secretary shall conduct, and make available to the public and the relevant committees of Congress, an independent review of the progress of the grants awarded under subparagraph (A).

(4) SOLAR ENERGY TECHNOLOGY RECYCLING RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.—

(A) IN GENERAL.—In addition to the program activities described in paragraph (2), in carrying out the program, the Secretary shall award financial assistance to eligible entities for research, development, demonstration, and commercialization projects to create innovative and practical approaches to increase the reuse and recycling of solar energy technologies, including—

(i) by increasing the efficiency and cost effectiveness of the recovery of raw materials from solar energy technology components and systems, including enabling technologies such as inverters;

(ii) by minimizing potential environmental impacts from the recovery and disposal processes;

(iii) by advancing technologies and processes for the disassembly and recycling of solar energy devices;

(iv) by developing alternative materials, designs, manufacturing processes, and other aspects of solar energy technologies and the disassembly and resource recovery process that enable efficient, cost effective, and environmentally responsible disassembly of, and resource recovery from, solar energy technologies; and

(v) strategies to increase consumer acceptance of, and participation in, the recycling of photovoltaic devices.

(B) DISSEMINATION OF RESULTS.—The Secretary shall make available to the public and the relevant committees of Congress the results of the projects carried out through financial assistance awarded under subparagraph (A), including—

(i) development of best practices or training materials for use in the photovoltaics manufacturing, design, installation, refurbishing, disposal, or recycling industries;

(ii) dissemination at industry conferences;

(iii) coordination with information dissemination programs relating to recycling of electronic devices in general;

(iv) demonstration projects; and

(v) educational materials.

(C) PRIORITY.—In carrying out the activities authorized under this subsection, the Secretary shall give special consideration to projects that recover critical materials.

(D) SENSITIVE INFORMATION.—In carrying out the activities authorized under this subsection, the Secretary shall ensure proper security controls are in place to protect proprietary or sensitive information, as appropriate.

(5) SOLAR ENERGY TECHNOLOGY MATERIALS PHYSICAL PROPERTY DATABASE.—

(A) IN GENERAL.—Not later than September 1, 2022, the Secretary shall establish a comprehensive physical property database of materials for use in solar energy technologies, which shall identify the type, quantity, country of origin, source, significant uses, projected availability, and physical properties of materials used in solar energy technologies.

(B) COORDINATION.—In establishing the database described in subparagraph (A), the Secretary shall coordinate with—

- (i) other Department activities, including those carried out by the Office of Science;
- (ii) the Director of the National Institute of Standards and Technology;
- (iii) the Administrator of the Environmental Protection Agency;
- (iv) the Secretary of the Interior; and
- (v) relevant industry stakeholders, as determined by the Secretary.

(6) SOLAR ENERGY TECHNOLOGY PROGRAM STRATEGIC VISION.—

(A) IN GENERAL.—Not later than September 1, 2022, and every 6 years thereafter, the Secretary shall submit to Congress a report on the strategic vision, progress, goals, and targets of the program, including assessments of solar energy markets and manufacturing.

(B) INCLUSION.—As a part of the report described in subparagraph (A), the Secretary shall include a study that examines the viable market opportunities available for solar energy technology manufacturing in the United States, including—

- (i) a description of—
 - (I) the ability to competitively manufacture solar technology in the United States, including the manufacture of—
 - (aa) new and advanced materials, such as cells made with new, high efficiency materials;
 - (bb) solar module equipment and enabling technologies, including smart inverters, sensors, and tracking equipment; and
 - (cc) innovative solar module designs and applications, including those that can directly integrate with new and existing buildings and other infrastructure; and
 - (II) opportunities and barriers within the United States and international solar energy technology market;
- (ii) policy recommendations for enhancing solar energy technology manufacturing in the United States;
- (iii) a 10-year target and plan to enhance the competitiveness of solar energy technology manufacturing in the United States; and
- (iv) any other research areas as determined by the Secretary.

(C) PREPARATION.—The Secretary shall coordinate the preparation of the report under subparagraph (A) with—

- (i) existing peer review processes;
- (ii) studies conducted by the National Laboratories;

and

- (iii) the multiyear program planning required under section 994 of the Energy Policy Act of 2005 (42 U.S.C. 16358).

(7) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out the program \$300,000,000 for each of fiscal years 2021 through 2025.

SEC. 3005. HYDROELECTRIC PRODUCTION INCENTIVES AND EFFICIENCY IMPROVEMENTS.

(a) HYDROELECTRIC PRODUCTION INCENTIVES.—Section 242 of the Energy Policy Act of 2005 (42 U.S.C. 15881) is amended—

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

“(1) QUALIFIED HYDROELECTRIC FACILITY.—The term ‘qualified hydroelectric facility’ means a turbine or other generating device owned or solely operated by a non-Federal entity—

“(A) that generates hydroelectric energy for sale; and
“(B)(i) that is added to an existing dam or conduit;

or

“(ii)(I) that has a generating capacity of not more than 20 megawatts;

“(II) for which the non-Federal entity has received a construction authorization from the Federal Energy Regulatory Commission, if applicable; and

“(III) that is constructed in an area in which there is inadequate electric service, as determined by the Secretary, including by taking into consideration—

“(aa) access to the electric grid;
“(bb) the frequency of electric outages; or
“(cc) the affordability of electricity.”;

(2) in subsection (c), by striking “10” and inserting “22”;

(3) in subsection (e)(2), by striking “section 29(d)(2)(B)” and inserting “section 45K(d)(2)(B)”;

(4) in subsection (f), by striking “20” and inserting “32”;

and

(5) in subsection (g), by striking “each of the fiscal years 2006 through 2015” and inserting “each of fiscal years 2021 through 2036”.

(b) HYDROELECTRIC EFFICIENCY IMPROVEMENT.—Section 243(c) of the Energy Policy Act of 2005 (42 U.S.C. 15882(c)) is amended by striking “each of the fiscal years 2006 through 2015” and inserting “each of fiscal years 2021 through 2036”.

SEC. 3006. CONFORMING AMENDMENTS.

(a) RENEWABLE ENERGY AND ENERGY EFFICIENCY TECHNOLOGY COMPETITIVENESS ACT OF 1989.—

(1) NATIONAL GOALS AND MULTI-YEAR FUNDING.—Section 4 of the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989 (42 U.S.C. 12003) is amended—

(A) in the section heading, by striking “wind, photovoltaics, and solar thermal” and inserting “alcohol from biomass and other technology”;

(B) in subsection (a)—

(i) in the matter preceding paragraph (1), by striking “wind, photovoltaics, and solar thermal energy” and inserting “alcohol from biomass and other energy technology”;

(ii) by striking paragraphs (1) through (3);

(iii) by redesignating paragraphs (4) and (5) as paragraphs (1) and (2), respectively; and

(iv) in paragraph (2) (as so redesignated), by striking “Ocean” and inserting “Marine”; and

(C) in subsection (c)—

(i) in the matter preceding paragraph (1)—

(I) by striking “the Wind Energy Research Program, the Photovoltaic Energy Systems Program, the Solar Thermal Energy Systems Program,”; and

(II) by striking “Ocean” and inserting “Marine”;

(ii) in paragraph (1)—

(I) by striking subparagraph (A); and

(II) by redesignating subparagraphs (B) and (C) as subparagraphs (A) and (B), respectively; and

(iii) in paragraph (2)—

(I) by striking subparagraph (A); and

(II) by redesignating subparagraphs (B) and (C) as subparagraphs (A) and (B), respectively.

(2) REPORTS.—Section 9(c) of the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989 (42 U.S.C. 12006(c)) is amended by striking “ocean,” and inserting “marine.”

(b) ENERGY POLICY ACT OF 2005.—The Energy Policy Act of 2005 (42 U.S.C. 15801 et seq.) is amended—

(1) ASSESSMENT OF RENEWABLE ENERGY RESOURCES.—Section 201(a) of the Energy Policy Act of 2005 (42 U.S.C. 15851(a)) is amended by striking “ocean (including tidal, wave, current, and thermal)” and inserting “marine”.

(2) FEDERAL PURCHASE REQUIREMENT.—Section 203(b)(2) of the Energy Policy Act of 2005 (42 U.S.C. 15852(b)(2)) is amended—

(A) by inserting “marine energy (as defined in section 632 of the Energy Independence and Security Act of 2007), or” before “electric energy”; and

(B) by striking “ocean (including tidal, wave, current, and thermal).”

(3) RENEWABLE ENERGY.—Section 931 of the Energy Policy Act of 2005 (42 U.S.C. 16231) is amended—

(A) in subsection (a)(2)—

(i) by striking subparagraphs (A) and (B);

(ii) by redesignating subparagraphs (C) through (E) as subparagraphs (A) through (C), respectively; and

(iii) in subparagraph (C)(i) (as so redesignated), by striking “ocean energy, including wave energy” and inserting “marine energy (as defined in section 632 of the Energy Independence and Security Act of 2007)”;

(B) by striking subsection (d); and

(C) by redesignating subsections (e) through (g) as subsections (d) through (f), respectively.

(c) ENERGY POLICY ACT OF 1992.—Section 1212 of the Energy Policy Act of 1992 (42 U.S.C. 13317) is amended—

(1) in subsection (a)(4)(A)(i), by striking “ocean (including tidal, wave, current, and thermal)” and inserting “marine energy (as defined in section 632 of the Energy Independence and Security Act of 2007)”;

(2) in subsection (b), in the matter preceding paragraph (1), by striking “ocean (including tidal, wave, current, and thermal)” and inserting “marine energy (as defined in section 632 of the Energy Independence and Security Act of 2007)”; and

(3) in subsection (e)(1), in the first sentence, by striking “ocean (including tidal, wave, current, and thermal)” and inserting “marine energy (as defined in section 632 of the Energy Independence and Security Act of 2007)”.

(d) FEDERAL NONNUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 1974.—Section 6(b)(3) of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5905(b)(3)) is amended—

(1) by striking subparagraph (L); and

(2) by redesignating subparagraphs (M) through (S) as subparagraphs (L) through (R), respectively.

(e) SOLAR ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1974.—

(1) REPEAL.—The Solar Energy Research, Development, and Demonstration Act of 1974 (42 U.S.C. 5551 et seq.) is repealed.

(2) SAVINGS PROVISION.—The repeal of the Solar Energy Research, Development, and Demonstration Act of 1974 (42 U.S.C. 5551 et seq.) under paragraph (1) shall not affect the authority of the Secretary of Energy to conduct research and development on solar energy.

(f) SOLAR PHOTOVOLTAIC ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1978.—The Solar Photovoltaic Energy Research, Development, and Demonstration Act of 1978 (42 U.S.C. 5581 et seq.) is repealed.

(g) ENERGY INDEPENDENCE AND SECURITY ACT OF 2007.—

(1) REPEALS.—Sections 606 and 607 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17174, 17175) are repealed.

(2) CONFORMING AMENDMENT.—The table of contents in section 1(b) of the Energy Independence and Security Act of 2007 (Public Law 110–140; 121 Stat. 1495) is amended by striking the items relating to sections 606 and 607.

Subtitle B—Natural Resources Provisions

SEC. 3101. DEFINITIONS.

In this subtitle:

(1) COVERED LAND.—The term “covered land” means land that is—

(A) Federal lands administered by the Secretary concerned; and

(B) not excluded from the development of geothermal, solar, or wind energy under—

(i) a land use plan; or

(ii) other Federal law.

(2) FEDERAL LAND.—The term “Federal land” means—

(A) public land as defined by section 103 of the Federal Land Policy Management Act of 1976 (43 U.S.C. 1702); or

(B) land of the National Forest System (as defined in section 11(a) of the Forest and Rangeland Renewable Resources Planning Act of 1974 (16 U.S.C. 1609(a))).

(3) LAND USE PLAN.—The term “land use plan” means—

(A) for public land, a land use plan established under the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.); and

(B) for National Forest System land, a land management plan approved, amended, or revised under section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974 (16 U.S.C. 1604).

(4) ELIGIBLE PROJECT.—The term “eligible project” means a project carried out on covered land that uses wind, solar, or geothermal energy to generate energy.

(5) SECRETARY.—The term “Secretary” means the Secretary of the Interior.

SEC. 3102. PROGRAM TO IMPROVE ELIGIBLE PROJECT PERMIT COORDINATION.

(a) ESTABLISHMENT.—The Secretary shall establish a national Renewable Energy Coordination Office and State, district, or field offices, as appropriate, with responsibility to establish and implement a program to improve Federal permit coordination with respect to eligible projects on covered land and such other activities as the Secretary determines necessary. In carrying out the program, the Secretary may temporarily assign qualified staff to Renewable Energy Coordination Offices to expedite the permitting of eligible projects.

(b) MEMORANDUM OF UNDERSTANDING.—

(1) IN GENERAL.—Not later than 180 days after the date of the enactment of this Act, the Secretary shall enter into a memorandum of understanding for purposes of this section with—

(A) the Secretary of Agriculture;

(B) the Administrator of the Environmental Protection Agency; and

(C) the Secretary of Defense.

(2) STATE AND TRIBAL PARTICIPATION.—The Secretary may request the Governor of any interested State or any Tribal leader of any interested Indian Tribe (as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5304)) to be a signatory to the memorandum of understanding under paragraph (1).

(c) DESIGNATION OF QUALIFIED STAFF.—

(1) IN GENERAL.—Not later than 30 days after the date on which the memorandum of understanding under subsection (b) is executed, all Federal signatories, as appropriate, shall identify for each of the Bureau of Land Management Renewable Energy Coordination Offices one or more employees who have expertise in the regulatory issues relating to the office in which the employee is employed, including, as applicable, particular expertise in—

(A) consultation regarding, and preparation of, biological opinions under section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1536);

(B) permits under section 404 of the Federal Water Pollution Control Act (33 U.S.C. 1344);

(C) regulatory matters under the Clean Air Act (42 U.S.C. 7401 et seq.);

(D) the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.);

(E) the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.);

(F) the preparation of analyses under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.);

(G) implementation of the requirements of section 306108 of title 54, United States Code (formerly known as section 106 of the National Historic Preservation Act);

(H) planning under section 14 of the National Forest Management Act of 1976 (16 U.S.C. 472a);

(I) developing geothermal resources under the Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.);

(J) the Act of June 8, 1940 (16 U.S.C. 668 et seq., popularly known as the Bald and Golden Eagle Protection Act); and

(K) section 100101(a), chapter 1003, and sections 100751(a), 100752, 100753 and 102101 of title 54, United States Code (previously known as the National Park Service Organic Act).

(2) DUTIES.—Each employee assigned under paragraph (1) shall—

(A) be responsible for addressing all issues relating to the jurisdiction of the home office or agency of the employee; and

(B) participate as part of the team of personnel working on proposed energy projects, planning, monitoring, inspection, enforcement, and environmental analyses.

(d) ADDITIONAL PERSONNEL.—The Secretary may assign such additional personnel for the Bureau of Land Management Renewable Energy Coordination Offices as are necessary to ensure the effective implementation of any programs administered by the offices in accordance with the multiple use mandate of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.).

(e) TRANSFER OF FUNDS.—To facilitate the coordination and processing of eligible project permits on Federal land under the Renewable Energy Coordination Offices, the Secretary may authorize the expenditure or transfer of any funds that are necessary to—

(1) the United States Fish and Wildlife Service;

(2) the Bureau of Indian Affairs;

(3) the Forest Service;

(4) the Corps of Engineers;

(5) the National Park Service;

(6) the Environmental Protection Agency; or

(7) the Department of Defense.

(f) REPORT TO CONGRESS.—

(1) IN GENERAL.—Not later than February 1 of the first fiscal year beginning after the date of the enactment of this Act, and each February 1 thereafter, the Secretary shall submit

to the Committee on Energy and Natural Resources and the Committee on Environment and Public Works of the Senate and the Committee on Natural Resources of the House of Representatives a report describing the progress made under the program established under subsection (a) during the preceding year.

(2) INCLUSIONS.—Each report under this subsection shall include—

(A) projections for renewable energy production and capacity installations; and

(B) a description of any problems relating to leasing, permitting, siting, or production.

SEC. 3103. INCREASING ECONOMIC CERTAINTY.

(a) CONSIDERATIONS.—The Secretary may consider acreage rental rates, capacity fees, and other recurring annual fees in total when evaluating existing rates paid for the use of Federal land by eligible projects.

(b) REDUCTIONS IN BASE RENTAL RATES.—The Secretary may reduce acreage rental rates and capacity fees, or both, for existing and new wind and solar authorizations if the Secretary determines—

(1) that the existing rates—

(A) exceed fair market value;

(B) impose economic hardships;

(C) limit commercial interest in a competitive lease sale or right-of-way grant; or

(D) are not competitively priced compared to other available land; or

(2) that a reduced rental rate or capacity fee is necessary to promote the greatest use of wind and solar energy resources.

SEC. 3104. NATIONAL GOAL FOR RENEWABLE ENERGY PRODUCTION ON FEDERAL LAND.

(a) IN GENERAL.—Not later than September 1, 2022, the Secretary shall, in consultation with the Secretary of Agriculture and other heads of relevant Federal agencies, establish national goals for renewable energy production on Federal land.

(b) MINIMUM PRODUCTION GOAL.—The Secretary shall seek to issue permits that, in total, authorize production of not less than 25 gigawatts of electricity from wind, solar, and geothermal energy projects by not later than 2025, through management of public lands and administration of Federal laws.

SEC. 3105. FACILITATION OF COPRODUCTION OF GEOTHERMAL ENERGY ON OIL AND GAS LEASES.

Section 4(b) of the Geothermal Steam Act of 1970 (30 U.S.C. 1003(b)) is amended by adding at the end the following:

“(4) LAND SUBJECT TO OIL AND GAS LEASE.—Land under an oil and gas lease issued pursuant to the Mineral Leasing Act (30 U.S.C. 181 et seq.) or the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351 et seq.) that is subject to an approved application for permit to drill and from which oil and gas production is occurring may be available for non-competitive leasing under subsection (c) by the holder of the oil and gas lease—

“(A) on a determination that geothermal energy will be produced from a well producing or capable of producing oil and gas; and

“(B) to provide for the coproduction of geothermal energy with oil and gas.”.

SEC. 3106. SAVINGS CLAUSE.

Notwithstanding any other provision of this subtitle, the Secretary of the Interior and the Secretary of Agriculture shall continue to manage public lands under the principles of multiple use and sustained yield in accordance with the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.) or the Forest and Rangeland Renewable Resources Planning Act of 1974 (16 U.S.C. 1600 et seq.), respectively, including for due consideration of mineral and nonrenewable energy-related projects and other nonrenewable energy uses, for the purposes of land use planning, permit processing, and conducting environmental reviews.

Subtitle C—Energy Storage

SEC. 3201. BETTER ENERGY STORAGE TECHNOLOGY.

(a) **DEFINITIONS.**—In this section:

(1) **ENERGY STORAGE SYSTEM.**—The term “energy storage system” means any system, equipment, facility, or technology that—

(A) is capable of absorbing or converting energy, storing the energy for a period of time, and dispatching the energy; and

(B)(i) uses mechanical, electrochemical, thermal, electrolysis, or other processes to convert and store electric energy that was generated at an earlier time for use at a later time;

(ii) uses mechanical, electrochemical, biochemical, or thermal processes to convert and store energy generated from mechanical processes that would otherwise be wasted, for delivery at a later time; or

(iii) stores energy in an electric, thermal, or gaseous state for direct use for heating or cooling at a later time in a manner that avoids the need to use electricity or other fuel sources at that later time, such as a grid-enabled water heater.

(2) **PROGRAM.**—The term “program” means the Energy Storage System Research, Development, and Deployment Program established under subsection (b)(1).

(3) **SECRETARY.**—The term “Secretary” means the Secretary of Energy.

(b) **ENERGY STORAGE SYSTEM RESEARCH, DEVELOPMENT, AND DEPLOYMENT PROGRAM.**—

(1) **ESTABLISHMENT.**—Not later than 180 days after the date of enactment of this Act, the Secretary shall establish a program, to be known as the Energy Storage System Research, Development, and Deployment Program.

(2) **INITIAL PROGRAM OBJECTIVES.**—The program shall focus on research, development, and deployment of—

(A) energy storage systems, components, and materials designed to further the development of technologies—

- (i) for large-scale commercial deployment;
 - (ii) for deployment at cost targets established by the Secretary;
 - (iii) for hourly and subhourly durations required to provide reliability services to the grid;
 - (iv) for daily durations, which have the capacity to discharge energy for a minimum of 6 hours;
 - (v) for weekly or monthly durations, which have the capacity to discharge energy for 10 to 100 hours, at a minimum; and
 - (vi) for seasonal durations, which have the capability to address seasonal variations in supply and demand;
- (B) distributed energy storage technologies and applications, including building-grid integration;
- (C) long-term cost, performance, and demonstration targets for different types of energy storage systems and for use in a variety of regions, including rural areas;
- (D) transportation energy storage technologies and applications, including vehicle-grid integration;
- (E) cost-effective systems and methods for—
- (i) the sustainable and secure sourcing, reclamation, recycling, and disposal of energy storage systems, including critical minerals; and
 - (ii) the reuse and repurposing of energy storage system technologies;
- (F) advanced control methods for energy storage systems;
- (G) pumped hydroelectric energy storage systems to advance—
- (i) adoption of innovative technologies, including—
 - (I) systems with adjustable-speed and other new pumping and generating equipment designs;
 - (II) modular systems;
 - (III) closed-loop systems, including mines and quarries; and
 - (IV) other innovative equipment and materials as determined by the Secretary; and
 - (ii) reductions of civil works costs and construction times for hydropower and pumped storage systems, including comprehensive data and systems analysis of hydropower and pumped storage construction technologies and processes in order to identify areas for whole-system efficiency gains;
- (H) models and tools to demonstrate the costs and benefits of energy storage to—
- (i) power and water supply systems;
 - (ii) electric generation portfolio optimization; and
 - (iii) expanded deployment of other renewable energy technologies, including in integrated energy storage systems;
- (I) energy storage use cases from individual and combination technology applications, including value from various-use cases and energy storage services; and
- (J) advanced manufacturing technologies that have the potential to improve United States competitiveness in

energy storage manufacturing or reduce United States dependence on critical materials.

(3) TESTING AND VALIDATION.—In coordination with 1 or more National Laboratories, the Secretary shall support the development, standardized testing, and validation of energy storage systems under the program, including test-bed and field trials, by developing testing and evaluation methodologies for—

(A) storage technologies, controls, and power electronics for energy storage systems under a variety of operating conditions;

(B) standardized and grid performance testing for energy storage systems, materials, and technologies during each stage of development;

(C) reliability, safety, degradation, and durability testing under standard and evolving duty cycles; and

(D) accelerated life testing protocols to predict estimated lifetime metrics with accuracy.

(4) PERIODIC EVALUATION OF PROGRAM OBJECTIVES.—Not less frequently than once every calendar year, the Secretary shall evaluate and, if necessary, update the program objectives to ensure that the program continues to advance energy storage systems toward widespread commercial deployment by lowering the costs and increasing the duration of energy storage resources.

(5) ENERGY STORAGE STRATEGIC PLAN.—

(A) IN GENERAL.—The Secretary shall develop a 10-year strategic plan for the program, and update the plan, in accordance with this paragraph.

(B) CONTENTS.—The strategic plan developed under subparagraph (A) shall—

(i) be coordinated with and integrated across other relevant offices in the Department;

(ii) to the extent practicable, include metrics that can be used to evaluate storage technologies;

(iii) identify Department programs that—

(I) support the research and development activities described in paragraph (2) and the demonstration projects under subsection (c); and

(II)(aa) do not support the activities or projects described in subclause (I); but

(bb) are important to the development of energy storage systems and the mission of the Department, as determined by the Secretary;

(iv) include expected timelines for—

(I) the accomplishment of relevant objectives under current programs of the Department relating to energy storage systems; and

(II) the commencement of any new initiatives within the Department relating to energy storage systems to accomplish those objectives; and

(v) incorporate relevant activities described in the Grid Modernization Initiative Multi-Year Program Plan.

(C) SUBMISSION TO CONGRESS.—Not later than 180 days after the date of enactment of this Act, the Secretary shall submit to the Committee on Energy and Natural Resources

of the Senate and the Committees on Energy and Commerce and Science, Space, and Technology of the House of Representatives the strategic plan developed under subparagraph (A).

(D) UPDATES TO PLAN.—The Secretary—

(i) shall annually review the strategic plan developed under subparagraph (A); and

(ii) may periodically revise the strategic plan as appropriate.

(6) LEVERAGING OF RESOURCES.—The program may be led by a specific office of the Department, but shall be cross-cutting in nature, so that in carrying out activities under the program, the Secretary (or a designee of the Secretary charged with leading the program) shall leverage existing Federal resources, including, at a minimum, the expertise and resources of—

(A) the Office of Electricity;

(B) the Office of Energy Efficiency and Renewable Energy, including the Water Power Technologies Office; and

(C) the Office of Science, including—

(i) the Basic Energy Sciences Program;

(ii) the Advanced Scientific Computing Research Program;

(iii) the Biological and Environmental Research Program; and

(D) the Electricity Storage Research Initiative established under section 975 of the Energy Policy Act of 2005 (42 U.S.C. 16315).

(7) PROTECTING PRIVACY AND SECURITY.—In carrying out this subsection, the Secretary shall identify, incorporate, and follow best practices for protecting the privacy of individuals and businesses and the respective sensitive data of the individuals and businesses, including by managing privacy risk and implementing the Fair Information Practice Principles of the Federal Trade Commission for the collection, use, disclosure, and retention of individual electric consumer information in accordance with the Office of Management and Budget Circular A-130 (or successor circulars).

(c) ENERGY STORAGE DEMONSTRATION PROJECTS; PILOT GRANT PROGRAM.—

(1) DEMONSTRATION PROJECTS.—Not later than September 30, 2023, the Secretary shall, to the maximum extent practicable, enter into agreements to carry out 3 energy storage system demonstration projects, including at least 1 energy storage system demonstration project designed to further the development of technologies described in clause (v) or (vi) of subsection (b)(2)(A).

(2) ENERGY STORAGE PILOT GRANT PROGRAM.—

(A) DEFINITION OF ELIGIBLE ENTITY.—In this paragraph, the term “eligible entity” means—

(i) a State energy office (as defined in section 124(a) of the Energy Policy Act of 2005 (42 U.S.C. 15821(a)));

(ii) an Indian Tribe (as defined in section 4 of the Native American Housing Assistance and Self-Determination Act of 1996 (25 U.S.C. 4103));

(iii) a Tribal organization (as defined in section 3765 of title 38, United States Code);

(iv) an institution of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001));

(v) an electric utility, including—

(I) an electric cooperative;

(II) a political subdivision of a State, such as a municipally owned electric utility, or any agency, authority, corporation, or instrumentality of a State political subdivision; and

(III) an investor-owned utility; and

(vi) a private energy storage company.

(B) ESTABLISHMENT.—The Secretary shall establish a competitive grant program under which the Secretary shall award grants to eligible entities to carry out demonstration projects for pilot energy storage systems.

(C) SELECTION REQUIREMENTS.—In selecting eligible entities to receive a grant under subparagraph (B), the Secretary shall, to the maximum extent practicable—

(i) ensure regional diversity among eligible entities awarded grants, including ensuring participation of eligible entities that are rural States and States with high energy costs;

(ii) ensure that grants are awarded for demonstration projects that—

(I) expand on the existing technology demonstration programs of the Department;

(II) are designed to achieve 1 or more of the objectives described in subparagraph (D); and

(III) inject or withdraw energy from the bulk power system, electric distribution system, building energy system, or microgrid (grid-connected or islanded mode) where the project is located;

(iii) give consideration to proposals from eligible entities for securing energy storage through competitive procurement or contract for service; and

(iv) prioritize projects that leverage matching funds from non-Federal sources.

(D) OBJECTIVES.—Each demonstration project carried out by a grant awarded under subparagraph (B) shall have 1 or more of the following objectives:

(i) To improve the security of critical infrastructure and emergency response systems.

(ii) To improve the reliability of transmission and distribution systems, particularly in rural areas, including high-energy cost rural areas.

(iii) To optimize transmission or distribution system operation and power quality to defer or avoid costs of replacing or upgrading electric grid infrastructure, including transformers and substations.

(iv) To supply energy at peak periods of demand on the electric grid or during periods of significant variation of electric grid supply.

(v) To reduce peak loads of homes and businesses.

(vi) To improve and advance power conversion systems.

(vii) To provide ancillary services for grid stability and management.

(viii) To integrate renewable energy resource production.

