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116TH CONGRESS
2D SESSION

H. R. 3607

[Report No. 116–510]

To amend the Energy Policy Act of 2005 to direct Federal research in fossil energy and to promote the development and demonstration of environmentally responsible coal and natural gas technologies, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JULY 2, 2019

Mr. VEASEY (for himself, Mr. SCHWEIKERT, Mr. LAMB, Mrs. FLETCHER, and Ms. JOHNSON of Texas) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

SEPTEMBER 17, 2020

Additional sponsors: Mr. FITZPATRICK, Mr. MCKINLEY, Ms. TORRES SMALL of New Mexico, Mr. MALINOWSKI, and Mr. MCADAMS

SEPTEMBER 17, 2020

Reported with an amendment; committed to the Committee of the Whole House on the State of the Union and ordered to be printed

[Strike out all after the enacting clause and insert the part printed in italic]

[For text of introduced bill, see copy of bill as introduced on July 2, 2019]

A BILL

To amend the Energy Policy Act of 2005 to direct Federal research in fossil energy and to promote the development and demonstration of environmentally responsible coal and natural gas technologies, and for other purposes.

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

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Fossil Energy Research and Development Act of 2019".

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

SEC. 2. DEFINITIONS.

For purposes of this Act:

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

(2) SECRETARY.—The term "Secretary" means the Secretary of Energy.

SEC. 3. FOSSIL ENERGY OBJECTIVES.

Section 961 of the Energy Policy Act of 2005 (42 U.S.C. 16291) is amended—

(1) in subsection (a)—

(A) by striking paragraph (2) and inserting the following:

"(2) Decreasing the cost of emissions control technologies for fossil energy production, generation, and delivery.";

(B) by striking paragraph (7) and inserting the following:

"(7) Increasing the export of emissions control technologies from the United States for fossil energy-related equipment, technology, and services."; and

(C) by adding at the end the following:

"(8) Improving the conversion, use, and storage of carbon oxides.

"(9) Lowering greenhouse gas emissions for all fossil fuel production, generation, delivery, and utilization, to the maximum extent possible.

"(10) Preventing, predicting, monitoring, and mitigating the unintended leaking of methane, carbon dioxide, or other fossil fuel-related emissions into the atmosphere.

"(11) Improving the separation and purification of helium from fossil fuel resources.

"(12) Reducing water use, improving water reuse, and minimizing the surface and subsurface en-

vironmental impact in the development of unconventional domestic oil and natural gas resources.

"(13) 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.";

(2) in subsection (b), by striking paragraphs (1) through (3) and inserting the following:

"(1) $825,000,000 for fiscal year 2020;

"(2) $866,250,000 for fiscal year 2021;

"(3) $909,563,000 for fiscal year 2022;

"(4) $955,041,000 for fiscal year 2023; and

"(5) $1,002,793,000 for fiscal year 2024."; and

(3) by striking subsections (c) through (e) and inserting the following:

"(c) PRIORITIZATION.—In carrying out this section, the Secretary shall prioritize technologies and strategies that have the potential to meet emissions reduction goals in the agreement of the twenty-first session of the Conference of the Parties to the United Nations Framework Convention on Climate Change.

"(d) LIMITATION.—None of the funds authorized under this section may be used for Fossil Energy Environmental Restoration or Import/Export Authorization.".

SEC. 4. CARBON CAPTURE TECHNOLOGIES.

(a) CARBON CAPTURE PROGRAM.—Section 962 of the Energy Policy Act of 2005 (42 U.S.C. 16292) is amended to read as follows:

"SEC. 962. CARBON CAPTURE TECHNOLOGIES.

"(a) IN GENERAL.—The Secretary shall conduct a program of research, development, demonstration, and commercial application of carbon capture technologies, which shall include facilitation of the development and use of—

"(1) carbon capture technologies for coal and natural gas;

"(2) innovations to significantly decrease emissions at existing power plants; and

"(3) advanced separation technologies.

"(b) INVESTMENT.—As a part of the program under subsection (a), the Secretary shall maintain robust investments in carbon capture technologies for coal and natural gas applications.

"(c) LARGE-SCALE PILOTS.—In carrying out this section, the Secretary is encouraged to support pilot projects that test carbon capture technologies on coal and natural gas power and industrial systems below the 100 megawatt scale, consistent with section 988(b).

"(d) COST AND PERFORMANCE GOALS.—In carrying out the program under subsection (a), the Secretary shall establish cost and performance goals to assist in the transi-

tion of carbon capture research to commercially viable technologies.

"(e) CARBON CAPTURE PILOT TEST CENTERS.—

"(1) IN GENERAL.—As a part of the program under subsection (a), not later than 1 year after the date of the enactment of the Fossil Energy Research and Development Act of 2019, the Secretary shall award grants to eligible entities for the operation of not less than three Carbon Capture Test Centers (in this subsection, known as the 'Centers') to provide unique testing capabilities for innovative carbon capture technologies for power and industrial systems.

"(2) PURPOSE.—Each Center shall—

"(A) advance research, development, demonstration, and commercial application of carbon capture technologies for power and industrial systems; and

"(B) test technologies that represent the scale of technology development beyond laboratory testing, but not yet advanced to testing under operational conditions at commercial scale.

"(3) APPLICATION.—An entity seeking to operate a Center under this subsection shall submit to the

Secretary an application at such time and in such manner as the Secretary may require.

"(4) PRIORITY CRITERIA.—In selecting applications to operate a Center under this subsection, the Secretary shall prioritize applicants that—

"(A) have access to existing or planned research facilities with modular technology capabilities;

"(B) are institutions of higher education with established expertise in engineering and design for carbon capture technologies, or partnerships with such institutions;

"(C) have access to existing research and test facilities for pre-combustion, post-combustion, or oxy-combustion technologies; or

"(D) have test capabilities to address scaling challenges of integrating carbon capture technologies with utility scale power plants.

"(5) CONSIDERATIONS.—In awarding grants for the operation of the Centers under this subsection, the Secretary shall ensure that—

"(A) the portfolio of Centers includes a diverse representation of regional and resource characteristics; and

"(B) each new Center demonstrates unique research capabilities, unique regional benefits, or new technology development opportunities.

"(6) SCHEDULE.—Each grant to operate a Center under this subsection shall be awarded for a term of not more than 5 years, subject to the availability of appropriations. The Secretary may renew such 5-year term without limit, subject to a rigorous merit review.

"(7) TERMINATION.—To the extent otherwise authorized by law, the Secretary may eliminate a Center during any 5-year term described in paragraph (6) if such Center is underperforming.

"(f) DEMONSTRATIONS.—

"(1) IN GENERAL.—As a part of the program under subsection (a), the Secretary may provide grants for large-scale demonstration projects for power and industrial systems that test 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 the technology at commercial scale, in accordance with this subsection.

"(2) ENGINEERING AND DESIGN STUDIES.—The Secretary is authorized to fund front-end engineering

and design studies in addition to, or in advance of, issuing an award for a demonstration project under this subsection.

"(3) APPLICATION.—An entity seeking an award to conduct a demonstration project under this subsection shall submit to the Secretary an application at such time and in such manner as the Secretary may require.

"(4) LIMITATIONS.—The Secretary shall only provide an award under this subsection after reviewing each applicant and application regarding—

"(A) financial strength;

"(B) construction schedule;

"(C) market risk; and

"(D) contractor history.

"(5) REQUIREMENTS.—A demonstration project funded under this subsection shall—

"(A) utilize technologies that have completed pilot-scale testing or the equivalent, as determined by the Secretary;

"(B) secure and maintain agreements for the utilization or sequestration of captured carbon dioxide; and

"(C) upon completion, demonstrate carbon capture technologies on a power or industrial

system capable of capturing not less than 100,000 tons of carbon dioxide annually.

"(g) DEFINITION OF POWER SYSTEM.—In this section, the term 'power system' means any electricity generating unit that utilizes fossil fuels to generate electricity provided to the electric grid or directly to a consumer.

"(h) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts made available under section 961, there are authorized to be appropriated to the Secretary for activities under this section—

"(1) $300,000,000 for fiscal year 2020;

"(2) $315,000,000 for fiscal year 2021;

"(3) $330,750,000 for fiscal year 2022;

"(4) $347,288,000 for fiscal year 2023; and

"(5) $364,652,000 for fiscal year 2024.".

(b) GAO STUDY.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Comptroller General of the United States 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 of the Department's successes, failures, practices, and improvements in carrying out demonstration projects for carbon capture technologies

for power and industrial systems. In conducting the study, the Comptroller General shall consider—

(A) applicant and contractor qualifications;

(B) project management practices at the Department;

(C) economic or market changes and other factors impacting project viability;

(D) completion of third-party agreements, including power purchase agreements and carbon dioxide offtake agreements;

(E) regulatory challenges; and

(F) construction challenges.

(2) CONSIDERATION.—The Secretary shall consider any relevant recommendations, as determined by the Secretary, provided in the report required under paragraph (1), and shall adopt such recommendations as the Secretary considers appropriate.

(3) POWER SYSTEM DEFINED.—In this section, the term "power system" means any electricity generating unit that utilizes fossil fuels to generate electricity provided to the electric grid or directly to a consumer.

SEC. 5. NATURAL GAS CARBON CAPTURE RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.

(a) 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. 969. NATURAL GAS CARBON CAPTURE RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.

"(a) DEFINITIONS.—In this section:

"(1) NATURAL GAS.—The term 'natural gas' includes 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) any product derived directly from natural gas, including hydrogen.

"(2) QUALIFYING ELECTRIC GENERATION FACILITY.—The term 'qualifying electric generation facility' means a facility that generates electric energy through the use of natural gas.

"(3) QUALIFYING TECHNOLOGY.—The term 'qualifying technology' means any technology to cap-

ture carbon dioxide produced during the generation of electricity from natural gas power systems

"(b) ESTABLISHMENT OF RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.—

"(1) IN GENERAL.—The Secretary shall establish a program under which the Secretary shall, through a competitive, merit-reviewed process, award grants to eligible entities to conduct research, development, and demonstration of qualifying technologies.