(ix) To increase the feasibility of microgrids (grid-connected or islanded mode).

(x) To enable the use of stored energy in forms other than electricity to support the natural gas system and other industrial processes.

(xi) To integrate fast charging of electric vehicles.

(xii) To improve energy efficiency.

(3) REPORTS.—Not less frequently than once every 3 years for the duration of the programs under paragraphs (1) and (2), the Secretary shall submit to Congress and make publicly available a report describing the performance of those programs.

(4) NO PROJECT OWNERSHIP INTEREST.—The Federal Government shall not hold any equity or other ownership interest in any energy storage system that is part of a project under this subsection unless the holding is agreed to by each participant of the project.

(d) LONG-DURATION DEMONSTRATION INITIATIVE AND JOINT PROGRAM.—

(1) DEFINITIONS.—In this subsection:

(A) INITIATIVE.—The term “Initiative” means the demonstration initiative established under paragraph (2).

(B) JOINT PROGRAM.—The term “Joint Program” means the joint program established under paragraph (4).

(2) ESTABLISHMENT OF INITIATIVE.—Not later than 180 days after the date of enactment of this Act, the Secretary shall establish a demonstration initiative composed of demonstration projects focused on the development of long-duration energy storage technologies.

(3) SELECTION OF PROJECTS.—To the maximum extent practicable, in selecting demonstration projects to participate in the Initiative, the Secretary shall—

(A) ensure a range of technology types;

(B) ensure regional diversity among projects; and

(C) consider bulk power level, distribution power level, behind-the-meter, microgrid (gridconnected or islanded mode), and off-grid applications.

(4) JOINT PROGRAM.—

(A) ESTABLISHMENT.—As part of the Initiative, the Secretary, in consultation with the Secretary of Defense, shall establish within the Department a joint program to carry out projects—

(i) to demonstrate promising long-duration energy storage technologies at different scales; and

(ii) to help new, innovative long-duration energy storage technologies become commercially viable.

(B) MEMORANDUM OF UNDERSTANDING.—Not later than 200 days after the date of enactment of this Act, the Secretary shall enter into a memorandum of understanding with the Secretary of Defense to administer the Joint Program.

(C) INFRASTRUCTURE.—In carrying out the Joint Program, the Secretary and the Secretary of Defense shall—

(i) use existing test-bed infrastructure at—

(I) Department facilities; and

(II) Department of Defense installations; and

(ii) develop new infrastructure for identified projects, if appropriate.

(D) GOALS AND METRICS.—The Secretary and the Secretary of Defense shall develop goals and metrics for technological progress under the Joint Program consistent with energy resilience and energy security policies.

(E) SELECTION OF PROJECTS.—

(i) IN GENERAL.—To the maximum extent practicable, in selecting projects to participate in the Joint Program, the Secretary and the Secretary of Defense shall—

(I) ensure that projects are carried out under conditions that represent a variety of environments with different physical conditions and market constraints; and

(II) ensure an appropriate balance of—

(aa) larger, higher-cost projects; and

(bb) smaller, lower-cost projects.

(ii) PRIORITY.—In carrying out the Joint Program, the Secretary and the Secretary of Defense shall give priority to demonstration projects that—

(I) make available to the public project information that will accelerate deployment of long-duration energy storage technologies; and

(II) will be carried out in the field.

(e) CRITICAL MATERIAL RECYCLING AND REUSE RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.—The United States Energy Storage Competitiveness Act of 2007 (42 U.S.C. 17231) is amended by adding at the end the following:

“(q) CRITICAL MATERIAL RECYCLING AND REUSE RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.—

“(1) DEFINITIONS.—In this subsection:

“(A) CRITICAL MATERIAL.—The term ‘critical material’ has the meaning given the term in 7002 of the Energy Act of 2020.

“(B) CRITICAL MATERIAL RECYCLING.—The term ‘critical material recycling’ means the separation and recovery of critical materials embedded within an energy storage system through physical or chemical means for the purpose of reuse of those critical materials in other technologies.

“(2) ESTABLISHMENT.—Not later than 180 days after the date of enactment of this subsection, the Secretary shall establish a research, development, and demonstration program for critical material recycling and reuse of energy storage systems containing critical materials.

“(3) RESEARCH, DEVELOPMENT, AND DEMONSTRATION.—In carrying out the program established under paragraph (1), the Secretary shall conduct—

“(A) research, development, and demonstration activities for—

“(i) technologies, process improvements, and design optimizations that facilitate and promote critical material recycling of energy storage systems, including separation and sorting of component materials of such systems, and extraction, recovery, and reuse of critical materials from such systems;

“(ii) technologies and methods that mitigate emissions and environmental impacts that arise from critical material recycling, including disposal of toxic reagents and byproducts related to critical material recycling processes;

“(iii) technologies to enable extraction, recovery, and reuse of energy storage systems from electric vehicles and critical material recycling from such vehicles; and

“(iv) technologies and methods to enable the safe transport, storage, and disposal of energy storage systems containing critical materials, including waste materials and components recovered during the critical material recycling process; and

“(B) research on nontechnical barriers to improve the collection and critical material recycling of energy storage systems, including strategies to improve consumer education of, acceptance of, and participation in, the critical material recycling of energy storage systems.

“(4) REPORT TO CONGRESS.—Not later than 2 years after the date of enactment of this subsection, and every 3 years thereafter, the Secretary shall submit to the Committee on Science, Space, and Technology and the Committee on Energy and Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report summarizing the activities, findings, and progress of the program.”.

(f) COORDINATION.—To the maximum extent practicable, the Secretary shall coordinate the activities under this section (including activities conducted pursuant to the amendments made by this section) among the offices and employees of the Department, other Federal agencies, and other relevant entities—

(1) to ensure appropriate collaboration;

(2) to avoid unnecessary duplication of those activities;

and

(3) to increase domestic manufacturing and production of energy storage systems, such as those within the Department and within the National Institute of Standards and Technology.

(g) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated—

(1) to carry out subsection (b), \$100,000,000 for each of fiscal years 2021 through 2025, to remain available until expended;

(2) to carry out subsection (c), \$71,000,000 for each of fiscal years 2021 through 2025, to remain available until expended; and

(3) to carry out subsection (d), \$30,000,000 for each of fiscal years 2021 through 2025, to remain available until expended.

SEC. 3202. ENERGY STORAGE TECHNOLOGY AND MICROGRID ASSISTANCE PROGRAM.

(a) **DEFINITIONS.**—In this section:

(1) **ELIGIBLE ENTITY.**—The term “eligible entity” means—

(A) a rural electric cooperative;

(B) an agency, authority, or instrumentality of a State or political subdivision of a State that sells or otherwise uses electrical energy to provide electric services for customers; or

(C) a nonprofit organization working with at least 6 entities described in subparagraph (A) or (B).

(2) **ENERGY STORAGE TECHNOLOGY.**—The term “energy storage technology” includes grid-enabled water heaters, building heating or cooling systems, electric vehicles, the production of hydrogen for transportation or industrial use, or other technologies that store energy.

(3) **MICROGRID.**—The term “microgrid” means a localized grid that operates autonomously regardless of whether the grid can operate in connection with another grid.

(4) **RENEWABLE ENERGY SOURCE.**—The term “renewable energy source” has the meaning given the term in section 609(a) of the Public Utility Regulatory Policies Act of 1978 (7 U.S.C. 918c(a)).

(5) **RURAL ELECTRIC COOPERATIVE.**—The term “rural electric cooperative” means an electric cooperative (as defined in section 3 of the Federal Power Act (16 U.S.C. 796)) that sells electric energy to persons in rural areas.

(6) **SECRETARY.**—The term “Secretary” means the Secretary of Energy.

(b) **IN GENERAL.**—Not later than 180 days after the date of the enactment of this Act, the Secretary shall establish a program under which the Secretary shall—

(1) provide grants to eligible entities under subsection (d);

(2) provide technical assistance to eligible entities under subsection (e); and

(3) disseminate information to eligible entities on—

(A) the activities described in subsections (d)(1) and (e); and

(B) potential and existing energy storage technology and microgrid projects.

(c) **COOPERATIVE AGREEMENT.**—The Secretary may enter into a cooperative agreement with an eligible entity to carry out subsection (b).

(d) **GRANTS.**—

(1) **IN GENERAL.**—The Secretary may award grants to eligible entities for identifying, evaluating, designing, and demonstrating energy storage technology and microgrid projects that utilize energy from renewable energy sources.

(2) **APPLICATION.**—To be eligible to receive a grant under paragraph (1), an eligible entity shall submit to the Secretary an application at such time, in such manner, and containing such information as the Secretary may require.

(3) **USE OF GRANT.**—An eligible entity that receives a grant under paragraph (1)—

(A) shall use the grant—

(i) to conduct feasibility studies to assess the potential for implementation or improvement of energy storage technology or microgrid projects;

(ii) to analyze and implement strategies to overcome barriers to energy storage technology or microgrid project implementation, including financial, contracting, siting, and permitting barriers;

(iii) to conduct detailed engineering of energy storage technology or microgrid projects;

(iv) to perform a cost-benefit analysis with respect to an energy storage technology or microgrid project;

(v) to plan for both the short- and long-term inclusion of energy storage technology or microgrid projects into the future development plans of the eligible entity;

or

(vi) to purchase and install necessary equipment, materials, and supplies for demonstration of emerging technologies; and

(B) may use the grant to obtain technical assistance from experts in carrying out the activities described in subparagraph (A).

(4) **CONDITION.**—As a condition of receiving a grant under paragraph (1), an eligible entity shall—

(A) implement a public awareness campaign, in coordination with the Secretary, about the project implemented under the grant in the community in which the eligible entity is located, which campaign shall include providing projected environmental benefits achieved under the project, where to find more information about the program established under this section, and any other information the Secretary determines necessary;

(B) submit to the Secretary, and make available to the public, a report that describes—

(i) any energy cost savings and environmental benefits achieved under the project; and

(ii) the results of the project, including quantitative assessments to the extent practicable, associated with each activity described in paragraph (3)(A); and

(C) create and disseminate tools and resources that will benefit other rural electric cooperatives, which may include cost calculators, guidebooks, handbooks, templates, and training courses.

(5) **COST-SHARE.**—Activities under this subsection shall be subject to the cost-sharing requirements of section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352).

(e) **TECHNICAL ASSISTANCE.**—

(1) **IN GENERAL.**—In carrying out the program established under subsection (b), the Secretary may provide eligible entities with technical assistance relating to—

(A) identifying opportunities for energy storage technology and microgrid projects;

(B) understanding the technical and economic characteristics of energy storage technology or microgrid projects;

(C) understanding financing alternatives;

(D) permitting and siting issues;

(E) obtaining case studies of similar and successful energy storage technology or microgrid projects;

(F) reviewing and obtaining computer software for assessment, design, and operation and maintenance of energy storage technology or microgrid systems; and

(G) understanding and utilizing the reliability and resiliency benefits of energy storage technology and microgrid projects.

(2) EXTERNAL CONTRACTS.—In carrying out paragraph (1), the Secretary may enter into contracts with third-party experts, including engineering, finance, and insurance experts, to provide technical assistance to eligible entities relating to the activities described in such paragraph, or other relevant activities, as determined by the Secretary.

(f) AUTHORIZATION OF APPROPRIATIONS.—

(1) IN GENERAL.—There is authorized to be appropriated to carry out this section \$15,000,000 for each of fiscal years 2021 through 2025.

(2) ADMINISTRATIVE COSTS.—Not more than 5 percent of the amount appropriated under paragraph (1) for each fiscal year shall be used for administrative expenses.

TITLE IV—CARBON MANAGEMENT

SEC. 4001. FOSSIL ENERGY.

Section 961(a) of the Energy Policy Act of 2005 (42 U.S.C. 16291(a)) is amended—

(1) by redesignating paragraphs (1) through (7) as subparagraphs (A) through (G), respectively, and indenting appropriately;

(2) in subparagraph (F) (as so redesignated), by inserting “, including technology development to reduce emissions of carbon dioxide and associated emissions of heavy metals within coal combustion residues and gas streams resulting from fossil fuel use and production” before the period at the end;

(3) by striking subparagraph (G) (as so redesignated) and inserting the following:

“(G) Increasing the export of fossil energy-related equipment, technology, including emissions control technologies, and services from the United States.

“(H) Decreasing the cost of emissions control technologies for fossil energy production, generation, and delivery.

“(I) Significantly lowering greenhouse gas emissions for all fossil fuel production, generation, delivery, and utilization technologies.

“(J) Developing carbon removal and utilization technologies, products, and methods that result in net reductions in greenhouse gas emissions, including direct air capture and storage, and carbon use and reuse for commercial application.

“(K) Improving the conversion, use, and storage of carbon oxides produced from fossil fuels.

“(L) Reducing water use, improving water reuse, and minimizing surface and subsurface environmental impact

in the development of unconventional domestic oil and natural gas resources.”;

(4) by striking the subsection designation and all that follows through “The Secretary” in the first sentence of the matter preceding subparagraph (A) (as so redesignated) and inserting the following:

“(a) ESTABLISHMENT.—

“(1) IN GENERAL.—The Secretary”;

(5) in paragraph (1) (as so designated), in the second sentence of the matter preceding subparagraph (A) (as so redesignated), by striking “Such programs” and inserting the following:

“(2) OBJECTIVES.—The programs described in paragraph (1) shall”; and

(6) by adding at the end the following:

“(3) PRIORITY.—In carrying out the objectives described in subparagraphs (F) through (K) of paragraph (2), the Secretary shall prioritize activities and strategies that have the potential to significantly reduce emissions for each technology relevant to the applicable objective and the international commitments of the United States.”.

SEC. 4002. ESTABLISHMENT OF CARBON CAPTURE TECHNOLOGY PROGRAM.

(a) IN GENERAL.—The Energy Policy Act of 2005 is amended by striking section 962 (42 U.S.C. 16292) and inserting the following:

“SEC. 962. CARBON CAPTURE TECHNOLOGY PROGRAM.

“(a) DEFINITIONS.—In this section:

“(1) LARGE-SCALE PILOT PROJECT.—The term ‘large-scale pilot project’ means a pilot project that—

“(A) represents the scale of technology development beyond laboratory development and bench scale testing, but not yet advanced to the point of being tested under real operational conditions at commercial scale;

“(B) represents the scale of technology necessary to gain the operational data needed to understand the technical and performance risks of the technology before the application of that technology at commercial scale or in commercial-scale demonstration; and

“(C) is large enough—

“(i) to validate scaling factors; and

“(ii) to demonstrate the interaction between major components so that control philosophies for a new process can be developed and enable the technology to advance from large-scale pilot project application to commercial-scale demonstration or application.

“(2) NATURAL GAS.—The term ‘natural gas’ means any fuel consisting in whole or in part of—

“(A) natural gas;

“(B) liquid petroleum gas;

“(C) synthetic gas derived from petroleum or natural gas liquids;

“(D) any mixture of natural gas and synthetic gas;

or

“(E) biomethane.

“(3) NATURAL GAS ELECTRIC GENERATION FACILITY.—

“(A) IN GENERAL.—The term ‘natural gas electric generation facility’ means a facility that generates electric energy using natural gas as the fuel.

“(B) INCLUSIONS.—The term ‘natural gas electric generation facility’ includes without limitation a new or existing—

“(i) simple cycle plant;

“(ii) combined cycle plant;

“(iii) combined heat and power plant; or

“(iv) steam methane reformer that produces hydrogen from natural gas for use in the production of electric energy.

“(4) PROGRAM.—The term ‘program’ means the program established under subsection (b)(1).

“(5) TRANSFORMATIONAL TECHNOLOGY.—

“(A) IN GENERAL.—The term ‘transformational technology’ means a technology that represents a significant change in the methods used to convert energy that will enable a step change in performance, efficiency, cost of electricity, and reduction of emissions as compared to the technology in existence on the date of enactment of the Energy Act of 2020.

“(B) INCLUSIONS.—The term ‘transformational technology’ includes a broad range of potential technology improvements, including—

“(i) thermodynamic improvements in energy conversion and heat transfer, including—

“(I) advanced combustion systems, including oxygen combustion systems and chemical looping; and

“(II) the replacement of steam cycles with supercritical carbon dioxide cycles;

“(ii) improvements in steam or carbon dioxide turbine technology;

“(iii) improvements in carbon capture, utilization, and storage systems technology;

“(iv) improvements in small-scale and modular coal-fired technologies with reduced carbon output or carbon capture that can support incremental power generation capacity additions;

“(v) fuel cell technologies for low-cost, high-efficiency modular power systems;

“(vi) advanced gasification systems;

“(vii) thermal cycling technologies; and

“(viii) any other technology the Secretary recognizes as transformational technology.

“(b) CARBON CAPTURE TECHNOLOGY PROGRAM.—

“(1) IN GENERAL.—The Secretary shall establish a carbon capture technology program for the development of transformational technologies that will significantly improve the efficiency, effectiveness, costs, emissions reductions, and environmental performance of coal and natural gas use, including in manufacturing and industrial facilities.

“(2) REQUIREMENTS.—The program shall include—

“(A) a research and development program;

“(B) large-scale pilot projects;

“(C) demonstration projects, in accordance with paragraph (4); and

“(D) a front-end engineering and design program.

“(3) PROGRAM GOALS AND OBJECTIVES.—In consultation with the interested entities described in paragraph (6)(C), the Secretary shall develop goals and objectives for the program to be applied to the transformational technologies developed within the program, taking into consideration the following:

“(A) Increasing the performance of coal electric generation facilities and natural gas electric generation facilities, including by—

“(i) ensuring reliable, low-cost power from new and existing coal electric generation facilities and natural gas electric generation facilities;

“(ii) achieving high conversion efficiencies;

“(iii) addressing emissions of carbon dioxide and other air pollutants;

“(iv) developing small-scale and modular technologies to support incremental capacity additions and load following generation, in addition to large-scale generation technologies;

“(v) supporting dispatchable operations for new and existing applications of coal and natural gas generation; and

“(vi) accelerating the development of technologies that have transformational energy conversion characteristics.

“(B) Using carbon capture, utilization, and sequestration technologies to decrease the carbon dioxide emissions, and the environmental impact from carbon dioxide emissions, from new and existing coal electric generation facilities and natural gas electric generation facilities, including by—

“(i) accelerating the development, deployment, and commercialization of technologies to capture and sequester carbon dioxide emissions from new and existing coal electric generation facilities and natural gas electric generation facilities;

“(ii) supporting sites for safe geological storage of large volumes of anthropogenic sources of carbon dioxide and the development of the infrastructure needed to support a carbon dioxide utilization and storage industry;

“(iii) improving the conversion, utilization, and storage of carbon dioxide produced from fossil fuels and other anthropogenic sources of carbon dioxide;

“(iv) lowering greenhouse gas emissions for all fossil fuel production, generation, delivery, and use, to the maximum extent practicable;

“(v) developing carbon utilization technologies, products, and methods, including carbon use and reuse for commercial application;

“(vi) developing net-negative carbon dioxide emissions technologies; and

“(vii) developing technologies for the capture of carbon dioxide produced during the production of hydrogen from natural gas.

“(C) Decreasing the non-carbon dioxide relevant environmental impacts of coal and natural gas production, including by—

“(i) further reducing non-carbon dioxide air emissions; and

“(ii) reducing the use, and managing the discharge, of water in power plant operations.

“(D) Accelerating the development of technologies to significantly decrease emissions from manufacturing and industrial facilities, including—

“(i) nontraditional fuel manufacturing facilities, including ethanol or other biofuel production plants or hydrogen production plants; and

“(ii) energy-intensive manufacturing facilities that produce carbon dioxide as a byproduct of operations.

“(E) Entering into cooperative agreements to carry out and expedite demonstration projects (including pilot projects) to demonstrate the technical and commercial viability of technologies to reduce carbon dioxide emissions released from coal electric generation facilities and natural gas electric generation facilities for commercial deployment.

“(F) Identifying any barriers to the commercial deployment of any technologies under development for the capture of carbon dioxide produced by coal electric generation facilities and natural gas electric generation facilities.

“(4) DEMONSTRATION PROJECTS.—

“(A) IN GENERAL.—In carrying out the program, the Secretary shall establish a demonstration program under which the Secretary, through a competitive, merit-reviewed process, shall enter into cooperative agreements by not later than September 30, 2025, for demonstration projects to demonstrate the construction and operation of 6 facilities to capture carbon dioxide from coal electric generation facilities, natural gas electric generation facilities, and industrial facilities.

“(B) TECHNICAL ASSISTANCE.—The Secretary, to the maximum extent practicable, shall provide technical assistance to any eligible entity seeking to enter into a cooperative agreement described in subparagraph (A) for the purpose of obtaining any necessary permits and licenses to demonstrate qualifying technologies.

“(C) ELIGIBLE ENTITIES.—The Secretary may enter into cooperative agreements under subparagraph (A) with industry stakeholders, including any industry stakeholder operating in partnership with the National Laboratories, institutions of higher education, multiinstitutional collaborations, and other appropriate entities.

“(D) COMMERCIAL-SCALE DEMONSTRATION PROJECTS.—

“(i) IN GENERAL.—In carrying out the program, the Secretary shall establish a carbon capture technology commercialization program to demonstrate substantial improvements in the efficiency, effectiveness, cost, and environmental performance of carbon capture technologies for power, industrial, and other commercial applications.

“(ii) REQUIREMENT.—The program established under clause (i) shall include funding for commercial-

scale carbon capture technology demonstrations of projects supported by the Department, including projects in addition to the projects described in subparagraph (A), including funding for not more than 2 projects to demonstrate substantial improvements in a particular technology type beyond the first of a kind demonstration and to account for considerations described in subparagraph (G).

“(E) REQUIREMENT.—Of the demonstration projects carried out under subparagraph (A)—

“(i) 2 shall be designed to capture carbon dioxide from a natural gas electric generation facility;

“(ii) 2 shall be designed to capture carbon dioxide from a coal electric generation facility; and

“(iii) 2 shall be designed to capture carbon dioxide from an industrial facility not purposed for electric generation.

“(F) GOALS.—Each demonstration project under the demonstration program under subparagraph (A)—

“(i) shall be designed to further the development, deployment, and commercialization of technologies to capture and sequester carbon dioxide emissions from new and existing coal electric generation facilities, natural gas electric generation facilities, and industrial facilities;

“(ii) shall be financed in part by the private sector; and

“(iii) if necessary, shall secure agreements for the offtake of carbon dioxide emissions captured by qualifying technologies during the project.

“(G) APPLICATIONS.—

“(i) IN GENERAL.—To be eligible to enter into an agreement with the Secretary for a demonstration project under subparagraphs (A) and (D), an entity shall submit to the Secretary an application at such time, in such manner, and containing such information as the Secretary may require.

“(ii) REVIEW OF APPLICATIONS.—In reviewing applications submitted under clause (i), the Secretary, to the maximum extent practicable, shall—

“(I) ensure a broad geographic distribution of project sites;

“(II) ensure that a broad selection of electric generation facilities are represented;

“(III) ensure that a broad selection of technologies are represented; and

“(IV) leverage existing public-private partnerships and Federal resources.

“(H) GAO STUDY AND REPORT.—

“(i) STUDY AND REPORT.—

“(I) IN GENERAL.—Not later than 1 year after the date of enactment of the Energy Act of 2020, the Comptroller General of the United States shall conduct, and submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report on the results

of, a study of the successes, failures, practices, and improvements of the Department in carrying out demonstration projects under this paragraph.

“(II) CONSIDERATIONS.—In conducting the study under subclause (I), the Comptroller General of the United States shall consider—

“(aa) applicant and contractor qualifications;

“(bb) project management practices at the Department;

“(cc) economic or market changes and other factors impacting project viability;

“(dd) completion of third-party agreements, including power purchase agreements and carbon dioxide offtake agreements;

“(ee) regulatory challenges; and

“(ff) construction challenges.

“(ii) RECOMMENDATIONS.—The Secretary shall—

“(I) consider any relevant recommendations, as determined by the Secretary, provided in the report required under clause (i)(I); and

“(II) adopt such recommendations as the Secretary considers appropriate.

“(I) REPORT.—

“(i) IN GENERAL.—Not later than 180 days after the date on which the Secretary solicits applications under subparagraph (G), and annually thereafter, the Secretary shall submit to the appropriate committees of jurisdiction of the Senate and the House of Representatives a report that includes a detailed description of how the applications under the demonstration program established under subparagraph (A) were or will be solicited and how the applications were or will be evaluated, including—

“(I) a list of any activities carried out by the Secretary to solicit or evaluate the applications; and

“(II) a process for ensuring that any projects carried out under a cooperative agreement entered into under subparagraph (A) are designed to result in the development or demonstration of qualifying technologies.

“(ii) INCLUSIONS.—The Secretary shall include—

“(I) in the first report required under clause (i), a detailed list of technical milestones for the development and demonstration of each qualifying technology pursued under the demonstration program established under subparagraph (A);

“(II) in each subsequent report required under clause (i), a description of the progress made towards achieving the technical milestones described in subclause (I) during the applicable period covered by the report; and

“(III) in each report required under clause (i)—

“(aa) an estimate of the cost of licensing, permitting, constructing, and operating each

carbon capture facility expected to be constructed under the demonstration program established under subparagraph (A);

“(bb) a schedule for the planned construction and operation of each demonstration or pilot project under the demonstration program; and

“(cc) an estimate of any financial assistance, compensation, or incentives proposed to be paid by the host State, Indian Tribe, or local government with respect to each facility described in item (aa).

“(5) INTRAAGENCY COORDINATION FOR CARBON CAPTURE, UTILIZATION, AND SEQUESTRATION ACTIVITIES.—The carbon capture, utilization, and sequestration activities described in paragraph (3)(B) shall be carried out by the Assistant Secretary for Fossil Energy, in coordination with the heads of other relevant offices of the Department and the National Laboratories.

“(6) CONSULTATIONS REQUIRED.—In carrying out the program, the Secretary shall—

“(A) undertake international collaborations, taking into consideration the recommendations of the National Coal Council and the National Petroleum Council;

“(B) use existing authorities to encourage international cooperation; and

“(C) consult with interested entities, including—

“(i) coal and natural gas producers;

“(ii) industries that use coal and natural gas;

“(iii) organizations that promote coal, advanced coal, and natural gas technologies;

“(iv) environmental organizations;

“(v) organizations representing workers; and

“(vi) organizations representing consumers.

“(c) REPORT.—

“(1) IN GENERAL.—Not later than 18 months after the date of enactment of the Energy Act of 2020, the Secretary shall submit to Congress a report describing the program goals and objectives adopted under subsection (b)(3).

“(2) UPDATE.—Not less frequently than once every 2 years after the initial report is submitted under paragraph (1), the Secretary shall submit to Congress a report describing the progress made towards achieving the program goals and objectives adopted under subsection (b)(3).

“(d) FUNDING.—

“(1) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section, to remain available until expended—

“(A) for activities under the research and development program component described in subsection (b)(2)(A)—

“(i) \$230,000,000 for each of fiscal years 2021 and 2022; and

“(ii) \$150,000,000 for each of fiscal years 2023 through 2025;

“(B) subject to paragraph (2), for activities under the large-scale pilot projects program component described in subsection (b)(2)(B)—

“(i) \$225,000,000 for each of fiscal years 2021 and 2022;

“(ii) \$200,000,000 for each of fiscal years 2023 and 2024; and

“(iii) \$150,000,000 for fiscal year 2025;

“(C) for activities under the demonstration projects program component described in subsection (b)(2)(C)—

“(i) \$500,000,000 for each of fiscal years 2021 through 2024; and

“(ii) \$600,000,000 for fiscal year 2025; and

“(D) for activities under the front-end engineering and design program described in subsection (b)(2)(D), \$50,000,000 for each of fiscal years 2021 through 2024.

“(2) COST SHARING FOR LARGE-SCALE PILOT PROJECTS.—Activities under subsection (b)(2)(B) shall be subject to the cost-sharing requirements of section 988(b).

“(e) CARBON CAPTURE TEST CENTERS.—

“(1) IN GENERAL.—Not later than 2 years after the date of enactment of the Energy Act of 2020, the Secretary shall award grants to 1 or more entities for the operation of 1 or more test centers (referred to in this subsection as a ‘Center’) to provide distinct testing capabilities for innovative carbon capture technologies.

“(2) PURPOSE.—Each Center shall—

“(A) advance research, development, demonstration, and commercial application of carbon capture technologies;

“(B) support large-scale pilot projects and demonstration projects and test carbon capture technologies; and

“(C) develop front-end engineering design and economic analysis.

“(3) SELECTION.—

“(A) IN GENERAL.—The Secretary shall select entities to receive grants under this subsection according to such criteria as the Secretary may develop.