"(2) OBJECTIVES.—The objectives of the program established under paragraph (1) shall be—

"(A) to conduct research to accelerate the development of qualifying technologies to reduce the quantity of carbon dioxide emissions released from qualifying electric generation facilities, including—

"(i) pre- and post-combustion capture technologies; and

"(ii) technologies to improve the thermodynamics, kinetics, scalability, durability, and flexibility of carbon capture technologies for use during the generation of electricity from natural gas power systems;

"(B) to expedite and carry out demonstration projects (including pilot projects) for quali-

fying technologies in partnership with qualifying electric generation facilities in order to demonstrate the technical feasibility and economic potential for commercial deployment of technologies developed pursuant to subparagraph (A); and

"(C) to identify any barriers to the commercial deployment of any qualifying technologies under development pursuant to research conducted pursuant to subparagraph (A).

"(3) ELIGIBLE ENTITIES.— An entity eligible to receive a grant under this subsection is—

"(A) a National Laboratory;

"(B) an institution of higher education;

"(C) a research facility;

"(D) a multi-institutional collaboration; or

"(E) another appropriate entity or combination of any of the entities specified in subparagraphs (A) through (D).

"(c) CARBON CAPTURE FACILITIES DEMONSTRATION PROGRAM.—

"(1) ESTABLISHMENT.—As part of the program established under paragraph (1), the Secretary shall establish a demonstration program under which the Secretary shall, through a competitive, merit-reviewed

process, enter into cooperative agreements with entities that submit applications pursuant to paragraph (4) for demonstration or pilot projects to construct and operate, by not later than September 30, 2025, up to five facilities to capture carbon dioxide from qualifying electric generation facilities. The Secretary shall, to the maximum extent practicable, provide technical assistance to any entity seeking to enter into such a cooperative agreement in obtaining any necessary permits and licenses to demonstrate qualifying technologies.

"(2) COOPERATIVE AGREEMENTS.—The Secretary may enter into a cooperative agreement under this subsection with industry stakeholders, including any such industry stakeholder operating in partnership with National Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

"(3) GOALS.—Each demonstration or pilot project carried out pursuant to the demonstration program under this subsection shall—

"(A) be designed to further the development of qualifying technologies that may be used by a qualifying electric generation facility;

"(B) be financed in part by the private sector;

"(C) if necessary, secure agreements for the offtake of carbon dioxide emissions captured by qualifying technologies during the project; and

"(D) support energy production in the United States.

"(4) REQUEST FOR APPLICATIONS.—Not later than 120 days after the date of enactment of this Act, the Secretary shall solicit applications for cooperative agreements for projects—

"(A) to demonstrate qualifying technologies at up to five qualifying electric generation facilities; and

"(B) to construct and operate three or more facilities to capture carbon dioxide from a qualifying electric generation facility.

"(5) REVIEW OF APPLICATIONS.—In considering applications submitted under paragraph (4), the Secretary, to the maximum extent practicable, shall—

"(A) ensure a broad geographic distribution of project sites;

"(B) ensure that a broad selection of qualifying electric generation facilities are represented;

"(C) ensure that a broad selection of qualifying technologies are represented;

"(D) require information and knowledge gained by each participant in the demonstration program to be transferred and shared among all participants in the demonstration program; and

"(E) leverage existing—

"(i) public-private partnerships; and

"(ii) Federal resources.

"(d) COST SHARING.—In carrying out this section, the Secretary shall require cost sharing in accordance with section 988.

"(e) REPORT.—Not later than 180 days after the date on which the Secretary solicits applications under subsection (c)(3), 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—

"(1) a detailed description of how applications for cooperative agreements under subsection (b) will be solicited and evaluated, including—

"(A) a list of any activities carried out by the Secretary to solicit or evaluate applications; and

"(B) a process for ensuring that any projects carried out under a cooperative agreement are designed to result in the development or demonstration of qualifying technologies;

"(2)(A) in the case of the first report under this subsection, a detailed list of technical milestones for the development and demonstration of each qualifying technology pursued under subsection (b); and

"(B) in the case of each subsequent report under this subsection, the progress made towards achieving such technical milestones during the period covered by the report; and

"(3) with respect to the demonstration program established under subsection (c), includes—

"(A) an estimate of the cost of licensing, permitting, constructing, and operating each carbon capture facility expected to be constructed under that demonstration program;

"(B) a schedule for the planned construction and operation of each demonstration or pilot project; and

"(C) 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.

"(f) FUNDING.—For each of fiscal years 2020 through 2025, out of any amounts appropriated to the Department to carry out fossil energy research and development activities and not otherwise obligated, the Secretary may use to carry out this section not more than $50,000,000.".

(b) CLERICAL AMENDMENT.—The table of contents for the Energy Policy Act of 2005 (Public Law 109–58; 119 Stat. 600) is amended by inserting after the item relating to section 968 the following:

"Sec. 969. Natural gas carbon capture research, development, and demonstration program.".

SEC. 6. CARBON STORAGE VALIDATION AND TESTING.

Section 963 of the Energy Policy Act of 2005 (42 U.S.C. 16293) is amended to read as follows:

"SEC. 963. CARBON STORAGE VALIDATION AND TESTING.

"(a) CARBON STORAGE.—The Secretary, in consultation with the Administrator of the Environmental Protection Agency, shall carry out a program of research, development, and demonstration for carbon storage. The program shall—

"(1) in coordination with relevant Federal agencies, develop and maintain mapping tools and resources that assess the capacity of geologic storage formations in the United States;

"(2) develop monitoring tools, modeling of geologic formations, and analyses to predict and verify

carbon dioxide containment and account for sequestered carbon dioxide in geologic storage sites;

"(3) research potential environmental, safety, and health impacts in the event of a leak to the atmosphere or to an aquifer, and any corresponding mitigation actions or responses to limit harmful consequences;

"(4) evaluate the interactions of carbon dioxide with formation solids and fluids, including the propensity of injections to induce seismic activity;

"(5) assess and ensure the safety of operations related to geologic sequestration of carbon dioxide;

"(6) determine the fate of carbon dioxide concurrent with and following injection into geologic formations;

"(7) support cost and business model assessments to examine the economic viability of technologies and systems developed under this program; and

"(8) provide information to State, local, and Tribal governments, the Environmental Protection Agency, and other appropriate entities, to support development of a regulatory framework for commercial-scale sequestration operations that ensure the protection of human health and the environment.

"(b) GEOLOGIC SETTINGS.—In carrying out research activities under this section, the Secretary shall consider a variety of candidate geologic settings, both onshore and offshore, including—

"(1) operating oil and gas fields;

"(2) depleted oil and gas fields;

"(3) residual oil zones;

"(4) unconventional reservoirs and rock types;

"(5) unmineable coal seams;

"(6) saline formations in both sedimentary and basaltic geologies;

"(7) geologic systems that may be used as engineered reservoirs to extract economical quantities of brine from geothermal resources of low permeability or porosity; and

"(8) geologic systems containing in situ carbon dioxide mineralization formations.

"(c) REGIONAL CARBON SEQUESTRATION PARTNERSHIPS.—

"(1) IN GENERAL.—The Secretary shall carry out large-scale carbon sequestration demonstrations for geologic containment of carbon dioxide to collect and validate information on the cost and feasibility of commercial deployment of technologies for the geologic containment of carbon dioxide. The Secretary

may fund new demonstrations or expand the work completed at one or more of the existing regional carbon sequestration partnerships.

"(2) DEMONSTRATION COMPONENTS.—Each demonstration described in paragraph (1) shall include longitudinal tests involving carbon dioxide injection and monitoring, mitigation, and verification operations.

"(3) CLEARINGHOUSE.—The National Energy Technology Laboratory shall act as a clearinghouse of shared information and resources for the regional carbon sequestration partnerships and any new demonstrations funded under this section.

"(4) REPORT.—Not later than 1 year after the date of enactment of the Fossil Energy Research and Development Act of 2019, the Secretary shall provide 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—

"(A) assesses the progress of all regional carbon sequestration partnerships;

"(B) identifies the remaining challenges in achieving carbon sequestration that is reliable

and safe for the environment and public health; and

"(C) creates a roadmap for Department of Energy carbon storage research and development activities through 2030 with the goal of reducing economic and policy barriers to commercial carbon sequestration.

"(5) LARGE-SCALE CARBON SEQUESTRATION.—For purposes of this subsection, 'large-scale carbon sequestration' means a scale that demonstrates the ability to inject and sequester several million metric tons carbon dioxide for at least 10 years.

"(d) INTEGRATED STORAGE PROJECTS.—The Secretary may carry out a program for the purpose of transitioning the large-scale carbon sequestration demonstration projects under subsection (c) into integrated, commercial storage complexes. The program shall focus on—

"(1) qualifying geologic storage sites in order to accept large volumes of carbon dioxide acceptable for commercial contracts;

"(2) understanding the technical and commercial viability of storage sites;

"(3) developing the qualification processes that will be necessary for a diverse range of geologic storage sites to commercially accept carbon dioxide; and

"(4) any other activities the Secretary determines necessary to transition the large scale demonstration storage projects into commercial ventures.

"(e) COST SHARING.—The Secretary shall require cost sharing under this section in accordance with section 988.

"(f) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts made available under section 961, there are authorized to be appropriated to the Secretary for activities under this section—

"(1) $120,000,000 for fiscal year 2020;

"(2) $126,000,000 for fiscal year 2021;

"(3) $132,300,000 for fiscal year 2022;

"(4) $138,915,000 for fiscal year 2023; and

"(5) $145,860,750 for fiscal year 2024.".

SEC. 7. CARBON UTILIZATION.

(a) PROGRAM.—Subtitle F of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16291 et seq.) is amended by inserting after section 963 (42 U.S.C. 16293) the following:

"SEC. 963A. CARBON UTILIZATION.