“(B) COMPETITIVE BASIS.—The Secretary shall select entities to receive grants under this subsection on a competitive basis.

“(C) PRIORITY CRITERIA.—In selecting entities to receive grants under this subsection, the Secretary shall prioritize consideration of applicants that—

“(i) have access to existing or planned research facilities for carbon capture technologies;

“(ii) are institutions of higher education with established expertise in engineering for carbon capture technologies, or partnerships with such institutions of higher education; or

“(iii) have access to existing research and test facilities for bulk materials design and testing, component design and testing, or professional engineering design.

“(D) EXISTING CENTERS.—In selecting entities to receive grants under this subsection, the Secretary shall prioritize carbon capture test centers in existence on the date of enactment of the Energy Act of 2020.

“(4) FORMULA FOR AWARDING GRANTS.—The Secretary may develop a formula for awarding grants under this subsection.

“(5) SCHEDULE.—

“(A) IN GENERAL.—Each grant awarded under this subsection shall be for a term of not more than 5 years, subject to the availability of appropriations.

“(B) RENEWAL.—The Secretary may renew a grant for 1 or more additional 5-year terms, subject to a competitive merit review and the availability of appropriations.

“(6) TERMINATION.—To the extent otherwise authorized by law, the Secretary may eliminate, and terminate grant funding under this subsection for, a Center during any 5-year term described in paragraph (5) if the Secretary determines that the Center is underperforming.

“(7) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to carry out this subsection \$25,000,000 for each of fiscal years 2021 through 2025.”.

(b) TECHNICAL AMENDMENT.—The table of contents for the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 600) is amended by striking the item relating to section 962 and inserting the following:

“Sec. 962. Carbon capture technology program.”.

SEC. 4003. CARBON STORAGE VALIDATION AND TESTING.

(a) IN GENERAL.—Section 963 of the Energy Policy Act of 2005 (42 U.S.C. 16293) is amended—

(1) by striking subsection (d) and inserting the following:

“(g) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section—

“(1) \$200,000,000 for fiscal year 2021;

“(2) \$200,000,000 for fiscal year 2022;

“(3) \$150,000,000 for fiscal year 2023;

“(4) \$150,000,000 for fiscal year 2024; and

“(5) \$100,000,000 for fiscal year 2025.”;

(2) in subsection (c)—

(A) by striking paragraphs (5) and (6) and inserting the following:

“(f) COST SHARING.—Activities carried out under this section shall be subject to the cost-sharing requirements of section 988.”; and

(B) by redesignating paragraph (4) as subsection (e) and indenting appropriately;

(3) in subsection (e) (as so redesignated)—

(A) by redesignating subparagraphs (A) and (B) as paragraphs (1) and (2), respectively, and indenting appropriately; and

(B) by striking “subsection” each place it appears and inserting “section”; and

(4) by striking the section designation and heading and all that follows through the end of subsection (c)(3) and inserting the following:

“SEC. 963. CARBON STORAGE VALIDATION AND TESTING.

“(a) DEFINITIONS.—In this section:

“(1) LARGE-SCALE CARBON SEQUESTRATION.—The term ‘large-scale carbon sequestration’ means a scale that—

“(A) demonstrates the ability to inject into geologic formations and sequester carbon dioxide; and

“(B) has a goal of sequestering not less than 50 million metric tons of carbon dioxide over a 10-year period.

“(2) PROGRAM.—The term ‘program’ means the program established under subsection (b)(1).

“(b) CARBON STORAGE PROGRAM.—

“(1) IN GENERAL.—The Secretary shall establish a program of research, development, and demonstration for carbon storage.

“(2) PROGRAM ACTIVITIES.—Activities under the program shall include—

“(A) in coordination with relevant Federal agencies, developing and maintaining mapping tools and resources that assess the capacity of geologic storage formation in the United States;

“(B) developing monitoring tools, modeling of geologic formations, and analyses—

“(i) to predict carbon dioxide containment; and

“(ii) to account for sequestered carbon dioxide in geologic storage sites;

“(C) researching—

“(i) potential environmental, safety, and health impacts in the event of a leak into the atmosphere or to an aquifer; and

“(ii) any corresponding mitigation actions or responses to limit harmful consequences of such a leak;

“(D) evaluating the interactions of carbon dioxide with formation solids and fluids, including the propensity of injections to induce seismic activity;

“(E) assessing and ensuring the safety of operations relating to geologic sequestration of carbon dioxide;

“(F) determining the fate of carbon dioxide concurrent with and following injection into geologic formations;

“(G) supporting cost and business model assessments to examine the economic viability of technologies and systems developed under the program; and

“(H) providing information to the Environmental Protection Agency, States, local governments, Tribal governments, and other appropriate entities, to ensure the protection of human health and the environment.

“(3) GEOLOGIC SETTINGS.—In carrying out research activities under this subsection, the Secretary shall consider a variety of candidate onshore and offshore geologic settings, including—

“(A) operating oil and gas fields;

“(B) depleted oil and gas fields;

“(C) residual oil zones;

“(D) unconventional reservoirs and rock types;

“(E) unmineable coal seams;

“(F) saline formations in both sedimentary and basaltic geologies;

“(G) geologic systems that may be used as engineered reservoirs to extract economical quantities of brine from geothermal resources of low permeability or porosity; and

“(H) geologic systems containing in situ carbon dioxide mineralization formations.

“(c) LARGE-SCALE CARBON SEQUESTRATION DEMONSTRATION PROGRAM.—

“(1) IN GENERAL.—The Secretary shall establish a demonstration program under which the Secretary shall provide

funding for demonstration projects to collect and validate information on the cost and feasibility of commercial deployment of large-scale carbon sequestration technologies.

“(2) EXISTING REGIONAL CARBON SEQUESTRATION PARTNERSHIPS.—In carrying out paragraph (1), the Secretary may provide additional funding to regional carbon sequestration partnerships that are carrying out or have completed a large-scale carbon sequestration demonstration project under this section (as in effect on the day before the date of enactment of the Energy Act of 2020) for additional work on that project.

“(3) DEMONSTRATION COMPONENTS.—Each demonstration project carried out under this subsection shall include longitudinal tests involving carbon dioxide injection and monitoring, mitigation, and verification operations.

“(4) CLEARINGHOUSE.—The National Energy Technology Laboratory shall act as a clearinghouse of shared information and resources for—

“(A) existing or completed demonstration projects receiving additional funding under paragraph (2); and

“(B) any new demonstration projects funded under this subsection.

“(5) REPORT.—Not later than 1 year after the date of enactment of the Energy Act of 2020, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report that—

“(A) assesses the progress of all regional carbon sequestration partnerships carrying out a demonstration project under this subsection;

“(B) identifies the remaining challenges in achieving large-scale carbon sequestration that is reliable and safe for the environment and public health; and

“(C) creates a roadmap for carbon storage research and development activities of the Department through 2025, with the goal of reducing economic and policy barriers to commercial carbon sequestration.

“(d) INTEGRATED STORAGE.—

“(1) IN GENERAL.—The Secretary may transition large-scale carbon sequestration demonstration projects under subsection (c) into integrated commercial storage complexes.

“(2) GOALS AND OBJECTIVES.—The goals and objectives of the Secretary in seeking to transition large-scale carbon sequestration demonstration projects into integrated commercial storage complexes under paragraph (1) shall be—

“(A) to identify geologic storage sites that are able to accept large volumes of carbon dioxide acceptable for commercial contracts;

“(B) to understand the technical and commercial viability of carbon dioxide geologic storage sites; and

“(C) to carry out any other activities necessary to transition the large-scale carbon sequestration demonstration projects under subsection (c) into integrated commercial storage complexes.”.

(b) TECHNICAL AMENDMENT.—The table of contents for the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 600;

121 Stat. 1708) is amended by striking the item relating to section 963 and inserting the following:

“Sec. 963. Carbon storage validation and testing.”

(c) CONFORMING AMENDMENTS.—

(1) Section 703(a)(3) of the Department of Energy Carbon Capture and Sequestration Research, Development, and Demonstration Act of 2007 (42 U.S.C. 17251(a)(3)) is amended, in the first sentence of the matter preceding subparagraph (A), by—

(A) striking “section 963(c)(3)” and inserting “section 963(c)”; and

(B) striking “16293(c)(3)” and inserting “16293(c)”.

(2) Section 704 of the Department of Energy Carbon Capture and Sequestration Research, Development, and Demonstration Act of 2007 (42 U.S.C. 17252) is amended, in the first sentence, by—

(A) striking “section 963(c)(3)” and inserting “section 963(c)”; and

(B) striking “16293(c)(3)” and inserting “16293(c)”.

SEC. 4004. CARBON UTILIZATION PROGRAM.

(a) CARBON UTILIZATION PROGRAM.—

(1) IN GENERAL.—Subtitle F of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16291 et seq.) is amended by adding at the end the following:

“SEC. 969A. CARBON UTILIZATION PROGRAM.

“(a) IN GENERAL.—The Secretary shall establish a program of research, development, and demonstration for carbon utilization—

“(1) to assess and monitor—

“(A) potential changes in lifecycle carbon dioxide and other greenhouse gas emissions; and

“(B) other environmental safety indicators of new technologies, practices, processes, or methods used in enhanced hydrocarbon recovery as part of the activities authorized under section 963;

“(2) to identify and assess novel uses for carbon, including the conversion of carbon and carbon oxides for commercial and industrial products and other products with potential market value;

“(3) to identify and assess carbon capture technologies for industrial systems; and

“(4) to identify and assess alternative uses for raw coal and processed coal products in all phases that result in no significant emissions of carbon dioxide or other pollutants, including products derived from carbon engineering, carbon fiber, and coal conversion methods.

“(b) DEMONSTRATION PROGRAMS FOR THE PURPOSE OF COMMERCIALIZATION.—

“(1) IN GENERAL.—Not later than 180 days after the date of enactment of the Energy Act of 2020, as part of the program established under subsection (a), the Secretary shall establish a 2-year demonstration program in each of the 2 major coal-producing regions of the United States for the purpose of

partnering with private institutions in coal mining regions to accelerate the commercial deployment of coal-carbon products.

“(2) COST SHARING.—Activities under paragraph (1) shall be subject to the cost-sharing requirements of section 988.

“(c) CARBON UTILIZATION RESEARCH CENTER.—

“(1) IN GENERAL.—In carrying out the program under subsection (a), the Secretary shall establish and operate a national Carbon Utilization Research Center (referred to in this subsection as the ‘Center’), which shall focus on early stage research and development activities including—

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

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

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

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

“(2) SELECTION.—The Secretary shall—

“(A) select the Center under this subsection on a competitive, merit-reviewed basis; and

“(B) consider applications from the National Laboratories, institutions of higher education, multiinstitutional collaborations, and other appropriate entities.

“(3) EXISTING CENTERS.—In selecting the Center under this subsection, the Secretary shall prioritize carbon utilization research centers in existence on the date of enactment of the Energy Act of 2020.

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

“(5) RENEWAL.—On the expiration of any period of support of the Center, the Secretary 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 Secretary may terminate the Center for cause during the performance period.

“(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section—

“(1) \$54,000,000 for fiscal year 2021;

“(2) \$55,250,000 for fiscal year 2022;

“(3) \$56,562,500 for fiscal year 2023;

“(4) \$57,940,625 for fiscal year 2024; and

“(5) \$59,387,656 for fiscal year 2025.

“(e) COORDINATION.—The Secretary shall coordinate the activities authorized in this section with the activities authorized in section 969 as part of one consolidated program at the Department. Nothing in section 969 shall be construed as limiting the authorities provided in this section.”

(2) TECHNICAL AMENDMENT.—The table of contents for the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 600) is amended by adding at the end of the items relating to subtitle F of title IX the following:

“Sec. 969A. Carbon utilization program.”

(b) STUDY.—

(1) IN GENERAL.—The Secretary of Energy (in this section referred to as the “Secretary”) shall enter into an agreement with the National Academies of Sciences, Engineering, and Medicine under which the National Academies of Sciences, Engineering, and Medicine shall conduct a study to assess any barriers and opportunities relating to commercializing carbon, coal-derived carbon, and carbon dioxide in the United States.

(2) REQUIREMENTS.—The study under paragraph (1) shall—

(A) analyze challenges to commercializing carbon dioxide, including—

- (i) expanding carbon dioxide pipeline capacity;
- (ii) mitigating environmental impacts;
- (iii) access to capital;
- (iv) geographic barriers; and
- (v) regional economic challenges and opportunities;

(B) identify potential markets, industries, or sectors that may benefit from greater access to commercial carbon dioxide;

(C) determine the feasibility of, and opportunities for, the commercialization of coal-derived carbon products, including for—

- (i) commercial purposes;
- (ii) industrial purposes;
- (iii) defense and military purposes;
- (iv) agricultural purposes, including soil amendments and fertilizers;
- (v) medical and pharmaceutical applications;
- (vi) construction and building applications;
- (vii) energy applications; and
- (viii) production of critical minerals;

(D) assess—

- (i) the state of infrastructure as of the date of the study; and
- (ii) any necessary updates to infrastructure to allow for the integration of safe and reliable carbon dioxide transportation, use, and storage;

(E) describe the economic, climate, and environmental impacts of any well-integrated national carbon dioxide pipeline system, including suggestions for policies that could—

- (i) improve the economic impact of the system; and
- (ii) mitigate impacts of the system;

(F) assess the global status and progress of chemical and biological carbon utilization technologies in practice as of the date of the study that utilize anthropogenic carbon, including carbon dioxide, carbon monoxide, methane, and biogas, from power generation, biofuels production, and other industrial processes;

(G) identify emerging technologies and approaches for carbon utilization that show promise for scale-up, demonstration, deployment, and commercialization;

(H) analyze the factors associated with making carbon utilization technologies viable at a commercial scale, including carbon waste stream availability, economics, market capacity, energy, and lifecycle requirements;

(I)(i) assess the major technical challenges associated with increasing the commercial viability of carbon reuse technologies; and

(ii) identify the research and development questions that will address the challenges described in clause (i);

(J)(i) assess research efforts being carried out as of the date of the study, including basic, applied, engineering, and computational research efforts, that are addressing the challenges described in subparagraph (I)(i); and

(ii) identify gaps in the research efforts under clause (i);

(K) develop a comprehensive research agenda that addresses long- and short-term research needs and opportunities for technologies that may be important to minimizing net greenhouse gas emissions from the use of coal and natural gas; and

(L)(i) identify appropriate Federal agencies with capabilities to support small business entities; and

(ii) determine what assistance the Federal agencies identified under clause (i) could provide to small business entities to further the development and commercial deployment of carbon dioxide-based products.

(3) DEADLINE.—Not later than 180 days after the date of enactment of this Act, the National Academies of Sciences, Engineering, and Medicine shall submit to the Secretary a report describing the results of the study under paragraph (1).

SEC. 4005. HIGH EFFICIENCY TURBINES.

(a) IN GENERAL.—Subtitle F of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16291 et seq.) is further amended by adding at the end the following:

“SEC. 969B. HIGH EFFICIENCY TURBINES.

“(a) IN GENERAL.—The Secretary, acting through the Assistant Secretary for Fossil Energy (referred to in this section as the ‘Secretary’), shall establish a multiyear, multiphase program (referred to in this section as the ‘program’) of research, development, and technology demonstration to improve the efficiency of gas turbines used in power generation systems and aviation.

“(b) PROGRAM ELEMENTS.—The program shall—

“(1) support first-of-a-kind engineering and detailed gas turbine design for small-scale and utility-scale electric power generation, including—

“(A) high temperature materials, including superalloys, coatings, and ceramics;

“(B) improved heat transfer capability;

“(C) manufacturing technology required to construct complex 3-dimensional geometry parts with improved aerodynamic capability;

“(D) combustion technology to produce higher firing temperature while lowering nitrogen oxide and carbon monoxide emissions per unit of output;

“(E) advanced controls and systems integration;

“(F) advanced high performance compressor technology;

and

“(G) validation facilities for the testing of components and subsystems;

“(2) include technology demonstration through component testing, subscale testing, and full-scale testing in existing fleets;

“(3) include field demonstrations of the developed technology elements to demonstrate technical and economic feasibility;

“(4) assess overall combined cycle and simple cycle system performance;

“(5) increase fuel flexibility by enabling gas turbines to operate with high proportions of, or pure, hydrogen or other renewable gas fuels;

“(6) enhance foundational knowledge needed for low-emission combustion systems that can work in high-pressure, high-temperature environments required for high-efficiency cycles;

“(7) increase operational flexibility by reducing turbine start-up times and improving the ability to accommodate flexible power demand; and

“(8) include any other elements necessary to achieve the goals described in subsection (c), as determined by the Secretary, in consultation with private industry.

“(c) PROGRAM GOALS.—

“(1) IN GENERAL.—The goals of the program shall be—

“(A) in phase I, to develop a conceptual design of, and to develop and demonstrate the technology required for—

“(i) advanced high efficiency gas turbines to achieve, on a lower heating value basis—

“(I) a combined cycle efficiency of not less than 65 percent; or

“(II) a simple cycle efficiency of not less than 47 percent; and

“(ii) aviation gas turbines to achieve a 25 percent reduction in fuel burn by improving fuel efficiency to existing best-in-class turbo-fan engines; and

“(B) in phase II, to develop a conceptual design of advanced high efficiency gas turbines that can achieve, on a lower heating value basis—

“(i) a combined cycle efficiency of not less than 67 percent; or

“(ii) a simple cycle efficiency of not less than 50 percent.

“(2) ADDITIONAL GOALS.—If a goal described in paragraph (1) has been achieved, the Secretary, in consultation with private industry and the National Academy of Sciences, may develop additional goals or phases for advanced gas turbine research and development.

“(d) FINANCIAL ASSISTANCE.—

“(1) IN GENERAL.—The Secretary may provide financial assistance, including grants, to carry out the program.

“(2) PROPOSALS.—Not later than 180 days after the date of enactment of the Energy Act of 2020, the Secretary shall solicit proposals from industry, small businesses, universities, and other appropriate parties for conducting activities under this section.

“(3) CONSIDERATIONS.—In selecting proposed projects to receive financial assistance under this subsection, the Secretary shall give special consideration to the extent to which the proposed project will—

“(A) stimulate the creation or increased retention of jobs in the United States; and

“(B) promote and enhance technology leadership in the United States.

“(4) **COMPETITIVE AWARDS.**—The Secretary shall provide financial assistance under this subsection on a competitive basis, with an emphasis on technical merit.

“(5) **COST SHARING.**—Financial assistance provided under this subsection shall be subject to the cost sharing requirements of section 988.

“(e) **AUTHORIZATION OF APPROPRIATIONS.**—There is authorized to be appropriated to carry out this section \$50,000,000 for each of fiscal years 2021 through 2025.”.

(b) **TECHNICAL AMENDMENT.**—The table of contents for the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 600) is further amended by adding at the end of the items relating to subtitle F of title IX the following:

“Sec. 969B. High efficiency gas turbines.”.

SEC. 4006. NATIONAL ENERGY TECHNOLOGY LABORATORY REFORMS.

(a) **IN GENERAL.**—Subtitle F of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16291 et seq.) is further amended by adding at the end the following:

“SEC. 969C. NATIONAL ENERGY TECHNOLOGY LABORATORY REFORMS.

“(a) **SPECIAL HIRING AUTHORITY FOR SCIENTIFIC, ENGINEERING, AND PROJECT MANAGEMENT PERSONNEL.**—

“(1) **IN GENERAL.**—The Director of the National Energy Technology Laboratory (referred to in this section as the ‘Director’) may—

“(A) make appointments to positions in the National Energy Technology Laboratory to assist in meeting a specific project or research need, without regard to civil service laws, of individuals who—

“(i) have an advanced scientific or engineering background; or

“(ii) have a business background and can assist in specific technology-to-market needs;

“(B) fix the basic pay of any employee appointed under subparagraph (A) at a rate not to exceed level II of the Executive Schedule under section 5313 of title 5, United States Code; and

“(C) pay any employee appointed under subparagraph (A) payments in addition to the basic pay fixed under subparagraph (B), subject to the condition that the total amount of additional payments paid to an employee under this subparagraph for any 12-month period shall not exceed the least of—

“(i) \$25,000;

“(ii) the amount equal to 25 percent of the annual rate of basic pay of that employee; and

“(iii) the amount of the limitation that is applicable for a calendar year under section 5307(a)(1) of title 5, United States Code.

“(2) **LIMITATIONS.**—

“(A) IN GENERAL.—The term of any employee appointed under paragraph (1)(A) shall not exceed 3 years.

“(B) FULL-TIME EMPLOYEES.—Not more than 10 full-time employees appointed under paragraph (1)(A) may be employed at the National Energy Technology Laboratory at any given time.

“(b) LABORATORY-DIRECTED RESEARCH AND DEVELOPMENT.—

“(1) IN GENERAL.—Beginning in fiscal year 2021, the National Energy Technology Laboratory shall be eligible for laboratory-directed research and development funding.

“(2) AUTHORIZATION OF FUNDING.—

“(A) IN GENERAL.—Each fiscal year, of funds made available to the National Energy Technology Laboratory, the Secretary may deposit an amount, not to exceed the rate made available to the National Laboratories for laboratory-directed research and development, in a special fund account.

“(B) USE.—Amounts in the account under subparagraph (A) shall only be available for laboratory-directed research and development.

“(C) REQUIREMENTS.—The account under subparagraph (A)—

“(i) shall be administered by the Secretary;

“(ii) shall be available without fiscal year limitation; and

“(iii) shall not be subject to appropriation.

“(3) REQUIREMENT.—The Director shall carry out laboratory-directed research and development activities at the National Energy Technology Laboratory consistent with Department of Energy Order 413.2C, dated August 2, 2018 (or a successor order).

“(4) ANNUAL REPORT ON USE OF AUTHORITY.—Annually, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report on the use of the authority provided under this subsection during the preceding fiscal year.

“(c) LABORATORY OPERATIONS.—The Secretary shall delegate human resources operations of the National Energy Technology Laboratory to the Director to assist in carrying out this section.

“(d) REVIEW.—Not later than 2 years after the date of enactment of the Energy Act of 2020, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report assessing the management and research activities of the National Energy Technology Laboratory, which shall include—

“(1) an assessment of the quality of science and research at the National Energy Technology Laboratory, relative to similar work at other National Laboratories;

“(2) a review of the effectiveness of authorities provided in subsections (a) and (b); and

“(3) recommendations for policy changes within the Department and legislative changes to provide the National Energy Technology Laboratory with the necessary tools and resources to advance the research mission of the National Energy Technology Laboratory.”.

(b) **TECHNICAL AMENDMENT.**—The table of contents for the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 600) is further amended by adding at the end of the items relating to subtitle F of title IX the following:

“Sec. 969C. National energy technology laboratory reforms.”

SEC. 4007. STUDY ON BLUE HYDROGEN TECHNOLOGY.

(a) **STUDY.**—The Secretary of Energy shall conduct a study to examine opportunities for research and development in integrating blue hydrogen technology in the industrial power sector and how that could enhance the deployment and adoption of carbon capture and storage.

(b) **REPORT.**—Not later than 1 year after the date of enactment of this Act, the Secretary of Energy shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report that describes the results of the study under subsection (a).

SEC. 4008. PRODUCED WATER RESEARCH AND DEVELOPMENT.

(a) **ESTABLISHMENT.**—As soon as possible after the date of enactment of this Act, the Secretary of Energy (in this section referred to as the “Secretary”) shall establish a research and development program on produced water to develop—

(1) new technologies and practices to reduce the environmental impact; and

(2) opportunities for reprocessing of produced water at natural gas or oil development sites.

(b) **PRIORITIZATION.**—In carrying out the program established under subsection (a), the Secretary shall give priority to projects that develop and bring to market—

(1) effective systems for on-site management or repurposing of produced water; and

(2) new technologies or approaches to reduce the environmental impact of produced water on local water sources and the environment.

(c) **CONDUCT OF PROGRAM.**—In carrying out the program established under subsection (a), the Secretary shall carry out science-based research and development activities to pursue—

(1) improved efficiency, technologies, and techniques for produced water recycling stations; and

(2) alternative approaches to treating, reusing, storing, or decontaminating produced water.

(d) **AUTHORIZATION OF APPROPRIATIONS.**—There are authorized to be appropriated to carry out this section \$10,000,000 for each of fiscal years 2021 through 2025.

TITLE V—CARBON REMOVAL

SEC. 5001. CARBON REMOVAL.

(a) **IN GENERAL.**—Subtitle F of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16291 et seq.) is further amended by adding at the end the following:

“SEC. 969D. CARBON REMOVAL.

“(a) ESTABLISHMENT.—The Secretary, in coordination with the heads of appropriate Federal agencies, including the Secretary of Agriculture, shall establish a research, development, and demonstration program (referred to in this section as the ‘program’) to test, validate, or improve technologies and strategies to remove carbon dioxide from the atmosphere on a large scale.

“(b) INTRAAGENCY COORDINATION.—The Secretary shall ensure that the program includes the coordinated participation of the Office of Fossil Energy, the Office of Science, and the Office of Energy Efficiency and Renewable Energy.

“(c) PROGRAM ACTIVITIES.—The program may include research, development, and demonstration activities relating to—

“(1) direct air capture and storage technologies;

“(2) bioenergy with carbon capture and sequestration;

“(3) enhanced geological weathering;

“(4) agricultural practices;

“(5) forest management and afforestation; and

“(6) planned or managed carbon sinks, including natural and artificial.

“(d) REQUIREMENTS.—In developing and identifying carbon removal technologies and strategies under the program, the Secretary shall consider—

“(1) land use changes, including impacts on natural and managed ecosystems;

“(2) ocean acidification;

“(3) net greenhouse gas emissions;

“(4) commercial viability;

“(5) potential for near-term impact;

“(6) potential for carbon reductions on a gigaton scale; and

“(7) economic cobenefits.

“(e) AIR CAPTURE PRIZE COMPETITIONS.—

“(1) DEFINITIONS.—In this subsection:

“(A) DILUTE MEDIA.—The term ‘dilute media’ means media in which the concentration of carbon dioxide is less than 1 percent by volume.

“(B) PRIZE COMPETITION.—The term ‘prize competition’ means the competitive technology prize competition established under paragraph (2).

“(C) QUALIFIED CARBON DIOXIDE.—

“(i) IN GENERAL.—The term ‘qualified carbon dioxide’ means any carbon dioxide that—

“(I) is captured directly from the ambient air;

and

“(II) is measured at the source of capture and verified at the point of disposal, injection, or utilization.

“(ii) INCLUSION.—The term ‘qualified carbon dioxide’ includes the initial deposit of captured carbon dioxide used as a tertiary injectant.

“(iii) EXCLUSION.—The term ‘qualified carbon dioxide’ does not include carbon dioxide that is recaptured, recycled, and reinjected as part of the enhanced oil and natural gas recovery process.

“(D) QUALIFIED DIRECT AIR CAPTURE FACILITY.—

“(i) IN GENERAL.—The term ‘qualified direct air capture facility’ means any facility that—

“(I) uses carbon capture equipment to capture carbon dioxide directly from the ambient air; and

“(II) captures more than 50,000 metric tons of qualified carbon dioxide annually.

“(ii) EXCLUSION.—The term ‘qualified direct air capture facility’ does not include any facility that captures carbon dioxide—

“(I) that is deliberately released from naturally occurring subsurface springs; or

“(II) using natural photosynthesis.

“(2) ESTABLISHMENT.—Not later than 2 years after the date of enactment of the Energy Act of 2020, the Secretary, in consultation with the Administrator of the Environmental Protection Agency, shall establish as part of the program a competitive technology prize competition to award prizes for—

“(A) precommercial carbon dioxide capture from dilute media; and

“(B) commercial applications of direct air capture technologies.

“(3) REQUIREMENTS.—In carrying out this subsection, the Secretary, in accordance with section 24 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719), shall develop requirements for—

“(A) the prize competition process; and

“(B) monitoring and verification procedures for projects selected to receive a prize under the prize competition.

“(4) ELIGIBLE PROJECTS.—

“(A) PRECOMMERCIAL AIR CAPTURE PROJECTS.—With respect to projects described in paragraph (2)(A), to be eligible to be awarded a prize under the prize competition, a project shall—

“(i) meet minimum performance standards set by the Secretary;

“(ii) meet minimum levels set by the Secretary for the capture of carbon dioxide from dilute media; and

“(iii) demonstrate in the application of the project for a prize—

“(I) a design for a promising carbon capture technology that will—

“(aa) be operated on a demonstration scale; and

“(bb) have the potential to achieve significant reduction in the level of carbon dioxide in the atmosphere;

“(II) a successful bench-scale demonstration of a carbon capture technology; or

“(III) an operational carbon capture technology on a commercial scale.