"(a) IN GENERAL.—The Secretary shall carry out a program of research, development, and demonstration for carbon utilization. The program shall—

"(1) assess and monitor potential changes in life cycle carbon dioxide and other greenhouse gas emissions, and other environmental safety indicators of new technologies, practices, processes, or methods, used in enhanced hydrocarbon recovery as part of the activities authorized in section 963 of the Energy Policy Act of 2005 (42 U.S.C. 16293);

"(2) identify and evaluate novel uses for carbon, including the conversion of carbon oxides, in a manner that, on a full life-cycle basis, achieves a permanent reduction in, or avoidance of a net increase in carbon dioxide in the atmosphere, for use in commercial and industrial products, such as—

"(A) chemicals;

"(B) plastics;

"(C) building materials;

"(D) fuels;

"(E) cement;

"(F) products of coal utilization in power systems (as such term is defined in section 962(e)), or other applications; or

"(G) other products with demonstrated market value;

"(3) carbon capture technologies for industrial systems;

"(4) identify and assess alternative uses for coal that result in no net emissions of carbon dioxide or other pollutants, including products derived from carbon engineering, carbon fiber, and coal conversion methods.

"(b) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts made available under section 961, there are authorized to be appropriated to the Secretary for activities under this section—

"(1) $25,000,000 for fiscal year 2020;

"(2) $26,250,000 for fiscal year 2021;

"(3) $27,562,500 for fiscal year 2022;

"(4) $28,940,625 for fiscal year 2023; and

"(5) $30,387,656 for fiscal year 2024.".

(b) STUDY.—The Secretary shall enter into an agreement with the National Academies to conduct a study assessing the barriers, and opportunities related to the commercial application of carbon dioxide in the United States. Such study shall—

(1) analyze the technical feasibility, related challenges, and impacts to commercializing carbon dioxide, including—

(A) creating a national system of carbon dioxide pipelines and geologic sequestration sites;

(B) mitigating environmental and landowner impacts; and

(C) regional economic challenges and opportunities;

(2) identify potential markets, industries, or sectors that may benefit from greater access to commercial carbon dioxide;

(3) assess the current state of infrastructure and any necessary updates to allow for the integration of safe and reliable carbon dioxide transportation, utilization, and storage;

(4) estimate the economic, climate, and environmental impacts of any well-integrated national carbon dioxide pipeline system, including suggestions for policies that could improve the economic impact of the system;

(5) assess the global status and progress of carbon utilization technologies (both chemical and biological) in practice today that utilize waste carbon (including carbon dioxide, carbon monoxide, methane,

and biogas) from power generation, biofuels production, and other industrial processes;

(6) identify emerging technologies and approaches for carbon utilization that show promise for scale-up, demonstration, deployment, and commercialization;

(7) 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;

(8) assess the major technical challenges associated with increasing the commercial viability of carbon reuse technologies, and identify the research and development questions that will address those challenges;

(9) assess current research efforts, including engineering and computational, that are addressing these challenges and identify gaps in the current research portfolio; and

(10) develop a comprehensive research agenda that addresses both long- and short-term research needs and opportunities.

SEC. 8. ADVANCED ENERGY SYSTEMS.

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. 969A. ADVANCED ENERGY SYSTEMS.

"(a) IN GENERAL.—The Secretary shall conduct a program, with the purpose of reducing emissions from fossil fuel power generation by not less than 50 percent, of research, development, demonstration, and commercial application with respect to the following:

"(1) High-efficiency turbines in accordance with the program under section 969A–1.

"(2) Supercritical and ultrasupercritical carbon dioxide, with an emphasis on developing directly-fired and indirectly fired cycles in the next 10 years.

"(3) Advanced combustion systems, including oxy-combustion systems and chemical looping.

"(4) Fuel cell technologies for low-cost, high-efficiency, fuel-flexible, modular power systems, including solid oxide fuel cell technology for commercial, residential, and distributed generation systems, using improved manufacturing production and processes.

"(5) Gasification systems to enable carbon capture, improve efficiency, and reduce capital and operating costs.

"(6) Thermal cycling with ramping or rapid black start capabilities that do not compromise efficiency or environmental performance.

"(7) Small-scale and modular coal-fired technologies with reduced carbon outputs or carbon capture that can support incremental power generation capacity additions.

"(b) PRIORITY.—In carrying out the program under subsection (a), the Secretary is encouraged to prioritize transformational technologies that enable a step change in reduction of emissions as compared to the technology in existence on the date of enactment of this section.

"(c) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts made available under section 961, there are authorized to be appropriated to the Secretary for activities under this section and section 969A–1—

"(1) $150,000,000 for fiscal year 2020;

"(2) $157,500,000 for fiscal year 2021;

"(3) $165,375,000 for fiscal year 2022;

"(4) $173,643,750 for fiscal year 2023; and

"(5) $182,325,938 for fiscal year 2024.

"SEC. 969A–1. HIGH EFFICIENCY GAS TURBINES.

"(a) IN GENERAL.—The Secretary of Energy, through the Office of Fossil Energy, shall carry out a multiyear, multiphase program of research, development, and tech-

nology demonstration to improve the efficiency of gas turbines used in power generation systems and to identify the technologies that ultimately will lead to gas turbine combined cycle efficiency of 67 percent or simple cycle efficiency of 50 percent.

"(b) PROGRAM ELEMENTS.—The program under this section shall—

"(1) support first-of-a-kind engineering and detailed gas turbine design for megawatt-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 three-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 so as to demonstrate technical and economic feasibility; and

"(4) assess overall combined cycle and simple cycle system performance.