“(B) COMMERCIAL DIRECT AIR CAPTURE PROJECTS.—

“(i) IN GENERAL.—With respect to projects described in paragraph (2)(B), the Secretary shall award prizes under the prize competition to qualified direct air capture facilities for metric tons of qualified

carbon dioxide captured and verified at the point of disposal, injection, or utilization.

“(ii) AMOUNT OF AWARD.—The amount of the award per metric ton under clause (i)—

“(I) shall be equal for each qualified direct air capture facility selected for a prize under the prize competition; and

“(II) shall be determined by the Secretary and in any case shall not exceed—

“(aa) \$180 for qualified carbon dioxide captured and stored in saline storage formations;

“(bb) a lesser amount, as determined by the Secretary, for qualified carbon dioxide captured and stored in conjunction with enhanced oil recovery operations; or

“(cc) a lesser amount, as determined by the Secretary, for qualified carbon dioxide captured and utilized in any activity consistent with section 45Q(f)(5) of the Internal Revenue Code of 1986.

“(iii) REQUIREMENT.—The Secretary shall make awards under this subparagraph until appropriated funds are expended.

“(f) DIRECT AIR CAPTURE TEST CENTER.—

“(1) IN GENERAL.—Not later than 2 years after the date of enactment of the Energy Act of 2020, the Secretary shall award grants to 1 or more entities for the operation of 1 or more test centers (referred to in this subsection as a ‘Center’) to provide distinct testing capabilities for innovative direct air capture and storage technologies.

“(2) PURPOSE.—Each Center shall—

“(A) advance research, development, demonstration, and commercial application of direct air capture and storage technologies;

“(B) support large-scale pilot and demonstration projects and test direct air capture and storage technologies; and

“(C) develop front-end engineering design and economic analysis.

“(3) SELECTION.—

“(A) IN GENERAL.—The Secretary shall select entities to receive grants under this subsection according to such criteria as the Secretary may develop.

“(B) COMPETITIVE BASIS.—The Secretary shall select entities to receive grants under this subsection on a competitive basis.

“(C) PRIORITY CRITERIA.—In selecting entities to receive grants under this subsection, the Secretary shall prioritize consideration of applicants that—

“(i) have access to existing or planned research facilities for direct air capture and storage technologies;

“(ii) are institutions of higher education with established expertise in engineering for direct air capture and storage technologies, or partnerships with such institutions of higher education; or

“(iii) have access to existing research and test facilities for bulk materials design and testing, component design and testing, or professional engineering design.

“(4) FORMULA FOR AWARDING GRANTS.—The Secretary may develop a formula for awarding grants under this subsection.

“(5) SCHEDULE.—

“(A) IN GENERAL.—Each grant awarded under this subsection shall be for a term of not more than 5 years, subject to the availability of appropriations.

“(B) RENEWAL.—The Secretary may renew a grant for 1 or more additional 5-year terms, subject to a competitive merit review and the availability of appropriations.

“(6) TERMINATION.—To the extent otherwise authorized by law, the Secretary may eliminate, and terminate grant funding under this subsection for, a Center during any 5-year term described in paragraph (5) if the Secretary determines that the Center is underperforming.

“(g) PILOT AND DEMONSTRATION PROJECTS.—In supporting the technology development activities under this section, the Secretary is encouraged to support carbon removal pilot and demonstration projects, including—

“(1) pilot projects that test direct air capture systems capable of capturing 10 to 100 tonnes of carbon oxides per year to provide data for demonstration-scale projects; and

“(2) direct air capture demonstration projects capable of capturing greater than 1,000 tonnes of carbon oxides per year.

“(h) INTRAAGENCY COLLABORATION.—In carrying out the program, the Secretary shall encourage and promote collaborations among relevant offices and agencies within the Department.

“(i) ACCOUNTING.—The Secretary shall collaborate with the Administrator of the Environmental Protection Agency and the heads of other relevant Federal agencies to develop and improve accounting frameworks and tools to accurately measure carbon removal and sequestration methods and technologies.

“(j) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section—

“(1) \$175,000,000 for fiscal year 2021, of which—

“(A) \$15,000,000 shall be used to carry out subsection (e)(2)(A), to remain available until expended; and

“(B) \$100,000,000 shall be used to carry out subsection (e)(2)(B), to remain available until expended;

“(2) \$63,500,000 for fiscal year 2022;

“(3) \$66,150,000 for fiscal year 2023;

“(4) \$69,458,000 for fiscal year 2024; and

“(5) \$72,930,000 for fiscal year 2025.”

(b) TECHNICAL AMENDMENT.—The table of contents for the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 600) is further amended by adding at the end of the items relating to subtitle F of title IX the following:

“Sec. 969D. Carbon removal.”

SEC. 5002. CARBON DIOXIDE REMOVAL TASK FORCE AND REPORT.

(a) DEFINITION OF CARBON DIOXIDE REMOVAL.—In this section, the term “carbon dioxide removal” means the capture of carbon

dioxide directly from ambient air or, in dissolved form, from seawater, combined with the sequestration of that carbon dioxide, including through—

- (1) direct air capture and sequestration;
- (2) enhanced carbon mineralization;
- (3) bioenergy with carbon capture and sequestration;
- (4) forest restoration;
- (5) soil carbon management; and
- (6) direct ocean capture.

(b) REPORT.—Not later than 180 days after the date of enactment of this Act, the Secretary of Energy (in this section referred to as the “Secretary”), in consultation with the heads of any other relevant Federal agencies, shall prepare a report that—

(1) estimates the magnitude of excess carbon dioxide in the atmosphere that will need to be removed by 2050 to achieve net-zero emissions and stabilize the climate;

(2) inventories current and emerging approaches of carbon dioxide removal and evaluates the advantages and disadvantages of each of the approaches; and

(3) identifies recommendations for legislation, funding, rules, revisions to rules, financing mechanisms, or other policy tools that the Federal Government can use to sufficiently advance the deployment of carbon dioxide removal projects in order to meet, in the aggregate, the magnitude of needed removals estimated under paragraph (1), including policy tools, such as—

- (A) grants;
- (B) loans or loan guarantees;
- (C) public-private partnerships;
- (D) direct procurement;
- (E) incentives, including subsidized Federal financing mechanisms available to project developers;
- (F) advance market commitments;
- (G) regulations; and
- (H) any other policy mechanism determined by the Secretary to be beneficial for advancing carbon dioxide removal methods and the deployment of carbon dioxide removal projects.

(c) SUBMISSION; PUBLICATION.—The Secretary shall—

(1) submit the report prepared under subsection (b) to the Committee on Energy and Natural Resources of the Senate and the Committees on Energy and Commerce and Science, Space, and Technology of the House of Representatives; and

(2) as soon as practicable after completion of the report, make the report publicly available.

(d) EVALUATION; REVISION.—

(1) IN GENERAL.—Not later than 2 years after the date on which the Secretary publishes the report under subsection (c)(2), and every 2 years thereafter, the Secretary shall evaluate the findings and recommendations of the report, or the most recent updated report submitted under paragraph (2)(B), as applicable, taking into consideration any issues and recommendations identified by the task force established under subsection (e)(1).

(2) REVISION.—After completing each evaluation under paragraph (1), the Secretary shall—

- (A) revise the report as necessary; and

(B) if the Secretary revises the report under subparagraph (A), submit and publish the updated report in accordance with subsection (c).

(e) TASK FORCE.—

(1) ESTABLISHMENT AND DUTIES.—Not later than 60 days after the date of enactment of this Act, the Secretary shall establish a task force—

(A) to identify barriers to advancement of carbon dioxide removal methods and the deployment of carbon dioxide removal projects;

(B) to inventory existing or potential Federal legislation, rules, revisions to rules, financing mechanisms, or other policy tools that are capable of advancing carbon dioxide removal methods and the deployment of carbon dioxide removal projects;

(C) to assist in preparing the report described in subsection (b) and any updates to the report under subsection (d); and

(D) to advise the Secretary on matters pertaining to carbon dioxide removal.

(2) MEMBERS AND SELECTION.—The Secretary shall—

(A) develop criteria for the selection of members to the task force established under paragraph (1); and

(B) select members for the task force in accordance with the criteria developed under subparagraph (A).

(3) MEETINGS.—The task force shall meet not less frequently than once each year.

(4) EVALUATION.—Not later than 7 years after the date of enactment of this Act, the Secretary shall—

(A) reevaluate the need for the task force established under paragraph (1); and

(B) submit to Congress a recommendation as to whether the task force should continue.

TITLE VI—INDUSTRIAL AND MANUFACTURING TECHNOLOGIES

SEC. 6001. PURPOSE.

The purpose of this title and the amendments made by this title is to encourage the development and evaluation of innovative technologies aimed at increasing—

(1) the technological and economic competitiveness of industry and manufacturing in the United States; and

(2) the emissions reduction of nonpower industrial sectors.

SEC. 6002. COORDINATION OF RESEARCH AND DEVELOPMENT OF ENERGY EFFICIENT TECHNOLOGIES FOR INDUSTRY.

Section 6(a) of the American Energy Manufacturing Technical Corrections Act (42 U.S.C. 6351(a)) is amended—

(1) by striking “Industrial Technologies Program” each place it appears and inserting “Advanced Manufacturing Office”; and

(2) in the matter preceding paragraph (1), by striking “Office of Energy” and all that follows through “Office of Science” and inserting “Department of Energy”.

SEC. 6003. INDUSTRIAL EMISSIONS REDUCTION TECHNOLOGY DEVELOPMENT PROGRAM.

(a) **IN GENERAL.**—Subtitle D of title IV of the Energy Independence and Security Act of 2007 is amended by adding at the end the following:

“SEC. 454. INDUSTRIAL EMISSIONS REDUCTION TECHNOLOGY DEVELOPMENT PROGRAM.

“(a) **DEFINITIONS.**—In this section:

“(1) **DIRECTOR.**—The term ‘Director’ means the Director of the Office of Science and Technology Policy.

“(2) **ELIGIBLE ENTITY.**—The term ‘eligible entity’ means—

“(A) a scientist or other individual with knowledge and expertise in emissions reduction;

“(B) an institution of higher education;

“(C) a nongovernmental organization;

“(D) a National Laboratory;

“(E) a private entity; and

“(F) a partnership or consortium of 2 or more entities described in subparagraphs (B) through (E).

“(3) **EMISSIONS REDUCTION.**—

“(A) **IN GENERAL.**—The term ‘emissions reduction’ means the reduction, to the maximum extent practicable, of net nonwater greenhouse gas emissions to the atmosphere by energy services and industrial processes.

“(B) **EXCLUSION.**—The term ‘emissions reduction’ does not include the elimination of carbon embodied in the principal products of industrial manufacturing.

“(4) **PROGRAM.**—The term ‘program’ means the program established under subsection (b)(1).

“(5) **CRITICAL MATERIAL OR MINERAL.**—The term ‘critical material or mineral’ means a material or mineral that serves an essential function in the manufacturing of a product and has a high risk of a supply disruption, such that a shortage of such a material or mineral would have significant consequences for United States economic or national security.

“(b) **INDUSTRIAL EMISSIONS REDUCTION TECHNOLOGY DEVELOPMENT PROGRAM.**—

“(1) **IN GENERAL.**—Not later than 1 year after the date of enactment of the Energy Act of 2020, the Secretary, in consultation with the Director, the heads of relevant Federal agencies, National Laboratories, industry, and institutions of higher education, shall establish a crosscutting industrial emissions reduction technology development program of research, development, demonstration, and commercial application to advance innovative technologies that—

“(A) increase the technological and economic competitiveness of industry and manufacturing in the United States;

“(B) increase the viability and competitiveness of United States industrial technology exports; and

“(C) achieve emissions reduction in nonpower industrial sectors.

“(2) **COORDINATION.**—In carrying out the program, the Secretary shall—

“(A) coordinate with each relevant office in the Department and any other Federal agency;

“(B) coordinate and collaborate with the Industrial Technology Innovation Advisory Committee established under section 456; and

“(C) coordinate and seek to avoid duplication with the energy-intensive industries program established under section 452.

“(3) LEVERAGE OF EXISTING RESOURCES.—In carrying out the program, the Secretary shall leverage, to the maximum extent practicable—

“(A) existing resources and programs of the Department and other relevant Federal agencies; and

“(B) public-private partnerships.

“(c) FOCUS AREAS.—The program shall focus on—

“(1) industrial production processes, including technologies and processes that—

“(A) achieve emissions reduction in high emissions industrial materials production processes, including production processes for iron, steel, steel mill products, aluminum, cement, concrete, glass, pulp, paper, and industrial ceramics;

“(B) achieve emissions reduction in medium- and high-temperature heat generation, including—

“(i) through electrification of heating processes;

“(ii) through renewable heat generation technology;

“(iii) through combined heat and power; and

“(iv) by switching to alternative fuels, including hydrogen and nuclear energy;

“(C) achieve emissions reduction in chemical production processes, including by incorporating, if appropriate and practicable, principles, practices, and methodologies of sustainable chemistry and engineering;

“(D) leverage smart manufacturing technologies and principles, digital manufacturing technologies, and advanced data analytics to develop advanced technologies and practices in information, automation, monitoring, computation, sensing, modeling, and networking to—

“(i) model and simulate manufacturing production lines;

“(ii) monitor and communicate production line status;

“(iii) manage and optimize energy productivity and cost throughout production; and

“(iv) model, simulate, and optimize the energy efficiency of manufacturing processes;

“(E) leverage the principles of sustainable manufacturing to minimize the potential negative environmental impacts of manufacturing while conserving energy and resources, including—

“(i) by designing products that enable reuse, refurbishment, remanufacturing, and recycling;

“(ii) by minimizing waste from industrial processes, including through the reuse of waste as other resources in other industrial processes for mutual benefit; and

“(iii) by increasing resource efficiency; and

“(F) increase the energy efficiency of industrial processes;

“(2) alternative materials that produce fewer emissions during production and result in fewer emissions during use, including—

“(A) high-performance lightweight materials; and

“(B) substitutions for critical materials and minerals;

“(3) development of net-zero emissions liquid and gaseous fuels;

“(4) emissions reduction in shipping, aviation, and long distance transportation;

“(5) carbon capture technologies for industrial processes;

“(6) other technologies that achieve net-zero emissions in nonpower industrial sectors, as determined by the Secretary, in consultation with the Director; and

“(7) high-performance computing to develop advanced materials and manufacturing processes contributing to the focus areas described in paragraphs (1) through (6), including—

“(A) modeling, simulation, and optimization of the design of energy efficient and sustainable products; and

“(B) the use of digital prototyping and additive manufacturing to enhance product design.

“(8) incorporation of sustainable chemistry and engineering principles, practices, and methodologies, as the Secretary determines appropriate; and

“(9) other research or technology areas identified in the Strategic Plan authorized in section 455.

“(d) GRANTS, CONTRACTS, COOPERATIVE AGREEMENTS, AND DEMONSTRATION PROJECTS.—

“(1) GRANTS.—In carrying out the program, the Secretary shall award grants on a competitive basis to eligible entities for projects that the Secretary determines would best achieve the goals of the program.

“(2) CONTRACTS AND COOPERATIVE AGREEMENTS.—In carrying out the program, the Secretary may enter into contracts and cooperative agreements with eligible entities and Federal agencies for projects that the Secretary determines would further the purposes of the program.

“(3) DEMONSTRATION PROJECTS.—In supporting technologies developed under this section, the Secretary shall fund demonstration projects that test and validate technologies described in subsection (c).

“(4) APPLICATION.—An entity seeking funding or a contract or agreement under this subsection shall submit to the Secretary an application at such time, in such manner, and containing such information as the Secretary may require.

“(5) COST SHARING.—In awarding funds under this section, the Secretary shall require cost sharing in accordance with section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352).

“(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the demonstration projects authorized in subsection (d)(3)—

“(1) \$20,000,000 for fiscal year 2021;

“(2) \$80,000,000 for fiscal year 2022;

“(3) \$100,000,000 for fiscal year 2023;

“(4) \$150,000,000 for fiscal year 2024; and

“(5) \$150,000,000 for fiscal year 2025.

“(f) COORDINATION.—The Secretary shall carry out the activities authorized in this section in accordance with section 203 of the

Department of Energy Research and Innovation Act (42 U.S.C. 18631).”.

(b) TECHNICAL AMENDMENT.—The table of contents of the Energy Independence and Security Act of 2007 (Public Law 110–140; 121 Stat. 1494) is amended by inserting after the item relating to section 453 the following:

“Sec. 454. Industrial emissions reduction technology development program.”.

SEC. 6004. INDUSTRIAL TECHNOLOGY INNOVATION ADVISORY COMMITTEE.

(a) IN GENERAL.—Subtitle D of title IV of the Energy Independence and Security Act of 2007, as amended by section 6003, is amended by adding at the end the following:

“SEC. 455. INDUSTRIAL TECHNOLOGY INNOVATION ADVISORY COMMITTEE.

“(a) DEFINITIONS.—In this section:

“(1) COMMITTEE.—The term ‘Committee’ means the Industrial Technology Innovation Advisory Committee established under subsection (b).

“(2) DIRECTOR.—The term ‘Director’ means the Director of the Office of Science and Technology Policy.

“(3) EMISSIONS REDUCTION.—The term ‘emissions reduction’ has the meaning given the term in section 454(a).

“(4) PROGRAM.—The term ‘program’ means the industrial emissions reduction technology development program established under section 454(b)(1).

“(b) ESTABLISHMENT.—Not later than 180 days after the date of enactment of the Energy Act of 2020, the Secretary, in consultation with the Director, shall establish an advisory committee, to be known as the ‘Industrial Technology Innovation Advisory Committee’.

“(c) MEMBERSHIP.—

“(1) APPOINTMENT.—The Committee shall be comprised of not fewer than 16 members and not more than 20 members, who shall be appointed by the Secretary, in consultation with the Director.

“(2) REPRESENTATION.—Members appointed pursuant to paragraph (1) shall include—

“(A) not less than 1 representative of each relevant Federal agency, as determined by the Secretary;

“(B) the Chair of the Secretary of Energy Advisory Board, if that position is filled;

“(C) not less than 2 representatives of labor groups;

“(D) not less than 3 representatives of the research community, which shall include academia and National Laboratories;

“(E) not less than 2 representatives of nongovernmental organizations;

“(F) not less than 6 representatives of small- and large-scale industry, the collective expertise of which shall cover every focus area described in section 454(c); and

“(F) not less than 1 representative of a State government; and

“(G) any other individuals the Secretary, in coordination with the Director, determines to be necessary to ensure

that the Committee is comprised of a diverse group of representatives of industry, academia, independent researchers, and public and private entities.

“(3) CHAIR.—The Secretary shall designate a member of the Committee to serve as Chair.

“(d) DUTIES.—

“(1) IN GENERAL.—The Committee shall—

“(A) in consultation with the Secretary and the Director, propose missions and goals for the program, which shall be consistent with the purposes of the program described in section 454(b)(1); and

“(B) advise the Secretary with respect to the program—

“(i) by identifying and evaluating any technologies being developed by the private sector relating to the focus areas described in section 454(c);

“(ii) by identifying technology gaps in the private sector or other Federal agencies in those focus areas, and making recommendations to address those gaps;

“(iii) by surveying and analyzing factors that prevent the adoption of emissions reduction technologies by the private sector; and

“(iv) by recommending technology screening criteria for technology developed under the program to encourage adoption of the technology by the private sector; and

“(C) develop the strategic plan described in paragraph

(2).

“(2) STRATEGIC PLAN.—

“(A) PURPOSE.—The purpose of the strategic plan developed under paragraph (1)(C) is to set forth a plan for achieving the goals of the program established in section 454(b)(1), including for the focus areas described in section 454(c).

“(B) CONTENTS.—The strategic plan developed under paragraph (1)(C) shall—

“(i) specify near-term and long-term qualitative and quantitative objectives relating to each focus area described in section 454(c), including research, development, demonstration, and commercial application objectives;

“(ii) leverage existing roadmaps relevant to the program in section 454(b)(1) and the focus areas in section 454(c);

“(iii) specify the anticipated timeframe for achieving the objectives specified under clause (i);

“(iv) include plans for developing emissions reduction technologies that are globally cost-competitive, including, as applicable, in developing economies;

“(v) identify the appropriate role for investment by the Federal Government, in coordination with the private sector, to achieve the objectives specified under clause (i);

“(vi) identify the public and private costs of achieving the objectives specified under clause (i); and

“(vii) estimate the economic and employment impact in the United States of achieving those objectives.

“(e) MEETINGS.—

“(1) FREQUENCY.—The Committee shall meet not less frequently than 2 times per year, at the call of the Chair.

“(2) INITIAL MEETING.—Not later than 30 days after the date on which the members are appointed under subsection (b), the Committee shall hold its first meeting.

“(f) COMMITTEE REPORT.—

“(1) IN GENERAL.—Not later than 2 years after the date of enactment of the Energy Act of 2020, and not less frequently than once every 3 years thereafter, the Committee shall submit to the Secretary a report on the progress of achieving the purposes of the program.

“(2) CONTENTS.—The report under paragraph (1) shall include—

“(A) a description of any technology innovation opportunities identified by the Committee;

“(B) a description of any technology gaps identified by the Committee under subsection (d)(1)(B)(ii);

“(C) recommendations for improving technology screening criteria and management of the program;

“(D) an evaluation of the progress of the program and the research, development, and demonstration activities funded under the program;

“(E) any recommended changes to the focus areas of the program described in section 454(c);

“(F) a description of the manner in which the Committee has carried out the duties described in subsection (d)(1) and any relevant findings as a result of carrying out those duties;

“(G) if necessary, an update to the strategic plan developed by the Committee under subsection (d)(1)(C);

“(H) the progress made in achieving the goals set out in that strategic plan;

“(I) a review of the management, coordination, and industry utility of the program;

“(J) an assessment of the extent to which progress has been made under the program in developing commercial, cost-competitive technologies in each focus area described in section 454(c); and

“(K) an assessment of the effectiveness of the program in coordinating efforts within the Department and with other Federal agencies to achieve the purposes of the program.

“(g) REPORT TO CONGRESS.—Not later than 60 days after receiving a report from the Committee under subsection (f), the Secretary shall submit a copy of that report to the Committees on Appropriations and Science, Space, and Technology of the House of Representatives, the Committees on Appropriations and Energy and Natural Resources of the Senate, and any other relevant Committee of Congress.

“(h) APPLICABILITY OF FEDERAL ADVISORY COMMITTEE ACT.—Except as otherwise provided in this section, the Federal Advisory Committee Act (5 U.S.C. App.) shall apply to the Committee.”.

(b) TECHNICAL AMENDMENT.—The table of contents of the Energy Independence and Security Act of 2007 (Public Law 110–

140; 121 Stat. 1494) (as amended by section 6003(b)) is amended by inserting after the item relating to section 454 the following:

“Sec. 455. Industrial Technology Innovation Advisory Committee.”.

SEC. 6005. TECHNICAL ASSISTANCE PROGRAM TO IMPLEMENT INDUSTRIAL EMISSIONS REDUCTION.

(a) IN GENERAL.—Subtitle D of title IV of the Energy Independence and Security Act of 2007, as amended by section 6004, is amended by adding at the end the following:

“SEC. 456. TECHNICAL ASSISTANCE PROGRAM TO IMPLEMENT INDUSTRIAL EMISSIONS REDUCTION.

“(a) DEFINITIONS.—In this section:

“(1) ELIGIBLE ENTITY.—The term ‘eligible entity’ means—

“(A) a State;

“(B) a unit of local government;

“(C) a territory or possession of the United States;

“(D) a relevant State or local office, including an energy office;

“(E) a tribal organization (as defined in section 3765 of title 38, United States Code);

“(F) an institution of higher education; and

“(G) a private entity; and

“(H) a trade association or technical society.

“(2) EMISSIONS REDUCTION.—The term ‘emissions reduction’ has the meaning given the term in section 454(a).

“(3) PROGRAM.—The term ‘program’ means the program established under subsection (b).

“(b) ESTABLISHMENT.—Not later than 1 year after the date of enactment of the Energy Act of 2020, the Secretary shall establish a program to provide technical assistance to eligible entities to promote the commercial application of emission reduction technologies developed through the program established in section 454(b).

“(c) APPLICATIONS.—

“(1) IN GENERAL.—An eligible entity desiring technical assistance under the program shall submit to the Secretary an application at such time, in such manner, and containing such information as the Secretary may require.

“(2) APPLICATION PROCESS.—The Secretary shall seek applications for technical assistance under the program on a periodic basis, but not less frequently than once every 12 months.

“(3) FACTORS FOR CONSIDERATION.—In selecting eligible entities for technical assistance under the program, the Secretary shall, to the maximum extent practicable—

“(A) give priority to—

“(i) activities carried out with technical assistance under the program that have the greatest potential for achieving emissions reduction in nonpower industrial sectors;

“(ii) activities carried out in a State in which there are active or inactive industrial facilities that may be used or retrofitted to carry out activities under the focus areas described in section 454(c); and

“(iii) activities carried out in an economically distressed area (as described in section 301(a) of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3161(a))); and

“(B) ensure that—

“(i) there is geographic diversity among the eligible entities selected; and

“(ii) the activities carried out with technical assistance under the program reflect a majority of the focus areas described in section 454(c).”

(b) **TECHNICAL AMENDMENT.**—The table of contents of the Energy Independence and Security Act of 2007 (Public Law 110–140; 121 Stat. 1494) (as amended by section 6004(b)) is amended by inserting after the item relating to section 455 the following:

“Sec. 456. Technical assistance program to implement industrial emissions reduction.”

SEC. 6006. DEVELOPMENT OF NATIONAL SMART MANUFACTURING PLAN.

(a) **IN GENERAL.**—Not later than 3 years after the date of enactment of this Act, the Secretary of Energy (in this section referred to as the “Secretary”), in consultation with the National Academies, shall develop and complete a national plan for smart manufacturing technology development and deployment to improve the productivity and energy efficiency of the manufacturing sector of the United States.

(b) **CONTENT.**—

(1) **IN GENERAL.**—The plan developed under subsection (a) shall identify areas in which agency actions by the Secretary and other heads of relevant Federal agencies would—

(A) facilitate quicker development, deployment, and adoption of smart manufacturing technologies and processes;

(B) result in greater energy efficiency and lower environmental impacts for all American manufacturers; and

(C) enhance competitiveness and strengthen the manufacturing sectors of the United States.

(2) **INCLUSIONS.**—Agency actions identified under paragraph (1) shall include—

(A) an assessment of previous and current actions of the Department relating to smart manufacturing;

(B) the establishment of voluntary interconnection protocols and performance standards;

(C) the use of smart manufacturing to improve energy efficiency and reduce emissions in supply chains across multiple companies;

(D) actions to increase cybersecurity in smart manufacturing infrastructure;

(E) deployment of existing research results;

(F) the leveraging of existing high-performance computing infrastructure; and

(G) consideration of the impact of smart manufacturing on existing manufacturing jobs and future manufacturing jobs.

(c) BIENNIAL REVISIONS.—Not later than 2 years after the date on which the Secretary completes the plan under subsection (a), and not less frequently than once every 2 years thereafter, the Secretary shall revise the plan to account for advancements in information and communication technology and manufacturing needs.

(d) REPORT.—Annually until the completion of the plan under subsection (a), the Secretary shall submit to Congress a report on the progress made in developing the plan.

(e) DEFINITION.—In this section, the term “smart manufacturing” means advanced technologies in information, automation, monitoring, computation, sensing, modeling, artificial intelligence, analytics, and networking that—

- (1) digitally—
 - (A) simulate manufacturing production lines;
 - (B) operate computer-controlled manufacturing equipment;
 - (C) monitor and communicate production line status;and
 - (D) manage and optimize energy productivity and cost throughout production;
- (2) model, simulate, and optimize the energy efficiency of a factory building;
- (3) monitor and optimize building energy performance;
- (4) model, simulate, and optimize the design of energy efficient and sustainable products, including the use of digital prototyping and additive manufacturing to enhance product design;
- (5) connect manufactured products in networks to monitor and optimize the performance of the networks, including automated network operations; and
- (6) digitally connect the supply chain network.

TITLE VII—CRITICAL MINERALS

SEC. 7001. RARE EARTH ELEMENTS.

(a) RESEARCH PROGRAM.—

(1) IN GENERAL.—The Secretary of Energy, acting through the Assistant Secretary for Fossil Energy (referred to in this section as the “Secretary”), shall conduct a program of research and development—

(A) to develop and assess advanced separation technologies for the extraction and recovery of rare earth elements and other critical materials from coal and coal byproducts; and

(B) to determine if there are, and mitigate, any potential environmental or public health impacts that could arise from the recovery of rare earth elements from coal-based resources.

(2) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out the program described in paragraph (1)—

- (A) \$23,000,000 for each of fiscal years 2021 and 2022;
- (B) \$24,200,000 for fiscal year 2023;
- (C) \$25,400,000 for fiscal year 2024;
- (D) \$26,600,000 for fiscal year 2025; and

(E) \$27,800,000 for fiscal year 2026.

(b) REPORT.—Not later than 1 year after the date of enactment of this Act, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committees on Science, Space, and Technology and Energy and Commerce of the House of Representatives a report evaluating the development of advanced separation technologies for the extraction and recovery of rare earth elements and other critical materials from coal and coal byproducts, including acid mine drainage from coal mines.

(c) CRITICAL MATERIAL.—In this section, the term “critical material” has the meaning given the term in section 7002 of this Act.

SEC. 7002. MINERAL SECURITY.

(a) DEFINITIONS.—In this section:

(1) BYPRODUCT.—The term “byproduct” means a critical mineral—

(A) the recovery of which depends on the production of a host mineral that is not designated as a critical mineral; and

(B) that exists in sufficient quantities to be recovered during processing or refining.

(2) CRITICAL MATERIAL.—The term “critical material” means—

(A) any non-fuel mineral, element, substance, or material that the Secretary of Energy determines—

(i) has a high risk of a supply chain disruption; and

(ii) serves an essential function in 1 or more energy technologies, including technologies that produce, transmit, store, and conserve energy; or

(B) a critical mineral.

(3) CRITICAL MINERAL.—

(A) IN GENERAL.—The term “critical mineral” means any mineral, element, substance, or material designated as critical by the Secretary under subsection (c).

(B) EXCLUSIONS.—The term “critical mineral” does not include—

(i) fuel minerals;

(ii) water, ice, or snow;

(iii) common varieties of sand, gravel, stone, pumice, cinders, and clay.

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

(5) SECRETARY.—The term “Secretary” means the Secretary of the Interior.

(6) STATE.—The term “State” means—

(A) a State;

(B) the District of Columbia;

(C) the Commonwealth of Puerto Rico;

(D) Guam;

(E) American Samoa;

(F) the Commonwealth of the Northern Mariana Islands; and

(G) the United States Virgin Islands.

(7) INSTITUTION OF HIGHER EDUCATION.—The term “institution of higher education” means—

(A) an institution of higher education (as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a))); or

(B) a postsecondary vocational institution (as defined in section 102(c) of the Higher Education Act of 1965 (20 U.S.C. 1002(c))).

(b) POLICY.—

(1) IN GENERAL.—Section 3 of the National Materials and Minerals Policy, Research and Development Act of 1980 (30 U.S.C. 1602) is amended—

(A) by striking paragraph (3) and inserting the following:

“(3) establish an analytical and forecasting capability for identifying critical mineral demand, supply, and other factors to allow informed actions to be taken to avoid supply shortages, mitigate price volatility, and prepare for demand growth and other market shifts;”;

(B) in paragraph (6), by striking “and” after the semicolon at the end; and

(C) by striking paragraph (7) and inserting the following:

“(7) facilitate the availability, development, and environmentally responsible production of domestic resources to meet national material or critical mineral needs;

“(8) avoid duplication of effort, prevent unnecessary paperwork, and minimize delays in the administration of applicable laws (including regulations) and the issuance of permits and authorizations necessary to explore for, develop, and produce critical minerals and to construct critical mineral manufacturing facilities in accordance with applicable environmental and land management laws;

“(9) strengthen—

“(A) educational and research capabilities at not lower than the secondary school level; and

“(B) workforce training for exploration and development of critical minerals and critical mineral manufacturing;

“(10) bolster international cooperation through technology transfer, information sharing, and other means;

“(11) promote the efficient production, use, and recycling of critical minerals;

“(12) develop alternatives to critical minerals; and

“(13) establish contingencies for the production of, or access to, critical minerals for which viable sources do not exist within the United States.”.

(2) CONFORMING AMENDMENT.—Section 2(b) of the National Materials and Minerals Policy, Research and Development Act of 1980 (30 U.S.C. 1601(b)) is amended by striking “(b) As used in this Act, the term” and inserting the following:

“(b) DEFINITIONS.—In this Act:

“(1) CRITICAL MINERAL.—The term ‘critical mineral’ means any mineral, element, substance, or material designated as critical by the Secretary under section 7002(c) of the Energy Act of 2020.

“(2) MATERIALS.—The term”.

(c) CRITICAL MINERAL DESIGNATIONS.—

(1) DRAFT METHODOLOGY AND LIST.—The Secretary, acting through the Director of the United States Geological Survey (referred to in this subsection as the “Secretary”), shall publish in the Federal Register for public comment—

(A) a description of the draft methodology used to identify a draft list of critical minerals;

(B) a draft list of minerals, elements, substances, and materials that qualify as critical minerals; and

(C) a draft list of critical minerals recovered as byproducts and their host minerals.

(2) AVAILABILITY OF DATA.—If available data is insufficient to provide a quantitative basis for the methodology developed under this subsection, qualitative evidence may be used to the extent necessary.

(3) FINAL METHODOLOGY AND LIST.—After reviewing public comments on the draft methodology and the draft lists published under paragraph (1) and updating the methodology and lists as appropriate, not later than 45 days after the date on which the public comment period with respect to the draft methodology and draft lists closes, the Secretary shall publish in the Federal Register—

(A) a description of the final methodology for determining which minerals, elements, substances, and materials qualify as critical minerals;

(B) the final list of critical minerals; and

(C) the final list of critical minerals recovered as byproducts and their host minerals.

(4) DESIGNATIONS.—

(A) IN GENERAL.—For purposes of carrying out this subsection, the Secretary shall maintain a list of minerals, elements, substances, and materials designated as critical, pursuant to the final methodology published under paragraph (3), that the Secretary determines—

(i) are essential to the economic or national security of the United States;

(ii) the supply chain of which is vulnerable to disruption (including restrictions associated with foreign political risk, abrupt demand growth, military conflict, violent unrest, anti-competitive or protectionist behaviors, and other risks throughout the supply chain); and

(iii) serve an essential function in the manufacturing of a product (including energy technology-, defense-, currency-, agriculture-, consumer electronics-, and health care-related applications), the absence of which would have significant consequences for the economic or national security of the United States.

(B) INCLUSIONS.—Notwithstanding the criteria under paragraph (3), the Secretary may designate and include on the list any mineral, element, substance, or material determined by another Federal agency to be strategic and critical to the defense or national security of the United States.

(C) REQUIRED CONSULTATION.—The Secretary shall consult with the Secretaries of Defense, Commerce, Agriculture, and Energy and the United States Trade Representative in designating minerals, elements, substances, and materials as critical under this paragraph.

(5) SUBSEQUENT REVIEW.—

(A) IN GENERAL.—The Secretary, in consultation with the Secretaries of Defense, Commerce, Agriculture, and Energy and the United States Trade Representative, shall review the methodology and list under paragraph (3) and the designations under paragraph (4) at least every 3 years, or more frequently as the Secretary considers to be appropriate.

(B) REVISIONS.—Subject to paragraph (4)(A), the Secretary may—

(i) revise the methodology described in this subsection;

(ii) determine that minerals, elements, substances, and materials previously determined to be critical minerals are no longer critical minerals; and

(iii) designate additional minerals, elements, substances, or materials as critical minerals.

(6) NOTICE.—On finalization of the methodology and the list under paragraph (3), or any revision to the methodology or list under paragraph (5), the Secretary shall submit to Congress written notice of the action.

(d) RESOURCE ASSESSMENT.—

(1) IN GENERAL.—Not later than 4 years after the date of enactment of this Act, in consultation with applicable State (including geological surveys), local, academic, industry, and other entities, the Secretary (acting through the Director of the United States Geological Survey) or a designee of the Secretary, shall complete a comprehensive national assessment of each critical mineral that—

(A) identifies and quantifies known critical mineral resources, using all available public and private information and datasets, including exploration histories; and

(B) provides a quantitative and qualitative assessment of undiscovered critical mineral resources throughout the United States, including probability estimates of tonnage and grade, using all available public and private information and datasets, including exploration histories.

(2) SUPPLEMENTARY INFORMATION.—In carrying out this subsection, the Secretary may carry out surveys and field work (including drilling, remote sensing, geophysical surveys, topographical and geological mapping, and geochemical sampling and analysis) to supplement existing information and datasets available for determining the existence of critical minerals in the United States.

(3) PUBLIC ACCESS.—Subject to applicable law, to the maximum extent practicable, the Secretary shall make all data and metadata collected from the comprehensive national assessment carried out under paragraph (1) publically and electronically accessible.

(4) TECHNICAL ASSISTANCE.—At the request of the Governor of a State or the head of an Indian Tribe, the Secretary may provide technical assistance to State governments and Indian

Tribes conducting critical mineral resource assessments on non-Federal land.

(5) PRIORITIZATION.—

(A) IN GENERAL.—The Secretary may sequence the completion of resource assessments for each critical mineral such that critical minerals considered to be most critical under the methodology established under subsection (c) are completed first.

(B) REPORTING.—During the period beginning not later than 1 year after the date of enactment of this Act and ending on the date of completion of all of the assessments required under this subsection, the Secretary shall submit to Congress on an annual basis an interim report that—

(i) identifies the sequence and schedule for completion of the assessments if the Secretary sequences the assessments; or

(ii) describes the progress of the assessments if the Secretary does not sequence the assessments.

(6) UPDATES.—The Secretary may periodically update the assessments conducted under this subsection based on—

(A) the generation of new information or datasets by the Federal Government; or

(B) the receipt of new information or datasets from critical mineral producers, State geological surveys, academic institutions, trade associations, or other persons.

(7) ADDITIONAL SURVEYS.—The Secretary shall complete a resource assessment for each additional mineral or element subsequently designated as a critical mineral under subsection (c)(5)(B) not later than 2 years after the designation of the mineral or element.

(8) REPORT.—Not later than 2 years after the date of enactment of this Act, the Secretary shall submit to Congress a report describing the status of geological surveying of Federal land for any mineral commodity—

(A) for which the United States was dependent on a foreign country for more than 25 percent of the United States supply, as depicted in the report issued by the United States Geological Survey entitled “Mineral Commodity Summaries 2021”; but

(B) that is not designated as a critical mineral under subsection (c).

(e) REPORT OF SMALL BUSINESS ADMINISTRATION.—Not later than 1 year and 300 days after the date of enactment of this Act, the Administrator of the Small Business Administration shall submit to the applicable committees of Congress a report that assesses the performance of Federal agencies with respect to—

(1) complying with chapter 6 of title 5, United States Code (commonly known as the “Regulatory Flexibility Act”), in promulgating regulations applicable to the critical minerals industry; and

(2) performing an analysis of the efficiency of regulations applicable to the critical minerals industry, including those that are disproportionately burdensome to small businesses.

(f) FEDERAL REGISTER PROCESS.—

(1) DEPARTMENTAL REVIEW.—Absent any extraordinary circumstance, and except as otherwise required by law, the Secretary and the Secretary of Agriculture shall ensure that each Federal Register notice described in paragraph (2) shall be—

(A) subject to any required reviews within the Department of the Interior or the Department of Agriculture; and

(B) published in final form in the Federal Register not later than 45 days after the date of initial preparation of the notice.

(2) PREPARATION.—The preparation of Federal Register notices required by law associated with the issuance of a critical mineral exploration or mine permit shall be delegated to the organizational level within the agency responsible for issuing the critical mineral exploration or mine permit.

(3) TRANSMISSION.—All Federal Register notices regarding official document availability, announcements of meetings, or notices of intent to undertake an action shall be originated in, and transmitted to the Federal Register from, the office in which, as applicable—

(A) the documents or meetings are held; or

(B) the activity is initiated.

(4) APPLICATION OF CERTAIN PROVISIONS.—

(A) IN GENERAL.—Subsection (f) shall also apply to—

(i) an exploration project in which the presence of a byproduct is reasonably expected, based on known mineral companionship, geologic formation, mineralogy, or other factors; and

(ii) a project that demonstrates that a byproduct is of sufficient grade that, when combined with the production of a host mineral, the byproduct is economic to recover, as determined by the applicable Secretary in accordance with subparagraph (B), and that the byproduct will be recovered in commercial quantities.

(B) REQUIREMENT.—In making the determination under subparagraph (A)(ii), the applicable Secretary shall consider the cost effectiveness of the byproducts recovery.

(g) RECYCLING, INNOVATION, EFFICIENCY, AND ALTERNATIVES.—

(1) ESTABLISHMENT.—The Secretary of Energy (referred to in this subsection as the “Secretary”) shall conduct a program (referred to in this subsection as the “program”) of research, development, demonstration, and commercialization—

(A) to develop alternatives to critical materials that do not occur in significant abundance in the United States;

(B) to promote the efficient production, use, and recycling of critical materials, with special consideration for domestic critical materials, throughout the supply chain;

(C) to ensure the long-term, secure, and sustainable supply of critical materials; and

(D) to prioritize work in areas that the private sector by itself is not likely to undertake due to financial or technical limitations.

(2) COOPERATION.—In carrying out the program, the Secretary shall cooperate with appropriate—

(A) Federal agencies, including the Department of the Interior;

(B) the National Laboratories;

(C) critical material producers, processors, and manufacturers;

(D) trade associations;

(E) academic institutions (including students and postdoctoral staff at institutions of higher education);

(F) small businesses;

(G) nongovernmental organizations; and

(H) other relevant entities or individuals.

(3) ENERGY INNOVATION HUB.—In carrying out the program, the Secretary may use an Energy Innovation Hub authorized under section 206 of the Department of Energy Research Coordination Act (42 U.S.C. 18632).

(4) ACTIVITIES.—Under the program, the Secretary shall carry out activities that include the identification and development of—

(A) alternative materials, particularly materials available in abundance within the United States and not subject to potential supply restrictions, that lessen the need for critical materials;

(B) alternative energy technologies or alternative designs of existing energy technologies, particularly technologies or designs that use materials that—

(i) occur in abundance in the United States; and

(ii) are not subject to potential supply restrictions;

(C) technologies or process improvements that minimize the use and content, or lead to more efficient use, of critical materials across the full supply chain;

(D) innovative technologies and practices to diversify commercially viable and sustainable domestic sources of critical materials, including technologies for recovery from waste streams;

(E) technologies, process improvements, or design optimizations that facilitate the recycling of critical materials, and options for improving the rates of collection of products and scrap containing critical materials from post-consumer, industrial, or other waste streams;

(F) advanced critical material extraction, production, separation, alloying, or processing technologies that decrease the energy consumption, environmental impact, and costs of those activities, including—

(i) efficient water and wastewater management strategies;

(ii) technologies and management strategies to control the environmental impacts of radionuclides in ore tailings;

(iii) technologies for separation and processing; and

(iv) technologies for increasing the recovery rates of coproducts and byproducts from host metal ores;

(G) commercial markets, advanced storage methods, energy applications, and other beneficial uses of critical materials; and

(H) advanced theoretical, computational, and experimental tools necessary to support the crosscutting research and development needs of diverse critical minerals stakeholders.

(5) PLAN.—

(A) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Secretary shall submit to Congress a plan to carry out the program.

(B) INCLUSIONS.—The plan under subparagraph (A) shall include a description of—

(i) the research and development activities to be carried out under the program during the subsequent 2 years;

(ii) the expected contributions under the program to the creation of innovative methods and technologies for the efficient and sustainable provision of critical materials to the domestic economy;

(iii) the expected activities under the program to mitigate the environmental and health impacts of the extraction, processing, manufacturing, use, recovery, and recycling of critical materials; and

(iv) how the program will promote the broadest possible participation by academic, industrial, and other contributors and the public.

(6) COORDINATION AND NONDUPLICATION.—To the maximum extent practicable, the Secretary shall ensure that the activities carried out under this subsection are coordinated with, and do not duplicate the efforts of, other programs within the Federal Government, including the work underway by the Critical Materials Institute and the National Minerals Information Center.

(7) STANDARD OF REVIEW.—Not later than 2 years after the date of enactment of this Act, the Secretary shall conduct a review of activities carried out under the program to determine the achievement of the technical milestones identified under paragraph (8)(D)(i)(I).

(8) CRITICAL MATERIALS CONSORTIUM.—

(A) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Secretary shall establish and operate a Critical Materials Consortium (referred to in this paragraph as the “Consortium”) for the purpose of supporting the program by providing, to the maximum extent practicable, a centralized entity for multidisciplinary, collaborative, critical materials research and development.

(B) LEADERSHIP.—If an Energy Innovation Hub authorized under section 206 of the Department of Energy Research Coordination Act (42 U.S.C. 18632) that is focused on critical materials exists on the date of enactment of this Act, the Secretary shall leverage the personnel and expertise of the Energy Innovation Hub to manage the Consortium for not less than 3 years following the date on which the Consortium is established.

(C) MEMBERSHIP.—The members of the Consortium shall be representatives from relevant Federal agencies, the National Laboratories, the National Minerals Information Center, institutions of higher education, private sector entities, multiinstitutional collaborations, and other appropriate entities.

(D) RESPONSIBILITIES.—The Consortium shall—

(i) develop and implement a multiyear plan that—

(I) identifies technical goals and milestones for the program;

(II) utilizes the high performance computing capabilities of the Department; and

(III) leverages the expertise of the National Laboratories and the United States Geological Survey; and

(ii) submit an annual report to the Secretary summarizing the activities of the Consortium, including an evaluation of the role of the Consortium in the achievement of the technical milestones identified under clause (i)(I).

(E) SUNSET; TERMINATION.—

(i) IN GENERAL.—The Secretary may provide support to the Consortium for a period of not more than 10 years, subject to the availability of appropriations.

(ii) MERIT REVIEW.—Not later than 5 years after the date on which the Consortium is established, the Secretary shall conduct a rigorous merit review to determine whether the Consortium helped the program achieve the technical milestones identified under subparagraph (D)(i)(I).

(iii) TERMINATION.—If the Secretary determines that the Consortium has not helped the program achieve the technical milestones identified under subparagraph (D)(i)(I), the Secretary may terminate any financial or technical support that the Department provides to the Consortium.

(9) REPORTS.—Not later than 2 years after the date of enactment of this Act, and annually thereafter, the Secretary shall submit to Congress a report summarizing the activities, findings, and progress of the program.

(10) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this subsection—

(A) \$125,000,000 for fiscal year 2021;

(B) \$105,000,000 for fiscal year 2022;

(C) \$100,000,000 for fiscal year 2023;

(D) \$135,000,000 for fiscal year 2024; and

(E) \$135,000,000 for fiscal year 2025.

(h) CRITICAL MATERIALS SUPPLY CHAIN RESEARCH FACILITY.—

(1) IN GENERAL.—The Secretary of Energy (referred to in this subsection as the “Secretary”) shall support construction of a Critical Materials Supply Chain Research Facility (referred to in this subsection as the “facility”).

(2) REQUIREMENTS.—The facility—

(A) shall be used to further enable research, development, demonstration, and commercialization activities throughout the supply chain for critical materials; and

(B) shall provide an integrated, rapidly reconfigurable research platform.

(3) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to fund the design and construction of the facility, to remain available until expended—

(A) \$10,000,000 for fiscal year 2021;

(B) \$30,000,000 for fiscal year 2022; and

(C) \$35,000,000 for fiscal year 2023.

(i) CRITICAL MATERIALS RESEARCH DATABASE AND INFORMATION PORTAL.—

(1) IN GENERAL.—In carrying out the program established under subsection (g)(1), the Secretary and the Secretary of Energy (referred to in this subsection as the “Secretaries”), in consultation with the Director of the National Science Foundation, shall establish and operate a Critical Materials Information Portal (referred to in this subsection as the “Portal”) to collect, catalogue, disseminate, and archive information on critical materials.

(2) COOPERATION.—In carrying out paragraph (1), the Secretaries shall leverage the expertise of the National Minerals Information Center, the Office of Scientific and Technical Information, and the Critical Materials Consortium established under subsection (g)(8)(A).

(3) PURPOSE.—The purpose of the Portal is to support the development of a web-based platform to provide public access to a database of computed information on known and predicted critical materials and related material properties and computational tools in order—

(A) to accelerate breakthroughs in critical materials identification and design;

(B) to strengthen the foundation for technologies that will enable more sustainable recycling, substitution, use, and recovery and minimize the environmental impacts of methods for extraction, processing, and manufacturing of critical materials; and

(C) to drive the development of advanced materials for applications that span the missions of the Department of Energy and the Department of the Interior (referred to in this subsection as the “Departments”) in energy, environment, and national security.

(4) ACTIVITIES.—In carrying out this subsection, the Secretaries shall—

(A) conduct cooperative research with industry, academia, and other research institutions to facilitate the design of novel materials, including critical materials and substitutes for critical materials;

(B) leverage existing high-performance computing systems to conduct high throughput calculations and develop computing and data mining algorithms for the prediction of material properties, including a focus on critical materials;

(C) leverage and support research in mineralogy and mineral chemistry to enhance the understanding, prediction, and manipulation of critical materials;

(D) assist scientists and engineers in making the fullest possible use of the relevant data holdings of the Departments, including the scientific and technical data generated by the research and development activities funded under subsection (g);

(E) seek and incorporate other information on critical materials to enhance the Departments’ utility for program participants and other users; and

(F) manage and make available to researchers and the public accessible, curated, standardized, secure, and

privacy-protected data sets from the public and private sectors for the purposes of critical materials research and development activities.

(5) PROPRIETARY INFORMATION.—In carrying out this subsection, the Secretaries shall ensure, consistent with section 5(f) of the National Materials and Minerals Policy, Research and Development Act of 1980 (30 U.S.C. 1604(f)), that—

(A) no person uses the information and data collected for the Portal for a purpose other than the development of, or reporting of, aggregate data in a manner such that the identity of the person or firm who supplied the information is not discernible and is not material to the intended uses of the information;

(B) no person discloses any information or data collected for the Portal unless the information or data has been transformed into a statistical or aggregate form that does not allow the identification of the person or firm who supplied particular information; and

(C) procedures are established to require the withholding of any information or data collected for the Portal if at least 1 of the Secretaries determines that the withholding is necessary to protect proprietary information, including any trade secrets or other confidential information.

(j) ANALYSIS AND FORECASTING.—

(1) CAPABILITIES.—In order to evaluate existing critical mineral policies and inform future actions that may be taken to avoid supply shortages, mitigate price volatility, and prepare for demand growth and other market shifts, the Secretary (acting through the Director of the United States Geological Survey) or a designee of the Secretary, in consultation with the Energy Information Administration, academic institutions, and others in order to maximize the application of existing competencies related to developing and maintaining computer-models and similar analytical tools, shall conduct and publish the results of an annual report that includes—

(A) as part of the annually published Mineral Commodity Summaries from the United States Geological Survey, a comprehensive review of critical mineral production, consumption, and recycling patterns, including—

(i) the quantity of each critical mineral domestically produced during the preceding year;

(ii) the quantity of each critical mineral domestically consumed during the preceding year;

(iii) market price data or other price data for each critical mineral;

(iv) an assessment of—

(I) critical mineral requirements to meet the national security, energy, economic, industrial, technological, and other needs of the United States during the preceding year;

(II) the reliance of the United States on foreign sources to meet those needs during the preceding year; and

(III) the implications of any supply shortages, restrictions, or disruptions during the preceding year;

(v) the quantity of each critical mineral domestically recycled during the preceding year;

(vi) the market penetration during the preceding year of alternatives to each critical mineral;

(vii) a discussion of international trends associated with the discovery, production, consumption, use, costs of production, prices, and recycling of each critical mineral as well as the development of alternatives to critical minerals; and

(viii) such other data, analyses, and evaluations as the Secretary finds are necessary to achieve the purposes of this subsection; and

(B) a comprehensive forecast, entitled the "Annual Critical Minerals Outlook", of projected critical mineral production, consumption, and recycling patterns, including—

(i) the quantity of each critical mineral projected to be domestically produced over the subsequent 1-year, 5-year, and 10-year periods;

(ii) the quantity of each critical mineral projected to be domestically consumed over the subsequent 1-year, 5-year, and 10-year periods;

(iii) an assessment of—

(I) critical mineral requirements to meet projected national security, energy, economic, industrial, technological, and other needs of the United States;

(II) the projected reliance of the United States on foreign sources to meet those needs; and

(III) the projected implications of potential supply shortages, restrictions, or disruptions;

(iv) the quantity of each critical mineral projected to be domestically recycled over the subsequent 1-year, 5-year, and 10-year periods;

(v) the market penetration of alternatives to each critical mineral projected to take place over the subsequent 1-year, 5-year, and 10-year periods;

(vi) a discussion of reasonably foreseeable international trends associated with the discovery, production, consumption, use, costs of production, and recycling of each critical mineral as well as the development of alternatives to critical minerals; and

(vii) such other projections relating to each critical mineral as the Secretary determines to be necessary to achieve the purposes of this subsection.

(2) PROPRIETARY INFORMATION.—In preparing a report described in paragraph (1), the Secretary shall ensure, consistent with section 5(f) of the National Materials and Minerals Policy, Research and Development Act of 1980 (30 U.S.C. 1604(f)), that—

(A) no person uses the information and data collected for the report for a purpose other than the development of or reporting of aggregate data in a manner such that the identity of the person or firm who supplied the information is not discernible and is not material to the intended uses of the information;

(B) no person discloses any information or data collected for the report unless the information or data has

been transformed into a statistical or aggregate form that does not allow the identification of the person or firm who supplied particular information; and

(C) procedures are established to require the withholding of any information or data collected for the report if the Secretary determines that withholding is necessary to protect proprietary information, including any trade secrets or other confidential information.

(k) EDUCATION AND WORKFORCE.—

(1) WORKFORCE ASSESSMENT.—Not later than 1 year and 300 days after the date of enactment of this Act, the Secretary of Labor (in consultation with the Secretary, the Director of the National Science Foundation, institutions of higher education with substantial expertise in mining, institutions of higher education with significant expertise in minerals research, including fundamental research into alternatives, and employers in the critical minerals sector) shall submit to Congress an assessment of the domestic availability of technically trained personnel necessary for critical mineral exploration, development, assessment, production, manufacturing, recycling, analysis, forecasting, education, and research, including an analysis of—

(A) skills that are in the shortest supply as of the date of the assessment;

(B) skills that are projected to be in short supply in the future;

(C) the demographics of the critical minerals industry and how the demographics will evolve under the influence of factors such as an aging workforce;

(D) the effectiveness of training and education programs in addressing skills shortages;

(E) opportunities to hire locally for new and existing critical mineral activities;

(F) the sufficiency of personnel within relevant areas of the Federal Government for achieving the policies described in section 3 of the National Materials and Minerals Policy, Research and Development Act of 1980 (30 U.S.C. 1602); and

(G) the potential need for new training programs to have a measurable effect on the supply of trained workers in the critical minerals industry.

(2) CURRICULUM STUDY.—

(A) IN GENERAL.—The Secretary and the Secretary of Labor shall jointly enter into an arrangement with the National Academy of Sciences and the National Academy of Engineering under which the Academies shall coordinate with the National Science Foundation on conducting a study—

(i) to design an interdisciplinary program on critical minerals that will support the critical mineral supply chain and improve the ability of the United States to increase domestic, critical mineral exploration, development, production, manufacturing, research, including fundamental research into alternatives, and recycling;

(ii) to address undergraduate and graduate education, especially to assist in the development of graduate level programs of research and instruction that lead to advanced degrees with an emphasis on the critical mineral supply chain or other positions that will increase domestic, critical mineral exploration, development, production, manufacturing, research, including fundamental research into alternatives, and recycling;

(iii) to develop guidelines for proposals from institutions of higher education with substantial capabilities in the required disciplines for activities to improve the critical mineral supply chain and advance the capacity of the United States to increase domestic, critical mineral exploration, research, development, production, manufacturing, and recycling; and

(iv) to outline criteria for evaluating performance and recommendations for the amount of funding that will be necessary to establish and carry out the program described in paragraph (3).

(B) REPORT.—Not later than 2 years after the date of enactment of this Act, the Secretary shall submit to Congress a description of the results of the study required under subparagraph (A).