"(c) PROGRAM GOALS.—The goals of the multiphase program established under subsection (a) shall be—

"(1) in phase I—

"(A) to develop the conceptual design of advanced high efficiency gas turbines that can achieve at least 65-percent combined cycle efficiency or 47-percent simple cycle efficiency on a lower heating value basis; and

"(B) to develop and demonstrate the technology required for advanced high efficiency gas turbines that can achieve at least 65-percent combined cycle efficiency or 47-percent simple cycle efficiency on a lower heating value basis; and

"(2) in phase II, to develop the conceptual design for advanced high efficiency gas turbines that can achieve at least 67-percent combined cycle efficiency or 50-percent simple cycle efficiency on a lower heating value basis.

"(d) PROPOSALS.—Within 180 days after the date of enactment of this Act, the Secretary shall solicit grant and contract proposals from industry, small businesses, universities, and other appropriate parties for conducting activities under this Act. In selecting proposals, the Secretary shall emphasize—

"(1) the extent to which the proposal will stimulate the creation or increased retention of jobs in the United States; and

"(2) the extent to which the proposal will promote and enhance United States technology leadership.

"(e) COMPETITIVE AWARDS.—The provision of funding under this section shall be on a competitive basis with an emphasis on technical merit.

"(f) COST SHARING.—Section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352) shall apply to an award of financial assistance made under this section.

"(g) LIMITS ON PARTICIPATION.—The limits on participation applicable under section 999E of the Energy Pol-

icy Act of 2005 (42 U.S.C. 16375) shall apply to financial assistance awarded under this section.".

SEC. 9. RARE EARTH ELEMENTS.

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. RARE EARTH ELEMENTS.

"(a) IN GENERAL.—In coordination with the relevant Federal agencies, the Secretary shall conduct research to develop and assess methods to separate and recover rare earth elements and other strategic minerals and coproducts from coal and coal byproduct streams. The program shall—

"(1) develop advanced rare earth element separation and extraction processes using coal-based resources as feedstock materials;

"(2) assess the technical and economic feasibility of recovering rare earth elements from coal-based resources and validate such feasibility with prototype systems producing salable, high-purity rare earth elements from coal-based resources; and

"(3) assess and mitigate any environmental and public health impacts of recovering rare earth elements from coal-based resources.

"(b) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts made available under section 961, there are au-

thorized to be appropriated to the Secretary for activities under this section—

"(1) $23,000,000 for fiscal year 2020;

"(2) $24,150,000 for fiscal year 2021;

"(3) $25,357,500 for fiscal year 2022;

"(4) $26,625,375 for fiscal year 2023; and

"(5) $27,956,644 for fiscal year 2024.".

SEC. 10. METHANE HYDRATE RESEARCH AMENDMENTS.

(a) IN GENERAL.—Section 4(b) of the Methane Hydrate Research and Development Act of 2000 (30 U.S.C. 2003(b)) is amended to read as follows:

"(b) GRANTS, CONTRACTS, COOPERATIVE AGREEMENTS, INTERAGENCY FUNDS TRANSFER AGREEMENTS, AND FIELD WORK PROPOSALS.—

"(1) ASSISTANCE AND COORDINATION.—In carrying out the program of methane hydrate research and development authorized by this section, the Secretary may award grants, or enter into contracts or cooperative agreements to—

"(A) conduct research to identify the environmental, health, and safety impacts of methane hydrate development;

"(B) assess and develop technologies to mitigate environmental impacts of the exploration and commercial development of methane hy-

drates as an energy resource, including the use of seismic testing, and to reduce the public health and safety risks of drilling through methane hydrates;

"(C) conduct research to assess and mitigate the environmental impact of hydrate degassing (including natural degassing and degassing associated with commercial development); or

"(D) expand education and training programs in methane hydrate resource research and resource development through fellowships or other means for graduate education and training.

"(2) ENVIRONMENTAL MONITORING AND RESEARCH.—The Secretary shall conduct a long-term environmental monitoring and research program to study the effects of production from methane hydrate reservoirs.

"(3) COMPETITIVE PEER REVIEW.—Funds made available to carry out paragraphs (1) and (2) shall be made available based on a competitive process using external scientific peer review of proposed research.".

(b) CONFORMING AMENDMENT.—Section 4(e) of such Act (30 U.S.C. 2003(e)) is amended in the matter preceding

paragraph (1) by striking "subsection (b)(1)" and inserting "paragraphs (1) and (2) of subsection (b)".

(c) AUTHORIZATION OF APPROPRIATIONS.—Section 7 of such Act (30 U.S.C. 2006) is amended to read as follows:

"SEC. 7. AUTHORIZATION OF APPROPRIATIONS.

"Of the amounts made available under section 961 of the Energy Policy Act of 2005 (42 U.S.C. 16291), there are authorized to be appropriated to the Secretary to carry out this Act $15,000,000, to remain available until expended, for each of fiscal years 2020 through 2024.".

SEC. 11. CARBON REMOVAL.

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. CARBON REMOVAL.