(3) PROGRAM.—

(A) ESTABLISHMENT.—The Secretary and the Secretary of Labor shall jointly conduct a competitive grant program under which institutions of higher education may apply for and receive 4-year grants for—

(i) startup costs for newly designated faculty positions in integrated critical mineral education, research, innovation, training, and workforce development programs consistent with paragraph (2);

(ii) internships, scholarships, and fellowships for students enrolled in programs related to critical minerals;

(iii) equipment necessary for integrated critical mineral innovation, training, and workforce development programs; and

(iv) research of critical minerals and their applications, particularly concerning the manufacture of critical components vital to national security.

(B) RENEWAL.—A grant under this paragraph shall be renewable for up to 2 additional 3-year terms based on performance criteria outlined under paragraph (2)(A)(iv).

(I) NATIONAL GEOLOGICAL AND GEOPHYSICAL DATA PRESERVATION PROGRAM.—Section 351(k) of the Energy Policy Act of 2005 (42 U.S.C. 15908(k)) is amended by striking “\$30,000,000 for each of fiscal years 2006 through 2010” and inserting “\$5,000,000 for each of fiscal years 2021 through 2029, to remain available until expended”.

(m) AMENDMENTS TO THE NATIONAL MATERIALS AND MINERALS, POLICY, RESEARCH AND DEVELOPMENT ACT OF 1980.—

(1) PROGRAM PLAN.—Section 5 of the National Materials and Minerals Policy, Research and Development Act of 1980 (30 U.S.C. 1604) is amended—

(A) by striking “date of enactment of this Act” each place it appears and inserting “date of enactment of the Energy Act of 2020”;

(B) in subsection (b)(1), by striking “Federal Coordinating Council for Science, Engineering, and Technology” and inserting “National Science and Technology Council”;

(C) in subsection (c)—

(i) in the matter preceding paragraph (1)—

(I) by striking “the Federal Emergency” and all that follows through “Agency, and”; and

(II) by striking “appropriate shall” and inserting “appropriate, shall”;

(ii) by striking paragraphs (1) and (3);

(iii) by redesignating paragraph (2) as paragraph

(1);

(iv) in paragraph (1) (as so redesignated)—

(I) by striking “within 1 year after October 21, 1980” and inserting “not later than 1 year after the date of the enactment of the Energy Act of 2020”;

(II) by striking “which assesses” and inserting “that assesses”; and

(III) by striking “in the case” and all that follows through “subsection, and which” and inserting “and that”; and

(v) by adding at the end the following:

“(2) assess the adequacy and stability of the supply of materials necessary to maintain national security, economic well-being, public health, and industrial production.”; and

(D) in subsection (e), by striking “Bureau of Mines” each place it appears and inserting “United States Geological Survey”.

(2) POLICY.—Section 3 of the National Materials and Minerals Policy, Research and Development Act of 1980 (30 U.S.C. 1602) is amended, in the matter preceding paragraph (1)—

(A) in the first sentence, by striking “The Congress declares that it” and inserting “It”; and

(B) in the second sentence, by striking “The Congress further declares that implementation” and inserting “Implementation”.

(3) IMPLEMENTATION.—Section 4 of the National Materials and Minerals Policy, Research and Development Act of 1980 (30 U.S.C. 1603) is amended, in the matter preceding paragraph (1)—

(A) by striking “For the purpose” and all that follows through “declares that the” and inserting “The”; and

(B) by striking “departments and agencies,” and inserting “departments and agencies to implement the policy described in section 3”.

(n) ADMINISTRATION.—

(1) IN GENERAL.—The National Critical Materials Act of 1984 (30 U.S.C. 1801 et seq.) is repealed.

(2) CONFORMING AMENDMENT.—Section 3(d) of the National Superconductivity and Competitiveness Act of 1988 (15 U.S.C. 5202(d)) is amended in the first sentence by striking “, with the assistance of the National Critical Materials Council as

specified in the National Critical Materials Act of 1984 (30 U.S.C. 1801 et seq.),”.

(3) SAVINGS CLAUSES.—

(A) IN GENERAL.—Nothing in this section or an amendment made by this section modifies any requirement or authority provided by—

(i) the matter under the heading “geological survey” of the first section of the Act of March 3, 1879 (43 U.S.C. 31(a)); or

(ii) the first section of Public Law 87–626 (43 U.S.C. 31(b)).

(B) EFFECT ON DEPARTMENT OF DEFENSE.—Nothing in this section or an amendment made by this section affects the authority of the Secretary of Defense with respect to the work of the Department of Defense on critical material supplies in furtherance of the national defense mission of the Department of Defense.

(C) SECRETARIAL ORDER NOT AFFECTED.—This section shall not apply to any mineral described in Secretarial Order No. 3324, issued by the Secretary on December 3, 2012, in any area to which the order applies.

(o) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out this section \$50,000,000 for each of fiscal years 2021 through 2029.

SEC. 7003. MONITORING MINERAL INVESTMENTS UNDER BELT AND ROAD INITIATIVE OF PEOPLE’S REPUBLIC OF CHINA.

(a) REPORT REQUIRED.—Not later than 1 year after the date of the enactment of this Act, the Director of National Intelligence (referred to in this section as the “Director”), in consultation with the Secretary of the Interior, the Secretary of Energy, the Secretary of Commerce, the Secretary of State, the Secretary of Defense, and the United States Trade Representative, shall submit to the appropriate congressional committees a report on investments in minerals under the Belt and Road Initiative of the People’s Republic of China that includes an assessment of—

(1) notable past mineral investments;

(2) whether and how such investments have increased the extent of control of minerals by the People’s Republic of China;

(3) any efforts by the People’s Republic of China to counter or interfere with the goals of the Energy Resource Governance Initiative of the Department of State; and

(4) the strategy of the People’s Republic of China with respect to mineral investments.

(b) MONITORING MECHANISM.—In conjunction with each report required by subsection (a), the Director shall submit to the appropriate congressional committees a list of any minerals with respect to which—

(1) the People’s Republic of China, directly or through the Belt and Road Initiative—

(A) is increasing its concentration of extraction and processing;

(B) is acquiring significant mining and processing facilities;

(C) is maintaining or increasing export restrictions;

or

(D) has achieved substantial control of the supply of minerals used within an industry or related minerals;

(2) there is a significant difference between domestic prices in the People's Republic of China as compared to prices on international markets; or

(3) there is a significant increase or volatility in price as a result of the Belt and Road Initiative of the People's Republic of China.

(c) CRITICAL MINERAL EVALUATION.—For any mineral included on the list required by subsection (b) that is not already designated as critical by the Secretary of the Interior pursuant to section 7002(c), the Director shall—

(1) determine, in consultation with the Secretary of the Interior, the Secretary of Energy, the Secretary of Commerce, the Secretary of State, the Secretary of Defense, and the United States Trade Representative, whether the mineral is strategic and critical to the defense or national security of the United States; and

(2) make a recommendation to the Secretary of the Interior regarding the designation of the mineral under section 7002(c).

(d) ANNUAL UPDATES.—The Director shall update the report required by subsection (a) and list required by subsection (b) not less frequently than annually.

(e) FORM.—Each report or list required by this section shall be submitted in unclassified form but may include a classified annex.

(f) APPROPRIATE CONGRESSIONAL COMMITTEES DEFINED.—In this section, the term “appropriate congressional committees” means—

(1) the Committee on Energy and Natural Resources, the Committee on Foreign Relations, the Committee on Armed Services, the Committee on Finance, the Committee on Homeland Security and Governmental Affairs, the Committee on Commerce, Science, and Transportation, and the Committee on Appropriations of the Senate; and

(2) the Committee on Energy and Commerce, the Committee on Foreign Affairs, the Committee on Armed Services, the Committee on Ways and Means, the Committee on Homeland Security, and the Committee on Appropriations of the House of Representatives.

TITLE VIII—GRID MODERNIZATION

SEC. 8001. SMART GRID REGIONAL DEMONSTRATION INITIATIVE.

Section 1304 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17384) is amended—

(1) in subsection (a), by inserting “research, development, and demonstration” before “program”;

(2) in subsection (b)—

(A) by amending paragraph (1) to read as follows:

“(1) IN GENERAL.—The Secretary shall establish a smart grid regional demonstration initiative (referred to in this subsection as the ‘Initiative’) composed of demonstration projects focused on cost-effective, advanced technologies for use in power grid sensing, communications, analysis, power flow control, visualization, distribution automation, industrial control systems,

dynamic line rating systems, grid redesign, and the integration of distributed energy resources.”; and

(B) in paragraph (2)—

(i) in subparagraph (D), by striking “and” at the end;

(ii) in subparagraph (E), by striking the period and inserting “; and”; and

(iii) by inserting at the end the following:

“(F) to encourage the commercial application of advanced distribution automation technologies that exert intelligent control over electrical grid functions at the distribution level to improve system resilience.”.

SEC. 8002. SMART GRID MODELING, VISUALIZATION, ARCHITECTURE, AND CONTROLS.

Title XIII of the Energy Independence and Security Act of 2007 (42 U.S.C. 17381 et seq.) is amended by inserting after section 1304 the following:

“SEC. 1304A. SMART GRID MODELING, VISUALIZATION, ARCHITECTURE, AND CONTROLS.

“(a) IN GENERAL.—Not later than 180 days after the enactment of this section, the Secretary shall establish a program of research, development, demonstration, and commercial application on electric grid modeling, sensing, visualization, architecture development, and advanced operation and controls.

“(b) MODELING RESEARCH AND DEVELOPMENT.—The Secretary shall support development of models of emerging technologies and systems to facilitate the secure and reliable design, planning, and operation of the electric grid for use by industry stakeholders. In particular, the Secretary shall support development of—

“(1) models to analyze and predict the effects of adverse physical and cyber events on the electric grid;

“(2) coupled models of electrical, physical, and cyber systems;

“(3) models of existing and emerging technologies being deployed on the electric grid due to projected changes in the electric generation mix and loads, for a variety of regional characteristics; and

“(4) integrated models of the communications, transmission, distribution, and other interdependent systems for existing, new, and emerging technologies.

“(c) SITUATIONAL AWARENESS RESEARCH AND DEVELOPMENT.—

“(1) IN GENERAL.—The Secretary shall support development of computational tools and technologies to improve sensing, monitoring, and visualization of the electric grid for real-time situational awareness and decision support tools that enable improved operation of the power system, including utility, non-utility, and customer grid-connected assets, for use by industry partners.

“(2) DATA USE.—In developing visualization capabilities under this section, the Secretary shall develop tools for industry stakeholders to use to analyze data collected from advanced measurement and monitoring technologies, including data from phasor measurement units and advanced metering units.

“(3) SEVERE EVENTS.—The Secretary shall prioritize enhancing cyber and physical situational awareness of the electric grid during adverse manmade and naturally-occurring events.

“(d) OPERATION AND CONTROLS RESEARCH AND DEVELOPMENT.—The Secretary shall conduct research to develop improvements to the operation and controls of the electric grid, in coordination with industry partners. Such activities shall include—

“(1) a training facility or facilities to allow grid operators to gain operational experience with advanced grid control concepts and technologies;

“(2) development of cost-effective advanced operation and control concepts and technologies, such as adaptive islanding, dynamic line rating systems, power flow controllers, network topology optimization, smart circuit breakers, intelligent load shedding, and fault-tolerant control system architectures;

“(3) development of real-time control concepts using artificial intelligence and machine learning for improved electric grid resilience; and

“(4) utilization of advanced data analytics including load forecasting, power flow modeling, equipment failure prediction, resource optimization, risk analysis, and decision analysis.

“(e) INTEROPERABILITY RESEARCH AND DEVELOPMENT.—The Secretary shall conduct research and development on tools and technologies that improve the interoperability and compatibility of new and emerging components, technologies, and systems with existing electric grid infrastructure.

“(f) UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES.—In carrying out the program under subsection (a), the Secretary shall support research and development on underground transmission and distribution lines. This shall include research on—

“(1) methods for lowering the costs of underground transmission and distribution lines, including through novel installation techniques and materials considerations;

“(2) techniques to improve the lifespan of underground transmission and distribution lines;

“(3) wireless sensors to improve safety of underground transmission and distribution lines and to predict, identify, detect, and transmit information about degradation and faults; and

“(4) methods for improving the resilience and reliability of underground transmission and distribution lines, including technologies and techniques that can mitigate the impact of flooding, storm surge, and seasonal climate cycles on degradation of and damage to underground transmission and distribution lines.

“(g) GRID ARCHITECTURE AND SCENARIO DEVELOPMENT.—

“(1) IN GENERAL.—Subject to paragraph (3), the Secretary shall establish and facilitate a collaborative process to develop model grid architecture and a set of future scenarios for the electric grid to examine the impacts of different combinations of resources (including different quantities of distributed energy resources and large-scale, central generation) on the electric grid.

“(2) ARCHITECTURE.—In supporting the development of model grid architectures, the Secretary shall—

“(A) analyze a variety of grid architecture scenarios that range from minor upgrades to existing transmission grid infrastructure to scenarios that involve the replacement of significant portions of existing transmission grid infrastructure;

“(B) analyze the effects of the increasing proliferation of renewable and other zero emissions energy generation sources, increasing use of distributed resources owned by non-utility entities, and the use of digital and automated controls not managed by grid operators;

“(C) include a variety of new and emerging distribution grid technologies, including distributed energy resources, electric vehicle charging stations, distribution automation technologies, energy storage, and renewable energy sources;

“(D) analyze the effects of local load balancing and other forms of decentralized control;

“(E) analyze the effects of changes to grid architectures resulting from modernizing electric grid systems, including communications, controls, markets, consumer choice, emergency response, electrification, and cybersecurity concerns; and

“(F) develop integrated grid architectures that incorporate system resilience for cyber, physical, and communications systems.

“(3) MARKET STRUCTURE.—The grid architecture and scenarios developed under paragraph (1) shall, to the extent practicable, account for differences in market structure, including an examination of the potential for stranded costs in each type of market structure.

“(h) COMPUTING RESOURCES AND DATA COORDINATION RESEARCH AND DEVELOPMENT.—In carrying out this section, the Secretary shall—

“(1) leverage existing computing resources at the National Laboratories; and

“(2) develop voluntary standards for data taxonomies and communication protocols in coordination with public and private sector stakeholders.

“(i) INFORMATION SHARING.—None of the activities authorized in this section shall require private entities to share information or data with the Secretary.

“(j) RESILIENCE.—In this section, the term ‘resilience’ means the ability to withstand and reduce the magnitude or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, or rapidly recover from such an event, including from deliberate attacks, accidents, and naturally occurring threats or incidents.”.

SEC. 8003. INTEGRATED ENERGY SYSTEMS.

Title XIII of the Energy Independence and Security Act of 2007 (42 U.S.C. 17381 et seq.) is amended by adding after section 1309 the following:

“SEC. 1310. INTEGRATED ENERGY SYSTEMS.

“(a) IN GENERAL.—Not later than 180 days after the enactment of this section, the Secretary shall establish a research, development, and demonstration program to develop cost-effective integrated energy systems, including—

“(1) development of computer modeling to design different configurations of integrated energy systems and to optimize system operation;

“(2) research on system integration needed to plan, design, build, and operate integrated energy systems, including interconnection requirements with the electric grid;

“(3) development of integrated energy systems for various applications, including—

“(A) thermal energy generation and storage for buildings and manufacturing;

“(B) electricity storage coupled with energy generation;

“(C) desalination;

“(D) production of liquid and gaseous fuels; and

“(E) production of chemicals such as ammonia and ethylene;

“(4) development of testing facilities for integrated energy systems; and

“(5) research on incorporation of various technologies for integrated energy systems, including nuclear energy, renewable energy, storage, and carbon capture, utilization, and sequestration technologies.

“(b) STRATEGIC PLAN.—

“(1) IN GENERAL.—Not later than 1 year after the date of the enactment of this section, 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 strategic plan that identifies opportunities, challenges, and standards needed for the development and commercial application of integrated energy systems. The strategic plan shall include—

“(A) analysis of the potential benefits of development of integrated electric systems on the electric grid;

“(B) analysis of the potential contributions of integrated energy systems to different grid architecture scenarios;

“(C) research and development goals for various integrated energy systems, including those identified in subsection (a);

“(D) assessment of policy and market barriers to the adoption of integrated energy systems;

“(E) analysis of the technical and economic feasibility of adoption of different integrated energy systems; and

“(F) a 10-year roadmap to guide the program established under subsection (a).

“(2) UPDATES.—Not less than once every 3 years for the duration of this research program, the Secretary shall submit an updated version of the strategic plan to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

“(c) PROGRAM IMPLEMENTATION.—In carrying out the research, development, demonstration, and commercial application aims of subsection (a), the Secretary shall—

“(1) implement the recommendations set forth in the strategic plan in subsection (b);

“(2) coordinate across all relevant program offices at the Department, including—

“(A) the Office of Energy Efficiency and Renewable Energy;

“(B) the Office of Nuclear Energy; and

“(C) the Office of Fossil Energy;

“(3) leverage existing programs and resources of the Department; and

“(4) prioritize activities that accelerate the development of integrated electricity generation, storage, and distribution systems with net zero greenhouse gas emissions.

“(d) INTEGRATED ENERGY SYSTEM DEFINED.—The term ‘integrated energy system’ means a system composed of 2 or more co-located or jointly operated sub-systems of energy generation, energy storage, or other energy technologies.”.

SEC. 8004. GRID INTEGRATION RESEARCH AND DEVELOPMENT.

(a) INTEGRATING DISTRIBUTED ENERGY RESOURCES ONTO THE ELECTRIC GRID.—Section 925(a) of the Energy Policy Act of 2005 (42 U.S.C. 16215) is amended—

(1) by redesignating paragraphs (10) and (11) as paragraphs (12) and (13), respectively; and

(2) by inserting after paragraph (9) the following:

“(10) the development of cost-effective technologies that enable two-way information and power flow between distributed energy resources and the electric grid;

“(11) the development of technologies and concepts that enable interoperability between distributed energy resources and other behind-the-meter devices and the electric grid;”.

(b) INTEGRATING RENEWABLE ENERGY ONTO THE ELECTRIC GRID.—Subtitle C of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16231 et seq.) is amended by adding at the end the following:

“SEC. 936. RESEARCH AND DEVELOPMENT INTO INTEGRATING RENEWABLE ENERGY ONTO THE ELECTRIC GRID.

“(a) IN GENERAL.—Not later than 180 days after the enactment of this section, the Secretary shall establish a research, development, and demonstration program on technologies that enable integration of renewable energy generation sources onto the electric grid across multiple program offices of the Department. The program shall include—

“(1) forecasting for predicting generation from variable renewable energy sources;

“(2) development of cost-effective low-loss, long-distance transmission lines; and

“(3) development of cost-effective advanced technologies for variable renewable generation sources to provide grid services.

“(b) COORDINATION.—In carrying out this program, the Secretary shall coordinate across all relevant program offices at the Department to achieve the goals established in this section, including the Office of Electricity.

“(c) ADOPTION OF TECHNOLOGIES.—In carrying out this section, the Secretary shall consider barriers to adoption and commercial application of technologies that enable integration of renewable energy sources onto the electric grid, including cost and other economic barriers, and shall coordinate with relevant entities to reduce these barriers.”.

(c) INTEGRATING ELECTRIC VEHICLES ONTO THE ELECTRIC GRID.—Subtitle B of title I of the Energy Independence and Security

Act of 2007 (42 U.S.C. 17011 et seq.) is amended by adding at the end the following:

“SEC. 137. RESEARCH AND DEVELOPMENT INTO INTEGRATING ELECTRIC VEHICLES ONTO THE ELECTRIC GRID.

“(a) **IN GENERAL.**—The Secretary shall establish a research, development, and demonstration program to advance the integration of electric vehicles, including plug-in hybrid electric vehicles, onto the electric grid.

“(b) **VEHICLES-TO-GRID INTEGRATION ASSESSMENT REPORT.**—Not later than 1 year after the enactment of this section, 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 results of a study that examines the research, development, and demonstration opportunities, challenges, and standards needed for integrating electric vehicles onto the electric grid.

“(1) **REPORT REQUIREMENTS.**—The report shall include—

“(A) an evaluation of the use of electric vehicles to maintain the reliability of the electric grid, including—

“(i) the use of electric vehicles for demand response, load shaping, emergency power, and frequency regulation; and

“(ii) the potential for the reuse of spent electric vehicle batteries for stationary grid storage;

“(B) the impact of grid integration on electric vehicles, including—

“(i) the impact of bi-directional electricity flow on battery degradation; and

“(ii) the implications of the use of electric vehicles for grid services on original equipment manufacturer warranties;

“(C) the impacts to the electric grid of increased penetration of electric vehicles, including—

“(i) the distribution grid infrastructure needed to support an increase in charging capacity;

“(ii) strategies for integrating electric vehicles onto the distribution grid while limiting infrastructure upgrades;

“(iii) the changes in electricity demand over a 24-hour cycle due to electric vehicle charging behavior;

“(iv) the load increases expected from electrifying the transportation sector;

“(v) the potential for customer incentives and other managed charging stations strategies to shift charging off-peak;

“(vi) the technology needed to achieve bi-directional power flow on the distribution grid; and

“(vii) the implementation of smart charging techniques;

“(D) research on the standards needed to integrate electric vehicles with the grid, including communications systems, protocols, and charging stations, in collaboration with the National Institute for Standards and Technology;

“(E) the cybersecurity challenges and needs associated with electrifying the transportation sector; and

“(F) an assessment of the feasibility of adopting technologies developed under the program established under subsection (a) at Department facilities.

“(2) RECOMMENDATIONS.—As part of the Vehicles-to-Grid Integration Assessment Report, the Secretary shall develop a 10-year roadmap to guide the research, development, and demonstration program to integrate electric vehicles onto the electric grid.

“(3) CONSULTATION.—In developing this report, the Secretary shall consult with relevant stakeholders, including—

“(A) electric vehicle manufacturers;

“(B) electric utilities;

“(C) public utility commissions;

“(D) vehicle battery manufacturers;

“(E) electric vehicle supply equipment manufacturers;

“(F) charging infrastructure manufacturers;

“(G) the National Laboratories; and

“(H) other Federal agencies, as the Secretary determines appropriate.

“(4) UPDATES.—The Secretary shall update the report required under this section every 3 years for the duration of the program under section (a) and shall submit the updated report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

“(c) PROGRAM IMPLEMENTATION.—In carrying out the research, development, demonstration, and commercial application aims of section, the Secretary shall—

“(1) implement the recommendations set forth in the report in subsection (b); and

“(2) coordinate across all relevant program offices at the Department to achieve the goals established in this section, including the Office of Electricity.

“(d) TESTING CAPABILITIES.—The Secretary shall coordinate with the National Laboratories to develop testing capabilities for the evaluation, rapid prototyping, and optimization of technologies enabling integration of electric vehicles onto the electric grid.”.

SEC. 8005. ADVISORY COMMITTEE.

Title XIII of the Energy Independence and Security Act of 2007 (42 U.S.C. 17381 et seq.) is amended by adding after section 1310 (as added by section 8003 of this Act) the following:

“SEC. 1311. ADVISORY COMMITTEE.

“(a) IN GENERAL.—Not later than 180 days after the enactment of this section, the Secretary shall designate an existing advisory committee to advise the Secretary on the authorization of research, development, and demonstration projects under sections 1304 and 1304A.

“(b) RESPONSIBILITY.—The Secretary shall annually solicit from the advisory committee—

“(1) comments to identify grid modernization technology needs;

“(2) an assessment of the progress of the research activities on grid modernization; and

“(3) assistance in annually updating grid modernization technology roadmaps.”.

SEC. 8006. COORDINATION OF EFFORTS.

In carrying out the amendments made by this title, the Secretary shall coordinate with relevant entities to the maximum extent practicable, including—

- (1) electric utilities;
- (2) private sector entities;
- (3) representatives of all sectors of the electric power industry;
- (4) transmission organizations;
- (5) transmission owners and operators;
- (6) distribution organizations;
- (7) distribution asset owners and operators;
- (8) State, Tribal, local, and territorial governments and regulatory authorities;
- (9) academic institutions;
- (10) the National Laboratories;
- (11) other Federal agencies;
- (12) nonprofit organizations;
- (13) the Federal Energy Regulatory Commission;
- (14) the North American Reliability Corporation;
- (15) independent system operators; and
- (16) programs and program offices at the Department.

SEC. 8007. TECHNOLOGY DEMONSTRATION ON THE DISTRIBUTION GRID.

(a) **IN GENERAL.**—The Secretary shall establish a grant program to carry out eligible projects related to the modernization of the electric grid, including the application of technologies to improve observability, advanced controls, and prediction of system performance on the distribution system.

(b) **ELIGIBLE PROJECTS.**—To be eligible for a grant under subsection (a), a project shall—

- (1) be designed to improve the performance and efficiency of the future electric grid, while ensuring the continued provision of safe, secure, reliable, and affordable power; and
- (2) demonstrate—
 - (A) secure integration and management of two or more energy resources, including distributed energy generation, combined heat and power, micro-grids, energy storage, electric vehicles, energy efficiency, demand response, and intelligent loads; and
 - (B) secure integration and interoperability of communications and information technologies.

SEC. 8008. VOLUNTARY MODEL PATHWAYS.

(a) **ESTABLISHMENT OF VOLUNTARY MODEL PATHWAYS.**—

(1) **ESTABLISHMENT.**—Not later than 90 days after the date of enactment of this Act, the Secretary of Energy (in this section referred to as the “Secretary”), in consultation with the steering committee established under paragraph (3), shall initiate the development of voluntary model pathways for modernizing the electric grid through a collaborative, public-private effort that—

- (A) produces illustrative policy pathways encompassing a diverse range of technologies that can be adapted for State and regional applications by regulators and policy-makers;

(B) facilitates the modernization of the electric grid and associated communications networks to achieve the objectives described in paragraph (2);

(C) ensures a reliable, resilient, affordable, safe, and secure electric grid; and

(D) acknowledges and accounts for different priorities, electric systems, and rate structures across States and regions.

(2) OBJECTIVES.—The pathways established under paragraph (1) shall facilitate achievement of as many of the following objectives as practicable:

(A) Near real-time situational awareness of the electric system.

(B) Data visualization.

(C) Advanced monitoring and control of the advanced electric grid.

(D) Enhanced certainty of policies for investment in the electric grid.

(E) Increased innovation.

(F) Greater consumer empowerment.

(G) Enhanced grid resilience, reliability, and robustness.

(H) Improved—

(i) integration of distributed energy resources;

(ii) interoperability of the electric system; and

(iii) predictive modeling and capacity forecasting.

(I) Reduced cost of service for consumers.

(J) Diversification of generation sources.

(3) STEERING COMMITTEE.—Not later than 90 days after the date of enactment of this Act, the Secretary shall establish a steering committee to help develop the pathways under paragraph (1), to be composed of members appointed by the Secretary, consisting of persons with appropriate expertise representing a diverse range of interests in the public, private, and academic sectors, including representatives of—

(A) the Federal Energy Regulatory Commission;

(B) the National Laboratories;

(C) States;

(D) State regulatory authorities;

(E) transmission organizations;

(F) representatives of all sectors of the electric power industry;

(G) institutions of higher education;

(H) independent research institutes; and

(I) other entities.

(b) TECHNICAL ASSISTANCE.—The Secretary may provide technical assistance to States, Indian Tribes, or units of local government to adopt or implement one or more elements of the pathways developed under subsection (a)(1), including on a pilot basis.

SEC. 8009. PERFORMANCE METRICS FOR ELECTRICITY INFRASTRUCTURE PROVIDERS.

(a) IN GENERAL.—Not later than 2 years after the date of enactment of this Act, the Secretary of Energy, in consultation with the steering committee established under section 8008(a)(3), shall submit to the Committee on Energy and Natural Resources

of the Senate and the Committee on Energy and Commerce of the House of Representatives a report that includes—

(1) an evaluation of the performance of the electric grid as of the date of the report; and

(2) a description of the projected range of measurable costs and benefits associated with the changes evaluated under the scenarios developed under section 1304A of the Energy Independence and Security Act of 2007.

(b) CONSIDERATIONS FOR DEVELOPMENT OF METRICS.—In developing metrics for the evaluation and projections under subsection (a), the Secretary of Energy shall consider—

(1) standard methodologies for calculating improvements or deteriorations in the performance metrics, such as reliability, grid efficiency, power quality, consumer satisfaction, sustainability, and financial incentives;

(2) standard methodologies for calculating potential costs and measurable benefits value to ratepayers, applying the performance metrics developed under paragraph (1);

(3) identification of tools, resources, and deployment models that may enable improved performance through the adoption of emerging, commercially available or advanced grid technologies or solutions, including—

(A) multicustomer micro-grids;

(B) distributed energy resources;

(C) energy storage;

(D) electric vehicles;

(E) electric vehicle charging infrastructure;

(F) integrated information and communications systems;

(G) transactive energy systems; and

(H) advanced demand management systems; and

(4) the role of States and local regulatory authorities in enabling a robust future electric grid to ensure that—

(A) electric utilities remain financially viable;

(B) electric utilities make the needed investments that ensure a reliable, secure, and resilient grid; and

(C) costs incurred to transform to an integrated grid are allocated and recovered responsibly, efficiently, and equitably.

SEC. 8010. VOLUNTARY STATE, REGIONAL, AND LOCAL ELECTRICITY DISTRIBUTION PLANNING.

(a) IN GENERAL.—On the request of a State, regional organization, or electric utility, the Secretary of Energy shall provide assistance to States, regional organizations, and electric utilities to facilitate the development of State, regional, and local electricity distribution plans by—

(1) conducting a resource assessment and analysis of future demand and distribution requirements; and

(2) developing open source tools for State, regional, and local planning and operations.

(b) RISK AND SECURITY ANALYSIS.—The assessment under subsection (a)(1) shall include—

(1) the evaluation of the physical security, cybersecurity, and associated communications needs of an advanced distribution management system and the integration of distributed energy resources; and

(2) advanced use of grid architecture to analyze risks in an all-hazards approach that includes communications infrastructure, control systems architecture, and power systems architecture.

(c) DESIGNATION.—The information collected for the assessment and analysis under subsection (a)(1)—

(1) shall be considered to be critical electric infrastructure information under section 215A of the Federal Power Act (16 U.S.C. 824o-1); and

(2) shall only be released in compliance with regulations implementing that section.

(d) TECHNICAL ASSISTANCE.—For the purpose of assisting in the development of State and regional electricity distribution plans, the Secretary shall provide technical assistance to—

(1) States;

(2) regional reliability entities; and

(3) other distribution asset owners and operators.

(e) WITHDRAWAL.—A State or any entity that has requested technical assistance under this section may withdraw the request for technical assistance at any time, and on such withdrawal, the Secretary shall terminate all assistance efforts.

(f) EFFECT.—Nothing in this section authorizes the Secretary to require any State, regional organization, regional reliability entity, asset owner, or asset operator to adopt any model, tool, plan, analysis, or assessment.

SEC. 8011. MICRO-GRID AND INTEGRATED MICRO-GRID SYSTEMS PROGRAM.

(a) DEFINITIONS.—In this section:

(1) INTEGRATED MICRO-GRID SYSTEM.—The term “integrated micro-grid system” means a micro-grid system that—

(A) comprises generation from both conventional and renewable energy resources; and

(B) may use grid-scale energy storage.

(2) ISOLATED COMMUNITY.—The term “isolated community” means a community that is powered by a stand-alone electric generation and distribution system without the economic and reliability benefits of connection to a regional electric grid.

(3) MICRO-GRID SYSTEM.—The term “micro-grid system” means a localized grid that operates autonomously, regardless of whether the grid can operate in connection with another grid.

(4) RURAL ELECTRIC COOPERATIVE.—The term “rural electric cooperative” means an electric cooperative (as defined in section 3 of the Federal Power Act (16 U.S.C. 796)) that sells electric energy to persons in rural areas.

(5) STRATEGY.—The term “strategy” means the strategy developed pursuant to subsection (b)(2)(B).

(b) PROGRAM.—

(1) ESTABLISHMENT.—The Secretary of Energy (in this section referred to as the “Secretary”) shall establish a program to promote the development of—

(A) integrated micro-grid systems for isolated communities; and

(B) micro-grid systems to increase the resilience of critical infrastructure.

(2) REQUIREMENTS.—The program established under paragraph (1) shall—

(A) develop a feasibility assessment for—

(i) integrated micro-grid systems in isolated communities; and

(ii) micro-grid systems to enhance the resilience of critical infrastructure;

(B) develop an implementation strategy, in accordance with paragraph (3), to promote the development of integrated micro-grid systems for isolated communities, particularly for those communities exposed to extreme weather conditions and high energy costs, including electricity, space heating and cooling, and transportation;

(C) develop an implementation strategy to promote the development of micro-grid systems that increase the resilience of critical infrastructure; and

(D) carry out cost-shared demonstration projects, based upon the strategies developed under subparagraph (B) that include the development of physical and cybersecurity plans to take appropriate measures to protect and secure the electric grid.

(3) REQUIREMENTS FOR STRATEGY.—In developing the strategy under paragraph (2)(B), the Secretary shall consider—

(A) opportunities for improving the efficiency of existing integrated micro-grid systems;

(B) the capacity of the local workforce to operate, maintain, and repair a integrated micro-grid system as well as opportunities to improve that capacity;

(C) leveraging existing capacity within local or regional research organizations, such as organizations based at institutions of higher education, to support development of integrated micro-grid systems, including by testing novel components and systems prior to field deployment;

(D) the need for basic infrastructure to develop, deploy, and sustain a integrated micro-grid system;

(E) input of traditional knowledge from local leaders of isolated communities in the development of a integrated micro-grid system;

(F) the impact of integrated micro-grid systems on defense, homeland security, economic development, and environmental interests;

(G) opportunities to leverage existing interagency coordination efforts and recommendations for new interagency coordination efforts to minimize unnecessary overhead, mobilization, and other project costs; and

(H) any other criteria the Secretary determines appropriate.

(c) COLLABORATION.—The program established under subsection (b)(1) shall be carried out in collaboration with relevant stakeholders, including, as appropriate—

(1) States;

(2) Indian Tribes;

(3) regional entities and regulators;

(4) units of local government;

(5) institutions of higher education; and

(6) private sector entities.

(d) REPORT.—Not later than 180 days after the date of enactment of this Act, and annually thereafter until calendar year 2029, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Energy and Commerce of the House of Representatives a report on the efforts to implement the program established under subsection (b)(1) and the status of the strategy developed under subsection (b)(2)(B).

(e) BARRIERS AND BENEFITS TO MICRO-GRID SYSTEMS.—

(1) REPORT.—Not later than 270 days after the date of enactment of this Act, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Energy and Commerce of the House of Representatives a report on the benefits of, and barriers to, implementing resilient micro-grid systems that are—

(A)(i) owned or operated by an isolated community, rural electric cooperative, or municipal government; or

(ii) operated on behalf of a municipal government or rural electric cooperative; and

(B) designed to maximize the use of—

(i) energy-generation facilities owned or operated by isolated communities; or

(ii) a municipal or rural electric cooperative energy-generation facility.

(2) GRANTS TO OVERCOME BARRIERS.—The Secretary shall award grants of not more than \$500,000 to not fewer than 20 municipal governments, rural electric cooperatives, or isolated communities, up to a total of \$15,000,000, each year to assist those municipal governments, rural electric cooperatives, and isolated communities in overcoming the barriers identified in the report under paragraph (1).

SEC. 8012. TECHNICAL AMENDMENTS; AUTHORIZATION OF APPROPRIATIONS.

(a) TECHNICAL AMENDMENTS.—

(1) ENERGY INDEPENDENCE AND SECURITY ACT OF 2007.—Section 1(b) of the Energy Independence and Security Act of 2007 is amended in the table of contents—

(A) by inserting the following after the item related to section 136:

“Sec. 137. Research and development into integrating electric vehicles onto the electric grid.”;

(B) by inserting the following after the item related to section 1304:

“Sec. 1304A. Smart grid modeling, visualization, architecture, and controls.”; and

(C) by inserting the following after the item related to section 1309:

“Sec. 1310. Integrated energy systems.

“Sec. 1311. Advisory committee.”.

(2) ENERGY POLICY ACT OF 2005.—Section 1(b) of the Energy Policy Act of 2005 is amended in the table of contents by inserting the following after the item related to section 935:

“Sec. 936. Research and development into integrating renewable energy onto the electric grid.”

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated—

(1) to carry out section 8006 and the amendments made by sections 8001, 8002, and 8005 of this title—

- (A) \$175,000,000 for fiscal year 2021;
- (B) \$180,000,000 for fiscal year 2022;
- (C) \$185,000,000 for fiscal year 2023;
- (D) \$190,000,000 for fiscal year 2024; and
- (E) \$199,500,000 for fiscal year 2025;

(2) to carry out sections 8007, 8008, 8009, 8010, and 8011 of this title \$175,000,000 for each of fiscal years 2021 through 2025;

(3) to carry out section 8003 of this title—

- (A) \$21,000,000 for fiscal year 2021;
- (B) \$22,050,000 for fiscal year 2022;
- (C) \$23,153,000 for fiscal year 2023;
- (D) \$24,310,000 for fiscal year 2024; and
- (E) \$25,525,000 for fiscal year 2025; and

(4) to carry out section 8004 of this title—

- (A) \$52,500,000 for fiscal year 2021;
- (B) \$55,152,000 for fiscal year 2022;
- (C) \$57,882,000 for fiscal year 2023;
- (D) \$60,775,000 for fiscal year 2024; and
- (E) \$63,814,000 for fiscal year 2025.

SEC. 8013. INDIAN ENERGY.

(a) DEFINITION OF INDIAN LAND.—Section 2601(2) of the Energy Policy Act of 1992 (25 U.S.C. 3501(2)) is amended—

(1) in subparagraph (B)(iii), by striking “and”;

(2) in subparagraph (C), by striking “land.” and inserting “land;” and

(3) by adding at the end the following subparagraphs:

“(D) any land located in a census tract in which the majority of residents are Natives (as defined in section 3(b) of the Alaska Native Claims Settlement Act (43 U.S.C. 1602(b))); and

“(E) any land located in a census tract in which the majority of residents are persons who are enrolled members of a federally recognized Tribe or village.”.

(b) REDUCTION OF COST SHARE.—Section 2602(b)(5) of the Energy Policy Act of 1992 (25 U.S.C. 3502(b)(5)) is amended by adding at the end the following subparagraphs:

“(D) The Secretary of Energy may reduce any applicable cost share required of an Indian tribe, intertribal organization, or tribal energy development organization in order to receive a grant under this subsection to not less than 10 percent if the Indian tribe, intertribal organization, or tribal energy development organization meets criteria developed by the Secretary of Energy, including financial need.

“(E) Section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352) shall not apply to assistance provided under this subsection.”

(c) AUTHORIZATION OF APPROPRIATIONS.—Section 2602(b)(7) of the Energy Policy Act of 1992 (25 U.S.C. 3502(b)(7)) is amended by striking “ \$20,000,000 for each of fiscal years 2006 through 2016” and inserting “ \$30,000,000 for each of fiscal years 2021 through 2025”.

SEC. 8014. REPORT ON ELECTRICITY ACCESS AND RELIABILITY.

(a) ASSESSMENT.—The Secretary of Energy shall conduct an assessment of the status of access to electricity by households residing in Tribal communities or on Indian land, and the reliability of electric service available to households residing in Tribal communities or on Indian land, as compared to the status of access to and reliability of electricity within neighboring States or within the State in which Indian land is located.

(b) CONSULTATION.—The Secretary of Energy shall consult with Indian Tribes, Tribal organizations, the North American Electricity Reliability Corporation, and the Federal Energy Regulatory Commission in the development and conduct of the assessment under subsection (a). Indian Tribes and Tribal organizations shall have the opportunity to review and make recommendations regarding the development of the assessment and the findings of the assessment, prior to the submission of the report under subsection (c).

(c) REPORT.—Not later than 18 months after the date of enactment of this Act, the Secretary of Energy shall submit to the Committee on Energy and Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on the results of the assessment conducted under subsection (a), which shall include—

(1) a description of generation, transmission, and distribution assets available to provide electricity to households residing in Tribal communities or on Indian land;

(2) a survey of the retail and wholesale prices of electricity available to households residing in Tribal communities or on Indian land;

(3) a description of participation of Tribal members in the electric utility workforce, including the workforce for construction and maintenance of renewable energy resources and distributed energy resources;

(4) the percentage of households residing in Tribal communities or on Indian land that do not have access to electricity;

(5) the potential of distributed energy resources to provide electricity to households residing in Tribal communities or on Indian land;

(6) the potential for tribally-owned electric utilities or electric utility assets to participate in or benefit from regional electricity markets;

(7) a description of the barriers to providing access to electric service to households residing in Tribal communities or on Indian land; and

(8) recommendations to improve access to and reliability of electric service for households residing in Tribal communities or on Indian land.

(d) DEFINITIONS.—In this section:

(1) **TRIBAL MEMBER.**—The term “Tribal member” means a person who is an enrolled member of a federally recognized Tribe or village.

(2) **TRIBAL COMMUNITY.**—The term “Tribal community” means a community in a United States census tract in which the majority of residents are persons who are enrolled members of a federally recognized Tribe or village.

SEC. 8015. NET METERING STUDY AND EVALUATION.

(a) **IN GENERAL.**—Not later than 180 days after the date of enactment of this Act, the Secretary of Energy shall seek to enter into an agreement with the National Academies of Sciences, Engineering, and Medicine (referred to in this section as the “National Academies”) under which the National Academies shall—

(1) study the opportunities and challenges associated with net metering; and

(2) evaluate the expected medium- and long-term impacts of net metering.

(b) **ELEMENTS.**—The study and evaluation conducted pursuant to the agreement entered into under subsection (a) shall address—

(1) developments in net metering, including the emergence of new technologies;

(2) alternatives to existing metering systems that—

(A) provide for transactions that—

(i) measure electric energy consumption by an electric consumer at the home or facility of that electric consumer; and

(ii) are capable of sending electric energy usage information through a communications network to an electric utility;

(B) promote equitable distribution of resources and costs; and

(C) provide incentives for the use of distributed renewable generation;

(3) net metering planning and operating techniques;

(4) effective architecture for net metering;

(5) successful net metering business models;

(6) consumer and industry incentives for net metering;

(7) the role of renewable resources in the electric grid;

(8) the role of net metering in developing future models for renewable infrastructure; and

(9) the use of battery storage with net metering.

(c) **REPORT.**—

(1) **IN GENERAL.**—The agreement entered into under subsection (a) shall require the National Academies to submit to the Secretary of Energy, not later than 2 years after entering into the agreement, a report that describes the results of the study and evaluation conducted pursuant to the agreement.

(2) **PUBLIC AVAILABILITY.**—The report submitted under paragraph (1) shall be made available to the public through electronic means, including the internet.

TITLE IX—DEPARTMENT OF ENERGY INNOVATION

SEC. 9001. OFFICE OF TECHNOLOGY TRANSITIONS.

Section 1001 of the Energy Policy Act of 2005 (42 U.S.C. 16391) is amended—

(1) by striking subsection (a) and all that follows through “The Coordinator” in subsection (b) and inserting the following:

“(a) OFFICE OF TECHNOLOGY TRANSITIONS.—

“(1) ESTABLISHMENT.—There is established within the Department an Office of Technology Transitions (referred to in this section as the ‘Office’).

“(2) MISSION.—The mission of the Office shall be—

“(A) to expand the commercial impact of the research investments of the Department; and

“(B) to focus on commercializing technologies that support the missions of the Department, including reducing greenhouse gas emissions and other pollutants.

“(3) GOALS.—

“(A) IN GENERAL.—In carrying out the mission and activities of the Office, the Chief Commercialization Officer appointed under paragraph (4) shall, with respect to commercialization activities, meet all of the goals described in subparagraph (B).

“(B) GOALS DESCRIBED.—The goals referred to in subparagraph (A) are the following:

“(i) Reduction of greenhouse gas emissions and other pollutants.

“(ii) Ensuring economic competitiveness.

“(iii) Enhancement of domestic energy security and national security.

“(iv) Enhancement of domestic jobs.

“(v) Improvement of energy efficiency.

“(vi) Any other goals to support the transfer of technology developed by Department-funded programs to the private sector, as consistent with missions of the Department.

“(4) CHIEF COMMERCIALIZATION OFFICER.—

“(A) IN GENERAL.—The Office shall be headed by an officer, who shall be known as the ‘Chief Commercialization Officer’, and who shall report directly to, and be appointed by, the Secretary.

“(B) PRINCIPAL ADVISOR.—The Chief Commercialization Officer shall be the principal advisor to the Secretary on all matters relating to technology transfer and commercialization.

“(C) QUALIFICATIONS.—The Chief Commercialization Officer”;

(2) in subsection (c)—

(A) in paragraph (1), by striking “subsection (d)” and inserting “subsection (b)”;

(B) by redesignating paragraphs (1) through (4) as clauses (i) through (iv), respectively, and indenting appropriately; and

(C) by striking the subsection designation and heading and all that follows through “The Coordinator” in the

matter preceding clause (i) (as so redesignated) and inserting the following:

“(D) DUTIES.—The Chief Commercialization Officer”;

(3) by adding at the end of subsection (a) (as amended by paragraph (2)(C)) the following:

“(5) COORDINATION.—In carrying out the mission and activities of the Office, the Chief Commercialization Officer shall coordinate with the senior leadership of the Department, other relevant program offices of the Department, National Laboratories, the Technology Transfer Working Group established under subsection (b), the Technology Transfer Policy Board, and other stakeholders (including private industry).”;

(4) by redesignating subsections (d) through (h) as subsections (b) through (f), respectively;

(5) in subsection (f) (as so redesignated), by striking “subsection (e)” and inserting “subsection (c)”; and

(6) by adding at the end the following:

“(g) ADDITIONAL TECHNOLOGY TRANSFER PROGRAMS.—The Secretary may develop additional programs to—

“(1) support regional energy innovation systems;

“(2) support clean energy incubators;

“(3) provide small business vouchers;

“(4) provide financial and technical assistance for entrepreneurial fellowships at national laboratories;

“(5) encourage students, energy researchers, and national laboratory employees to develop entrepreneurial skillsets and engage in entrepreneurial opportunities;

“(6) support private companies and individuals in partnering with National Laboratories; and

“(7) further support the mission and goals of the Office.”.

SEC. 9002. LAB PARTNERING SERVICE PILOT PROGRAM.

(a) PILOT PROGRAM.—

(1) IN GENERAL.—The Secretary of Energy (in this section referred to as the “Secretary”), acting through the Chief Commercialization Officer established in section 1001(a) of the Energy Policy Act of 2005 (42 U.S.C. 16391(a)), shall establish a Lab Partnering Service Pilot Program (hereinafter in this section referred to as the “pilot program”).

(2) PURPOSES.—The purposes of the pilot program are to provide services that encourage and support partnerships between the National Laboratories and public and private sector entities, and to improve communication of research, development, demonstration, and commercial application projects and opportunities at the National Laboratories to potential partners through the development of a website and the provision of services, in collaboration with relevant external entities, and to identify and develop metrics regarding the effectiveness of such partnerships.

(3) ACTIVITIES.—In carrying out this pilot program, the Secretary shall—

(A) conduct outreach to and engage with relevant public and private entities;

(B) identify and disseminate best practices for strengthening connections between the National Laboratories and public and private sector entities; and

(C) develop a website to disseminate information on—

- (i) different partnering mechanisms for working with the National Laboratories;
- (ii) National Laboratory experts and research areas; and
- (iii) National Laboratory facilities and user facilities.

(b) **METRICS.**—The Secretary shall support the development of metrics, including conversion metrics, to determine the effectiveness of the pilot program in achieving the purposes in subsection (a) and the number and types of partnerships established between public and private sector entities and the National Laboratories compared to baseline data.

(c) **COORDINATION.**—In carrying out the activities authorized in this section, the Secretary shall coordinate with the Directors of (and dedicated technology transfer staff at) the National Laboratories, in particular for matchmaking services for individual projects, which should be led by the National Laboratories.

(d) **FUNDING EMPLOYEE PARTNERING ACTIVITIES.**—The Secretary shall delegate to the Directors of each National Laboratory and single-purpose research facility of the Department the authority to compensate National Laboratory employees providing services under this section.

(e) **DURATION.**—Subject to the availability of appropriations, the pilot program established in this section shall operate for not less than 3 years and may be built off an existing program.

(f) **EVALUATION.**—Not later than 6 months after the completion of this pilot program, the Secretary shall support the evaluation of the success of the pilot program in achieving the purposes in subsection (a) and shall submit the evaluation to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate. The assessment shall include analyses of the performance of the pilot program based on the metrics developed under subsection (b).

(g) **DEFINITION.**—In this section, the term “National Laboratory” has the meaning given such term in section 2(3) of the Energy Policy Act of 2005 (42 U.S.C. 15801(3)).

SEC. 9003. TECHNOLOGY COMMERCIALIZATION FUND.

Section 1001(e) of the Energy Policy Act of 2005 (42 U.S.C. 16391(e)) is amended to read as follows:

“(e) **TECHNOLOGY COMMERCIALIZATION FUND.**—

“(1) **ESTABLISHMENT.**—The Secretary, acting through the Chief Commercialization Officer established in section 1001(a) of the Energy Policy Act of 2005 (42 U.S.C. 16391(a)), shall establish a Technology Commercialization Fund (hereafter referred to as the ‘Fund’), using nine-tenths of one percent of the amount of appropriations made available to the Department for applied energy research, development, demonstration, and commercial application for each fiscal year, to be used to provide, in accordance with the cost-sharing requirements under section 988, funds to private partners, including national laboratories, to promote promising energy technologies for commercial purposes.

“(2) **APPLICATIONS.**—

“(A) CONSIDERATIONS.—The Secretary shall develop criteria for evaluating applications for funding under this section, which may include—

“(i) the potential that a proposed technology will result in a commercially successful product within a reasonable timeframe; and

“(ii) the relative maturity of a proposed technology for commercial application.

“(B) SELECTIONS.—In awarding funds under this section, the Secretary may give special consideration to applications that involve at least one applicant that has participated in an entrepreneurial or commercialization training program, such as Energy Innovation Corps.

“(f) ANNUAL REPORT.—The Secretary shall include in the annual report required under section 9007(a) of the Energy Act of 2020—

“(1) description of the projects carried out with awards from the Fund for that fiscal year;

“(2) each project’s cost-share for that fiscal year; and

“(3) each project’s partners for that fiscal year.

“(g) TECHNOLOGY COMMERCIALIZATION FUND REPORT.—

“(1) IN GENERAL.—Not later than 1 year after the date of enactment of the Energy Act of 2020, the Secretary shall submit to the Committee on Science, Space, and Technology and Committee on Appropriations of the House of Representatives and the Committee on Energy and Natural Resources and Committee on Appropriations of the Senate a report on the current and recommended implementation of the Fund.

“(2) CONTENTS.—The report under subparagraph (A) shall include—

“(A) a summary, with supporting data, of how much Department program offices contribute to and use the Fund each year, including a list of current funding restrictions;

“(B) recommendations on how to improve implementation and administration of the Fund; and

“(C) an analysis on how to spend funds optimally on technology areas that have the greatest need and opportunity for commercial application, rather than spending funds at the programmatic level or under current funding restrictions.”.

SEC. 9004. STREAMLINING PRIZE COMPETITIONS.

Section 1008 of the Energy Policy Act of 2005 (42 U.S.C. 16396) is amended by inserting after subsection (d) the following (and redesignating subsections (f) and (g) as subsections (g) and (h), respectively):

“(e) COORDINATION.—In carrying out subsection (a), and for any prize competitions under section 105 of the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Reauthorization Act of 2010, the Secretary shall—

“(1) issue Department-wide guidance on the design, development, and implementation of prize competitions;

“(2) collect and disseminate best practices on the design and administration of prize competitions;

“(3) streamline contracting mechanisms for the implementation of prize competitions; and

“(4) provide training and prize competition design support, as necessary, to Department staff to develop prize competitions and challenges.”

SEC. 9005. MILESTONE-BASED DEMONSTRATION PROJECTS.

(a) **IN GENERAL.**—Acting under section 646(g) of the Department of Energy Organization Act (42 U.S.C. 7256(g)), notwithstanding paragraph (10) of such section, the Secretary of Energy (in this section referred to as the “Secretary”) may carry out demonstration projects as a milestone-based demonstration project that requires particular technical and financial milestones to be met before a participant is awarded grants by the Department through a competitive award process.

(b) **REQUIREMENTS.**—In carrying out milestone-based demonstration projects under the authority in paragraph (1), the Secretary shall, for each relevant project—

(1) request proposals from eligible entities, as determined by the Secretary, including—

(A) a business plan, that may include a plan for scalable manufacturing and a plan for addressing supply chain gaps;

(B) a plan for raising private sector investment; and

(C) proposed technical and financial milestones, including estimated project timelines and total costs; and

(2) award funding of a predetermined amount to projects that successfully meet proposed milestones under paragraph (1)(C) or for expenses deemed reimbursable by the Secretary, in accordance with terms negotiated for an individual award;

(3) require cost sharing in accordance with section 988 of the Energy Policy Act of 2005; and

(4) communicate regularly with selected eligible entities and, if the Secretary deems appropriate, exercise small amounts of flexibility for technical and financial milestones as projects mature.

(c) **AWARDS.**—For the program established under subsection (a)—

(1) an award recipient shall be responsible for all costs until milestones are achieved, or reimbursable expenses are reviewed and verified by the Department; and

(2) should an awardee not meet the milestones described in subsection (a), the Secretary or their designee may end the partnership with an award recipient and use the remaining funds in the ended agreement for new or existing projects carried out under this section.

(d) **PROJECT MANAGEMENT.**—In carrying out projects under this program and assessing the completion of their milestones in accordance with subsection (b), the Secretary shall consult with experts that represent diverse perspectives and professional experiences, including those from the private sector, to ensure a complete and thorough review.

(e) **REPORT.**—In accordance with section 9007(a), the Secretary shall report annually on any demonstration projects carried out using the authorities under this section.

SEC. 9006. OTHER TRANSACTION AUTHORITY EXTENSION.

(a) Subsection 646(g)(10) of the Department of Energy Organization Act (42 U.S.C. 7256(g)(10)) is amended by striking “September 30, 2020” and inserting “September 30, 2030”.

(b) The provisions of section 602 of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3212) shall apply with respect to construction, alteration, or repair work of demonstration projects funded by grants or contracts authorized under sections 3001, 3003, 3004, 5001, and 8007 and the amendments made by such sections.

SEC. 9007. TECHNOLOGY TRANSFER REPORTS AND EVALUATION.

(a) ANNUAL REPORT.—As part of the updated technology transfer execution plan required each year under section 1001(h)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16391(g)(2)), the Secretary of Energy (in this section referred to as 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 progress and implementation of programs established under sections 9001, 9002, 9003, 9004, and 9005 of this Act.

(b) EVALUATION.—Not later than 3 years after the enactment of this Act and every 3 years thereafter 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 an evaluation on the extent to which programs established under sections 9001, 9002, 9003, 9004, and 9005 of this Act are achieving success based on relevant short-term and long-term metrics.

(c) REPORT ON TECHNOLOGY TRANSFER GAPS.—Not later than 3 years after the enactment of this Act, the Secretary shall enter into an agreement with the National Academies of Science, Engineering, and Medicine to 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 programmatic gaps that exist to advance the commercial application of technologies developed at the National Laboratories (as defined in section 2(3) of the Energy Policy Act of 2005 (42 U.S.C. 15801(3))).

SEC. 9008. VETERANS’ HEALTH INITIATIVE.

(a) PURPOSES.—The purposes of this section are to advance Department of Energy expertise in artificial intelligence and high-performance computing in order to improve health outcomes for veteran populations by—

(1) supporting basic research through the application of artificial intelligence, high-performance computing, modeling and simulation, machine learning, and large-scale data analytics to identify and solve outcome-defined challenges in the health sciences;

(2) maximizing the impact of the Department of Veterans Affairs’ health and genomics data housed at the National Laboratories, as well as data from other sources, on science, innovation, and health care outcomes through the use and advancement of artificial intelligence and high-performance computing capabilities of the Department;

(3) promoting collaborative research through the establishment of partnerships to improve data sharing between Federal agencies, National Laboratories, institutions of higher education, and nonprofit institutions;

(4) establishing multiple scientific computing user facilities to house and provision available data to foster transformational outcomes; and

(5) driving the development of technology to improve artificial intelligence, high-performance computing, and networking relevant to mission applications of the Department, including modeling, simulation, machine learning, and advanced data analytics.