"(a) ESTABLISHMENT.—The Secretary, in coordination with the appropriate Federal agencies, shall establish a research, development, and demonstration program to remove carbon dioxide from the atmosphere on a large scale. The program may include activities in—

"(1) direct air capture and storage technologies;

"(2) enhanced carbon mineralization;

"(3) bioenergy with carbon capture and sequestration;

"(4) agricultural and grazing practices;

"(5) forest management and afforestation; and

"(6) planned or managed carbon sinks, including natural and artificial.

"(b) PRIORITIZATION.—In carrying out the program established in subsection (a), the Secretary shall prioritize—

"(1) the activities described in paragraphs (1) and (2) of subsection (a), acting through the Assistant Secretary for Fossil Energy; and

"(2) the activities described in subsection (a)(3), acting through the Assistant Secretary for Energy Efficiency and Renewable Energy and the Assistant Secretary for Fossil Energy.

"(c) CONSIDERATIONS.—The program under this section shall identify and develop carbon removal technologies and strategies that consider the following:

"(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.

"(7) Economic co-benefits.

"(d) ACCOUNTING.—The Department shall collaborate with the Environmental Protection Agency and other relevant agencies to develop and improve accounting frameworks and tools to accurately measure carbon removal and sequestration methods and technologies across the Federal Government.

"(e) AIR CAPTURE TECHNOLOGY PRIZE.—Not later than 1 year after the date of enactment of this Act, as part of the program carried out under this section, the Secretary shall carry out a program to award competitive technology prizes for carbon dioxide capture from ambient air or water. In carrying out this subsection, the Secretary shall—

"(1) in accordance with section 24 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719), develop requirements for—

"(A) the prize competition process;

"(B) minimum performance standards for projects eligible to participate in the prize competition; and

"(C) monitoring and verification procedures for projects selected to receive a prize award;

"(2) establish minimum levels for the capture of carbon dioxide from ambient air or water that are required to qualify for a prize award; and

"(3) offer prize awards for any of the following:

"(A) A design for a promising capture technology that will—

"(i) be operated on a demonstration scale; and

"(ii) have the potential to achieve significant reduction in the level of carbon dioxide in the atmosphere.

"(B) A successful bench-scale demonstration of a capture technology.

"(C) An operational capture technology on a commercial scale.

"(f) DIRECT AIR CAPTURE TEST CENTER.—

"(1) IN GENERAL.—Not later than 1 year after the date of enactment of the Fossil Energy Research and Development Act of 2019, the Secretary shall award grants to one or more eligible entities for the operation of one or more test centers (in this subsection, known as 'Centers') to provide unique 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 pilot plant and full-scale demonstration projects and test technologies that represent the scale of technology development beyond laboratory testing but not yet advanced to test under operational conditions at commercial scale;

"(C) develop front-end engineering design and economic analysis; and

"(D) maintain a public record of pilot and full-scale plant performance.

"(3) PRIORITY CRITERIA.—In selecting applications to operate a Center under this subsection, the Secretary shall prioritize applicants that—

"(A) have access to existing or planned research facilities;

"(B) are institutions of higher education with established expertise in engineering for direct air capture technologies, or partnerships with such institutions; or

"(C) have access to existing research and test facilities for bulk materials design and testing, component design and testing, or professional engineering design.

"(4) SCHEDULE.—Each grant to operate a Center under this subsection shall be awarded for a term

of not more than 5 years, subject to the availability of appropriations. The Secretary may renew such 5-year term without limit, subject to a rigorous merit review.

"(5) TERMINATION.—To the extent otherwise authorized by law, the Secretary may eliminate the center during any 5-year term described in the last paragraph if it is underperforming.

"(g) LARGE-SCALE PILOTS AND DEMONSTRATIONS.—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) INTRA-AGENCY RESEARCH.—In carrying out the program established in (a), the Secretary shall encourage and promote collaborations among relevant offices and agencies within the Department.

"(i) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts made available under section 961, there are au-

thorized to be appropriated to the Secretary for activities under this section—

"(1) $75,000,000 for fiscal year 2020, $15,000,000 of which are authorized to carry out subsection (e);

"(2) $63,000,000 for fiscal year 2021;

"(3) $66,150,000 for fiscal year 2022;

"(4) $69,458,000 for fiscal year 2023; and

"(5) $72,930,000 for fiscal year 2024.".

SEC. 12. METHANE LEAK DETECTION AND MITIGATION.

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. METHANE LEAK DETECTION AND MITIGATION.

"(a) IN GENERAL.—The Secretary, in consultation with the Administrator of the Environmental Protection Agency and other appropriate Federal agencies, shall carry out a program of methane leak detection and mitigation research, development, demonstration, and commercial application for technologies and methods that significantly reduce emissions. In carrying out the program, the Secretary shall—

"(1) develop cooperative agreements with State or local governments or private entities to provide technical assistance to—

"(A) prevent or respond to methane leaks, including detection, mitigation, and identification of leaks throughout the natural gas infrastructure (which includes natural gas storage, pipelines, and natural gas production sites); and

"(B) protect public health in the event of a major methane leak;

"(2) promote demonstration and adoption of effective methane emissions-reduction technologies in the private sector;

"(3) in coordination with representatives from private industry, State and local governments, and institutions of higher education, create a publicly accessible resource for best practices in the design, construction, maintenance, performance, monitoring, and incident response for—

"(A) pipeline systems;

"(B) wells;

"(C) compressor stations;

"(D) storage facilities; and

"(E) other vulnerable infrastructure;

"(4) identify high-risk characteristics of pipelines, wells, and materials, geologic risk factors, or other key factors that increase the likelihood of methane leaks; and

"(5) in collaboration with private entities and institutions of higher education, quantify and map significant geologic methane seeps across the United States.