(b) VETERANS HEALTH RESEARCH AND DEVELOPMENT.—

(1) IN GENERAL.—The Secretary of Energy (in this section referred to as the “Secretary”) shall establish and carry out a research program in artificial intelligence and high-performance computing, focused on the development of tools to solve large-scale data analytics and management challenges associated with veteran’s healthcare, and to support the efforts of the Department of Veterans Affairs to identify potential health risks and challenges utilizing data on long-term healthcare, health risks, and genomic data collected from veteran populations. 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 may—

(A) conduct basic research in modeling and simulation, machine learning, large-scale data analytics, and predictive analysis in order to develop novel or optimized algorithms for prediction of disease treatment and recovery;

(B) develop methods to accommodate large data sets with variable quality and scale, and to provide insight and models for complex systems;

(C) develop new approaches and maximize the use of algorithms developed through artificial intelligence, machine learning, data analytics, natural language processing, modeling and simulation, and develop new algorithms suitable for high-performance computing systems and large biomedical data sets;

(D) advance existing and construct new data enclaves capable of securely storing data sets provided by the Department of Veterans Affairs, Department of Defense, and other sources; 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) COORDINATION.—In carrying out the program established under paragraph (1), the Secretary is authorized—

(A) to enter into memoranda of understanding in order to carry out reimbursable agreements with the Department of Veterans Affairs and other entities in order to maximize the effectiveness of Department research and development to improve veterans’ healthcare;

(B) to consult with the Department of Veterans Affairs and other Federal agencies as appropriate; and

(C) to ensure that data storage meets all privacy and security requirements established by the Department of

Veterans Affairs, and that access to data is provided in accordance with relevant Department of Veterans Affairs data access policies, including informed consent.

(4) REPORT.—Not later than 2 years after the date of enactment of this Act, the Secretary shall submit to the Committee on Energy and Natural Resources and the Committee on Veterans' Affairs of the Senate, and the Committee on Science, Space, and Technology and the Committee on Veterans' Affairs of the House of Representatives, a report detailing the effectiveness of—

(A) the interagency coordination between each Federal agency involved in the research program carried out under this subsection;

(B) collaborative research achievements of the program; and

(C) potential opportunities to expand the technical capabilities of the Department.

(5) FUNDING.—There is authorized to be appropriated to the Secretary of Veterans Affairs to carry out this subsection \$27,000,000 for fiscal year 2021.

(c) INTERAGENCY COLLABORATION.—

(1) IN GENERAL.—The Secretary is authorized to carry out research, development, and demonstration activities to develop tools to apply to big data that enable Federal agencies, institutions of higher education, nonprofit research organizations, and industry to better leverage the capabilities of the Department to solve complex, big data challenges. The Secretary shall carry out these activities through a competitive, merit-reviewed process, and consider applications from National Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

(2) ACTIVITIES.—In carrying out the research, development, and demonstration activities authorized under paragraph (1), the Secretary may—

(A) utilize all available mechanisms to prevent duplication and coordinate research efforts across the Department;

(B) establish multiple 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

(C) 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 enactment of this Act, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report evaluating the effectiveness of the activities authorized under paragraph (1).

(4) FUNDING.—There are authorized to be appropriated to the Secretary to carry out this subsection \$15,000,000 for each of fiscal years 2021 through 2025.

(d) DEFINITION.—In this section, the term “National Laboratory” has the meaning given such term in section 2(3) of the Energy Policy Act of 2005 (42 U.S.C. 15801(3)).

SEC. 9009. SUSTAINABLE TRANSPORTATION RESEARCH AND DEVELOPMENT.

There are authorized to be appropriated to carry out research, development, demonstration, and commercial application activities within the Department of Energy's Offices of Hydrogen and Fuel Cell Technologies, Vehicle Technologies, and Bioenergy Technologies—

- (1) \$830,000,000 for fiscal year 2021;
- (2) \$855,000,000 for fiscal year 2022; and
- (3) \$880,000,000 for fiscal year 2023.

SEC. 9010. LOAN PROGRAM OFFICE TITLE XVII REFORM.

(a) **TERMS AND CONDITIONS.**—Section 1702 of the Energy Policy Act of 2005 (42 U.S.C. 16512) is amended—

(1) by amending subsection (b) to read as follows:

“(b) **SPECIFIC APPROPRIATION OR CONTRIBUTION.**—

“(1) **IN GENERAL.**—Except as provided in paragraph (2), the cost of a guarantee shall be paid by the Secretary using an appropriation made for the cost of the guarantee, subject to the availability of such an appropriation.

“(2) **INSUFFICIENT APPROPRIATIONS.**—If sufficient appropriated funds to pay the cost of a guarantee are not available, then the guarantee shall not be made unless—

“(A) the Secretary has received from the borrower a payment in full for the cost of the guarantee and deposited the payment into the Treasury; or

“(B) a combination of one or more appropriations and one or more payments from the borrower under this subsection has been made that is sufficient to cover the cost of the guarantee.”;

(2) in subsection (d)(3), by striking “is not subordinate” and inserting “, including any reorganization, restructuring, or termination thereof, shall not at any time be subordinate”;

(3) in subsection (h)—

(A) by amending paragraph (1) to read as follows:

“(1) **IN GENERAL.**—The Secretary shall charge, and collect on or after the date of the financial close of an obligation, a fee for a guarantee in an amount that the Secretary determines is sufficient to cover applicable administrative expenses (including any costs associated with third-party consultants engaged by the Secretary).”; and

(B) by adding at the following:

“(3) **REDUCTION IN FEE AMOUNT.**—Notwithstanding paragraph (1) and subject to the availability of appropriations, the Secretary may reduce the amount of a fee for a guarantee under this subsection.”; and

(4) by adding at the end the following:

“(1) **RESTRUCTURING OF LOAN GUARANTEES.**—The Secretary shall consult with the Secretary of the Treasury regarding any restructuring of the terms or conditions of a guarantee issued pursuant to this title, including with respect to any deviations from the financial terms of the guarantee.

“(m) **WRITTEN ANALYSIS.**—

“(1) **REQUIREMENT.**—The Secretary may not make a guarantee under this title until the Secretary of the Treasury has transmitted to the Secretary, and the Secretary has taken

into consideration, a written analysis of the financial terms and conditions of the proposed guarantee.

“(2) TRANSMISSION.—Not later than 30 days after receiving information on a proposed guarantee from the Secretary, the Secretary of the Treasury shall transmit the written analysis of the financial terms and conditions of the proposed guarantee required under paragraph (1) to the Secretary.

“(3) EXPLANATION.—If the Secretary makes a guarantee the financial terms and conditions of which are not consistent with the written analysis required under this subsection, not later than 30 days after making such guarantee, the Secretary shall submit to the Committee on Energy and Commerce and the Committee on Science, Space, and Technology of the House of Representatives, and the Committee on Energy and Natural Resources of the Senate, a written explanation of any material inconsistencies.

“(n) APPLICATION STATUS.—

“(1) REQUEST.—If the Secretary does not make a final decision on an application for a guarantee under this title by the date that is 180 days after receipt of the application by the Secretary, the applicant may request, on or after that date and not more than once every 60 days thereafter until a final decision is made, that the Secretary provide to the applicant a response described in paragraph (2).

“(2) RESPONSE.—Not later than 10 days after receiving a request from an applicant under paragraph (1), the Secretary shall provide to the applicant a response that includes—

“(A) a description of the current status of review of the application;

“(B) a summary of any factors that are delaying a final decision on the application, a list of what items are required in order to reach a final decision, citations to authorities stating the reasons why such items are required, and a list of actions the applicant can take to expedite the process; and

“(C) an estimate of when a final decision on the application will be made.

“(o) OUTREACH.—In carrying out this title, the Secretary shall—

“(1) provide assistance with the completion of applications for a guarantee under this title;

“(2) conduct outreach, including through conferences and online programs, to disseminate information to potential applicants;

“(3) conduct outreach to encourage participation of supporting finance institutions and private lenders in eligible projects.

“(p) COORDINATION.—In carrying out this title, the Secretary shall coordinate activities under this title with activities of other relevant offices with the Department.

“(q) REPORT.—Not later than 2 years after the date of the enactment of this subsection and every 3 years thereafter, the Secretary shall submit to Congress a report on the status of applications for, and projects receiving, guarantees under this title, including—

“(1) a list of such projects, including the guarantee amount, construction status, and financing partners of each such project;

“(2) the status of each such project’s loan repayment, including interest paid and future repayment projections;

“(3) an estimate of the air pollutant or greenhouse gas emissions avoided or reduced from each such project;

“(4) data regarding the number of direct and indirect jobs retained, restored, or created by such projects;

“(5) identification of—

“(A) technologies deployed by projects that have received guarantees that have subsequently been deployed commercially without guarantees; and

“(B) novel technologies that have been deployed by such projects and deployed in the commercial energy market;

“(6) the number of new projects projected to receive a guarantee under this title during the next 2 years and the aggregate guarantee amount;

“(7) the number of outreach engagements conducted with potential applicants;

“(8) the number of applications received and currently pending for each open solicitation; and

“(9) any other metrics the Secretary finds appropriate.”.

(b) PROJECT ELIGIBILITY EXPANSION.—Section 1703 of the Energy Policy Act of 2005 (42 U.S.C. 16513) is amended—

(1) in subsection (a)—

(A) in paragraph (1), by inserting “, utilize” after “reduce”; and

(B) in paragraph (2), by striking “.” and inserting “, including projects that employ elements of commercial technologies in combination with new or significantly improved technologies.”;

(2) in subsection (b)—

(A) in paragraph (4), by inserting “, including manufacturing of nuclear supply components for advanced nuclear reactors” after “facilities”;

(B) by amending paragraph (5) to read as follows:

“(5) Carbon capture, utilization, and sequestration practices and technologies, including—

“(A) agricultural and forestry practices that store and sequester carbon; and

“(B) synthetic technologies to remove carbon from the air and oceans.”; and

(C) by adding at the end the following:

“(11) Energy storage technologies for residential, industrial, transportation, and power generation applications.

“(12) Technologies or processes for reducing greenhouse gas emissions from industrial applications, including iron, steel, cement, and ammonia production, hydrogen production, and the generation of high-temperature heat.”; and

(3) by adding at the end the following new subsection:

“(f) REGIONAL VARIATION.—Notwithstanding subsection (a)(2), the Secretary may, if regional variation significantly affects the deployment of a technology, make guarantees under this title for up to 6 projects that employ the same or similar technology as another project, provided no more than 2 projects that use the same or a similar technology are located in the same region of the United States.”.

(c) AUTHORIZATION OF APPROPRIATIONS.—Section 1704 of the Energy Policy Act of 2005 (42 U.S.C. 16514) is amended by adding at the end the following:

“(c) ADMINISTRATIVE AND OTHER EXPENSES.—There are authorized to be appropriated—

“(1) \$32,000,000 for each of fiscal years 2021 through 2025 to carry out this title; and

“(2) for fiscal year 2021, in addition to amounts authorized under paragraph (1), \$25,000,000, to remain available until expended, for administrative expenses described in section 1702(h)(1) that are not covered by fees collected pursuant to section 1702(h).”.

SEC. 9011. ESTABLISHED PROGRAM TO STIMULATE COMPETITIVE RESEARCH.

Section 2203(b) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)) is amended by striking paragraph (3) and inserting the following:

“(3) ESTABLISHED PROGRAM TO STIMULATE COMPETITIVE RESEARCH.—

“(A) DEFINITIONS.—In this paragraph:

“(i) ELIGIBLE ENTITY.—The term ‘eligible entity’ means an institution of higher education located in an eligible jurisdiction.

“(ii) ELIGIBLE JURISDICTION.—The term ‘eligible jurisdiction’ means a State that, as determined by the Secretary—

“(I)(aa) historically has received relatively little Federal research and development funding; and

“(bb) has demonstrated a commitment—

“(AA) to develop the research bases in the State; and

“(BB) to improve science and engineering research and education programs at institutions of higher education in the State; and

“(II) is an eligible jurisdiction under the criteria used by the Secretary to make awards under this paragraph on the day before the date of enactment of the Energy Act of 2020.

“(iii) EPSCoR.—The term ‘EPSCoR’ means the Established Program to Stimulate Competitive Research operated under subparagraph (B).

“(iv) NATIONAL LABORATORY.—The term ‘National Laboratory’ has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

“(v) STATE.—The term ‘State’ means—

“(I) a State;

“(II) the District of Columbia;

“(III) the Commonwealth of Puerto Rico;

“(IV) Guam;

“(V) the United States Virgin Islands;

“(VI) American Samoa; and

“(VII) the Commonwealth of the Northern Mariana Islands.

“(B) PROGRAM OPERATION.—The Secretary shall operate an Established Program to Stimulate Competitive Research.

“(C) OBJECTIVES.—The objectives of EPSCoR shall be—

“(i) to increase the number of researchers at institutions of higher education in eligible jurisdictions capable of performing nationally competitive science and engineering research in support of the mission of the Department of Energy in the areas of applied energy research, environmental management, and basic science;

“(ii) to enhance the capabilities of institutions of higher education in eligible jurisdictions to develop, plan, and execute research that is competitive in the peer-review process; and

“(iii) to increase the probability of long-term growth of competitive funding to institutions of higher education in eligible jurisdictions.

“(D) GRANTS IN AREAS OF APPLIED ENERGY RESEARCH, ENVIRONMENTAL MANAGEMENT, AND BASIC SCIENCE.—

“(i) IN GENERAL.—EPSCoR shall make grants to eligible entities to carry out and support applied energy research and research in all areas of environmental management and basic science sponsored by the Department of Energy, including—

“(I) energy efficiency, fossil energy, renewable energy, and other applied energy research;

“(II) electricity delivery research;

“(III) cybersecurity, energy security, and emergency response;

“(IV) environmental management; and

“(V) basic science research.

“(ii) ACTIVITIES.—EPSCoR may make grants under this subparagraph for any activities consistent with the objectives described in subparagraph (C) in the areas of applied energy research, environmental management, and basic science described in clause (i), including—

“(I) to support research at eligible entities that is carried out in partnership with the National Laboratories;

“(II) to provide for graduate traineeships;

“(III) to support research by early career faculty; and

“(IV) to improve research capabilities at eligible entities through biennial implementation grants.

“(iii) NO COST SHARING.—EPSCoR shall not impose any cost-sharing requirement with respect to a grant made under this subparagraph.

“(E) OTHER ACTIVITIES.—EPSCoR may carry out such activities as may be necessary to meet the objectives described in subparagraph (C) in the areas of applied energy research, environmental management, and basic science described in subparagraph (D)(i).

“(F) PROGRAM IMPLEMENTATION.—

“(i) IN GENERAL.—Not later than 270 days after the date of enactment of the Energy Act of 2020, the Secretary shall submit to the Committees on Energy and Natural Resources and Appropriations of the Senate and the Committees on Energy and Commerce and Appropriations of the House of Representatives a plan describing how the Secretary shall implement EPSCoR.

“(ii) CONTENTS OF PLAN.—The plan described in clause (i) shall include a description of—

“(I) the management structure of EPSCoR, which shall ensure that all research areas and activities described in this paragraph are incorporated into EPSCoR;

“(II) efforts to conduct outreach to inform eligible entities and faculty of changes to, and opportunities under, EPSCoR;

“(III) how EPSCoR plans to increase engagement with eligible entities, faculty, and State committees, including by holding regular workshops, to increase participation in EPSCoR; and

“(IV) any other issues relating to EPSCoR that the Secretary determines appropriate.

“(G) PROGRAM EVALUATION.—

“(i) IN GENERAL.—Not later than 5 years after the date of enactment of the Energy Act of 2020, the Secretary shall contract with a federally funded research and development center, the National Academy of Sciences, or a similar organization to carry out an assessment of the effectiveness of EPSCoR, including an assessment of—

“(I) the tangible progress made towards achieving the objectives described in subparagraph (C);

“(II) the impact of research supported by EPSCoR on the mission of the Department of Energy; and

“(III) any other issues relating to EPSCoR that the Secretary determines appropriate.

“(ii) LIMITATION.—The organization with which the Secretary contracts under clause (i) shall not be a National Laboratory.

“(iii) REPORT.—Not later than 6 years after the date of enactment of the Energy Act of 2020, the Secretary shall submit to the Committees on Energy and Natural Resources and Appropriations of the Senate and the Committees on Energy and Commerce and Appropriations of the House of Representatives a report describing the results of the assessment carried out under clause (i), including recommendations for improvements that would enable the Secretary to achieve the objectives described in subparagraph (C).”.

TITLE X—ARPA-E AMENDMENTS

SEC. 10001. ARPA-E AMENDMENTS.

(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 the energy and environmental missions of the Department”.

(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 radioactive waste and spent nuclear fuel; and

“(v) improve the resilience, reliability, and security of infrastructure to produce, deliver, and store energy; 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) REPORTS AND ROADMAPS.—

“(1) ANNUAL REPORT.—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) describes projects supported by ARPA-E during the previous fiscal year that examine topics and technologies closely related to other activities funded by the Department, and includes an analysis of whether in supporting such projects, the Director is in compliance with subsection (i)(1); and

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

“(2) STRATEGIC VISION ROADMAP.—Not later than October 1, 2021, and every four years thereafter, the Director shall provide to the relevant authorizing and appropriations committees of Congress 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 this paragraph, the Secretary is authorized to enter into a contract with the National Academy of Sciences under which the National Academy shall conduct an evaluation of how well ARPA-E is achieving the goals and mission of ARPA-E.”; and

(2) in paragraph (2)—

(A) in the matter preceding subparagraph (A), by striking “shall” and inserting “may”; and

(B) in subparagraph (A), 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) \$435,000,000 for fiscal year 2021;

“(B) \$500,000,000 for fiscal year 2022;

“(C) \$575,000,000 for fiscal year 2023;

“(D) \$662,000,000 for fiscal year 2024; and

“(E) \$761,000,000 for fiscal year 2025.”

(h) TECHNICAL AMENDMENTS.—Section 5012 of the America COMPETES Act (42 U.S.C. 16538) is amended—

(1) in subsection (g)(3)(A)(iii), by striking “subpart” each place it appears and inserting “subparagraph”; and

(2) in subsection (o)(4)(B), by striking “(c)(2)(D)” and inserting “(c)(2)(C)”.

TITLE XI—OTHER MATTERS

SEC. 11001. LOW-DOSE RADIATION RESEARCH.

(a) LOW-DOSE RADIATION RESEARCH PROGRAM.—Section 306(c) of the Department of Energy Research and Innovation Act (42 U.S.C. 18644(c)) is amended to read as follows:

“(c) LOW-DOSE RADIATION RESEARCH PROGRAM.—

“(1) IN GENERAL.—The Secretary shall carry out a research program on low-dose and low dose-rate radiation to—

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

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

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

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

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

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

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

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

“(3) RESEARCH PLAN.—

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

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

“(4) GAO STUDY.—Not later than 3 years after the date of enactment of the Energy Act of 2020, the Comptroller General shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate, a report on:

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

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

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

“(6) DEFINITIONS.—In this subsection:

“(A) LOW-DOSE RADIATION.—The term ‘low-dose radiation’ means a radiation dose of less than 100 millisieverts.

“(B) LOW DOSE-RATE RADIATION.—The term ‘low dose-rate radiation’ means a radiation dose rate of less than 5 millisieverts per hour.

“(7) RULE OF CONSTRUCTION.—Nothing in this subsection shall be construed to subject any research carried out by the Secretary for the program under this subsection to any limitations described in section 977(e) of the Energy Policy Act of 2005 (42 U.S.C. 16317(e)).

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

“(A) \$20,000,000 for fiscal year 2021;

“(B) \$20,000,000 for fiscal year 2022;

“(C) \$30,000,000 for fiscal year 2023; and

“(D) \$40,000,000 for fiscal year 2024.”

(b) SPACE RADIATION RESEARCH.—Section 306 of the Department of Energy Research and Innovation Act (42 U.S.C. 18644) is amended by adding at the end the following:

“(d) SPACE RADIATION RESEARCH.—The Secretary of Energy, shall continue and strengthen collaboration with the Administrator of the National Aeronautics and Space Administration on basic research to understand the effects and risks of human exposure to ionizing radiation in low Earth orbit, and in the space environment.”

SEC. 11002. AUTHORIZATION.

Section 112(a)(1)(B) of the Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. 7922(a)(1)(B)) is amended by striking “September 30, 2023” and inserting “September 30, 2031”.

SEC. 11003. SENSE OF CONGRESS.

It is the sense of Congress that in order to reduce emissions and meet 100 percent of the power demand in the United States through clean, renewable, or zero emission energy sources while maintaining United States leadership in science and technology, the Secretary of Energy must prioritize funding for critical fundamental research infrastructure and for basic research and development activities carried out through the Office of Science.

SEC. 11004. ADDRESSING INSUFFICIENT COMPENSATION OF EMPLOYEES AND OTHER PERSONNEL OF THE FEDERAL ENERGY REGULATORY COMMISSION.

(a) IN GENERAL.—Section 401 of the Department of Energy Organization Act (42 U.S.C. 7171) is amended by adding at the end the following:

“(k) ADDRESSING INSUFFICIENT COMPENSATION OF EMPLOYEES AND OTHER PERSONNEL OF THE COMMISSION.—

“(1) IN GENERAL.—Notwithstanding any other provision of law, if the Chairman of the Commission publicly certifies that compensation for a category of employees or other personnel of the Commission is insufficient to retain or attract employees and other personnel to allow the Commission to carry out the functions of the Commission in a timely, efficient, and effective manner, the Chairman may fix the compensation for the category of employees or other personnel without regard to chapter 51 and subchapter III of chapter 53 of title 5, United States Code, or any other civil service law.

“(2) CERTIFICATION REQUIREMENTS.—A certification issued under paragraph (1) shall—

“(A) apply with respect to a category of employees or other personnel responsible for conducting work of a scientific, technological, engineering, or mathematical nature;

“(B) specify a maximum amount of reasonable compensation for the category of employees or other personnel;

“(C) be valid for a 5-year period beginning on the date on which the certification is issued;

“(D) be no broader than necessary to achieve the objective of retaining or attracting employees and other personnel to allow the Commission to carry out the functions of the Commission in a timely, efficient, and effective manner; and

“(E) include an explanation for why the other approaches available to the Chairman for retaining and attracting employees and other personnel are inadequate.

“(3) RENEWAL.—

“(A) IN GENERAL.—Not later than 90 days before the date of expiration of a certification issued under paragraph (1), the Chairman shall determine whether the certification should be renewed for a subsequent 5-year period.

“(B) REQUIREMENT.—If the Chairman determines that a certification should be renewed under subparagraph (A), the Chairman may renew the certification, subject to the certification requirements under paragraph (2) that were applicable to the initial certification.

“(4) NEW HIRES.—

“(A) IN GENERAL.—An employee or other personnel that is a member of a category of employees or other personnel that would have been covered by a certification issued under paragraph (1), but was hired during a period in which the certification has expired and has not been renewed under paragraph (3) shall not be eligible for compensation at the level that would have applied to the employee or other personnel if the certification had been in effect on the date on which the employee or other personnel was hired.

“(B) COMPENSATION OF NEW HIRES ON RENEWAL.—On renewal of a certification under paragraph (3), the Chairman may fix the compensation of the employees or other personnel described in subparagraph (A) at the level established for the category of employees or other personnel in the certification.

“(5) RETENTION OF LEVEL OF FIXED COMPENSATION.—A category of employees or other personnel, the compensation of which was fixed by the Chairman in accordance with paragraph (1), may, at the discretion of the Chairman, have the level of fixed compensation for the category of employees or other personnel retained, regardless of whether a certification described under that paragraph is in effect with respect to the compensation of the category of employees or other personnel.

“(6) CONSULTATION REQUIRED.—The Chairman shall consult with the Director of the Office of Personnel Management in implementing this subsection, including in the determination

of the amount of compensation with respect to each category of employees or other personnel.

“(7) EXPERTS AND CONSULTANTS.—

“(A) IN GENERAL.—Subject to subparagraph (B), the Chairman may—

“(i) obtain the services of experts and consultants in accordance with section 3109 of title 5, United States Code;

“(ii) compensate those experts and consultants for each day (including travel time) at rates not in excess of the rate of pay for level IV of the Executive Schedule under section 5315 of that title; and

“(iii) pay to the experts and consultants serving away from the homes or regular places of business of the experts and consultants travel expenses and per diem in lieu of subsistence at rates authorized by sections 5702 and 5703 of that title for persons in Government service employed intermittently.

“(B) LIMITATIONS.—The Chairman shall—

“(i) to the maximum extent practicable, limit the use of experts and consultants pursuant to subparagraph (A); and

“(ii) ensure that the employment contract of each expert and consultant employed pursuant to subparagraph (A) is subject to renewal not less frequently than annually.”.

(b) REPORTS.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, and every 2 years thereafter for 10 years, the Chairman of the Federal Energy Regulatory Commission shall submit to the Committee on Energy and Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on information relating to hiring, vacancies, and compensation at the Federal Energy Regulatory Commission.

(2) INCLUSIONS.—Each report under paragraph (1) shall include—

(A) an analysis of any trends with respect to hiring, vacancies, and compensation at the Federal Energy Regulatory Commission; and

(B) a description of the efforts to retain and attract employees or other personnel responsible for conducting work of a scientific, technological, engineering, or mathematical nature at the Federal Energy Regulatory Commission.

(c) APPLICABILITY.—The amendment made by subsection (a) shall apply beginning on the date that is 30 days after the date of enactment of this Act.

SEC. 11005. REPORT ON THE AUTHORITY OF THE SECRETARY OF ENERGY TO IMPLEMENT FLEXIBLE COMPENSATION MODELS.

Not later than 180 days after the date of enactment of this Act, the Secretary of Energy shall submit to Congress a report examining the full scope of the hiring authority made available to the Secretary of Energy by the Office of Personnel Management to implement flexible compensation models, including pay for

performance and pay banding, throughout the Department of Energy, including at the National Laboratories, for the purposes of hiring, recruiting, and retaining employees responsible for conducting work of a scientific, technological, engineering, or mathematical nature.

DIVISION AA—WATER RESOURCES DEVELOPMENT ACT OF 2020

SEC. 1. SHORT TITLE; TABLE OF CONTENTS.

(a) **SHORT TITLE.**—This division may be cited as the “Water Resources Development Act of 2020”.

(b) **TABLE OF CONTENTS.**—The table of contents for this Act is as follows:

DIVISION AA—WATER RESOURCES DEVELOPMENT ACT OF 2020

Sec. 1. Short title; table of contents.
Sec. 2. Secretary defined.

TITLE I—GENERAL PROVISIONS

Sec. 101. Budgetary treatment expansion and adjustment for the Harbor Maintenance Trust Fund.
Sec. 102. Authorization of appropriations for navigation.
Sec. 103. Annual report to Congress on the Harbor Maintenance Trust Fund.
Sec. 104. Additional measures at donor ports and energy transfer ports.
Sec. 105. Construction of water resources development projects by non-Federal interests.
Sec. 106. Coast Guard anchorages.
Sec. 107. State contribution of funds for certain operation and maintenance costs.
Sec. 108. Great Lakes confined disposal facilities.
Sec. 109. Inland waterway projects.
Sec. 110. Implementation of water resources principles and requirements.
Sec. 111. Resiliency planning assistance.
Sec. 112. Project consultation.
Sec. 113. Review of resiliency assessments.
Sec. 114. Small flood control projects.
Sec. 115. Flood Protection Projects.
Sec. 116. Feasibility studies; review of natural and nature-based features.
Sec. 117. Federal interest determination.
Sec. 118. Pilot programs on the formulation of Corps of Engineers projects in rural communities and economically disadvantaged communities.
Sec. 119. Permanent measures to reduce emergency flood fighting needs for communities subject to repetitive flooding.
Sec. 120. Emergency response to natural disasters.
Sec. 121. Cost and benefit feasibility assessment.
Sec. 122. Expediting repairs and recovery from flooding.
Sec. 123. Review of Corps of Engineers assets.
Sec. 124. Sense of Congress on multipurpose projects.
Sec. 125. Beneficial use of dredged material; dredged material management plans.
Sec. 126. Aquatic ecosystem restoration for anadromous fish.
Sec. 127. Annual report to Congress on water resources infrastructure.
Sec. 128. Harmful algal bloom demonstration program.
Sec. 129. Missouri River interception-rearing complex construction.
Sec. 130. Materials, services, and funds for repair, restoration, or rehabilitation of projects.
Sec. 131. Levee safety.
Sec. 132. National Dam Safety Program.
Sec. 133. Rehabilitation of Corps of Engineers constructed pump stations.
Sec. 134. Non-Federal Project Implementation Pilot Program.
Sec. 135. Cost sharing provisions for territories and Indian Tribes.
Sec. 136. Review of contracting policies.
Sec. 137. Criteria for funding environmental infrastructure projects.
Sec. 138. Aging infrastructure.
Sec. 139. Uniformity of notification systems.
Sec. 140. Coastal storm damage reduction contracts.
Sec. 141. Dam remediation for ecosystem restoration.