"(b) CONSIDERATIONS.—In carrying out the program under this section, the Secretary shall consider the following:

"(1) Historical data of methane leaks.

"(2) Public health consequences.

"(3) Public safety.

"(4) Novel materials and designs for pipelines, compressor stations, components, and wells (including casing, cement, wellhead).

"(5) Regional geologic traits.

"(6) Induced and natural seismicity.

"(c) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts made available under section 961, there are authorized to be appropriated to the Secretary for activities under this section—

"(1) $22,000,000 for fiscal years 2020;

"(2) $23,100,000 for fiscal years 2021;

"(3) $24,255,000 for fiscal years 2022;

"(4) $25,467,750 for fiscal years 2023; and

"(5) $26,741,138 for fiscal years 2024.".

SEC. 13. WASTE GAS UTILIZATION.

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. 969E. WASTE GAS UTILIZATION.

"The Secretary shall carry out a program of research, development, and demonstration for waste gas utilization. The program shall—

"(1) identify and evaluate novel uses for light hydrocarbons, such as methane, ethane, propane, butane, pentane and hexane, produced during oil and shale gas production, including the production of chemicals or transportation fuels;

"(2) develop advanced gas conversion technologies that are modular and compact, and may leverage advanced manufacturing technologies;

"(3) support demonstration activities at operating oil and gas facilities to test the performance and cost-effectiveness of new gas conversion technologies; and

"(4) assess and monitor potential changes in life cycle greenhouse gas emissions that may result from the use of technologies developed under this program.".

SEC. 14. 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 shall have the authority to—

(A) make appointments to positions in the 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 this section at a rate not to exceed level II of the Executive Schedule; and

(C) pay any employee appointed under this section payments in addition to basic pay, except that the total amount of additional payments paid to an employee under this subsection 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 this section shall not exceed 3 years.

(B) FULL-TIME EMPLOYEES.—Not more than 10 full-time employees appointed under this subsection may be employed at the National Energy Technology Laboratory at any given time.

(b) DISCRETIONARY RESEARCH AND DEVELOPMENT.—

(1) IN GENERAL.—The Secretary shall establish mechanisms under which the Director of the National Energy Technology Laboratory may use an amount that is, in total, not less than 2 percent and not more than 4 percent of all funds available to the Laboratory for the following purposes:

(A) To fund innovative research that is conducted at the Laboratory and supports the mission of the Department.

(B) To fund technology development programs that support the transition of technologies developed by the Laboratory into the commercial market.

(C) To fund workforce development activities to strengthen external engineering and manufacturing partnerships to ensure safe, efficient, productive, and useful fossil energy technology production.

(D) To fund the revitalization, recapitalization, or minor construction of the Laboratory infrastructure.

(2) PRIORITIZATION.—The Director shall prioritize innovative experiments and proposals proposed by scientists and researchers at the National Energy Technology Laboratory.

(3) ANNUAL REPORT ON USE OF AUTHORITY.—Not later than March 1 of each year, 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 use of the authority 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 of the National Energy Technology Laboratory.

(d) REVIEW.—Not later than 2 years after the date of 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 assessing the National Energy Technology Laboratory's management and research. The report 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 the necessary tools and resources to advance its research mission.

SEC. 15. CLIMATE SOLUTIONS CHALLENGES.

(a) AUTHORITY.—Not later than 180 days after the date of enactment of this Act, the Secretary of Energy shall establish a program to be known as "Fossil Energy Climate Solutions Challenges" for carrying out prize competitions described under subsection (d) pursuant to section 24 of the

Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719) relating to the climate and energy.

(b) PRIZE COMMITTEES.—

(1) IN GENERAL.—The Secretary shall assemble a prize committee that shall define the scope and detail of, and provide the requirements for, the prize competitions under this section. Such committee may be composed of—

(A) members from the Office of Fossil Energy, Advanced Research Projects Energy, Office of Technology Transitions, or other offices that most appropriately corresponds with the topic of the prize competition; and

(B) representatives of any other entities, as determined appropriate by the Secretary, including other Federal agencies, State and local governments, and the private sector.

(2) DEFINING TOPIC AREAS.—The prize committee may modify and define the scope of the prize areas described under subsection (c), so long as such modification is in accordance with descriptions in such subsection.

(3) INCENTIVE FOR PRIZE COMPETITION.—The prize committee for each prize competition shall deter-

mine the incentive for the prize competition. In determining the incentive, the committee shall consider—

(A) a cash prize;

(B) access to Government facilities, such as through a lab-embedded entrepreneurship program of the Department of Energy, a cooperative research and development agreement, or other method;

(C) advance market commitments for technologies of use or promise to the Federal Government; and

(D) any other incentive provided for by law.

(4) JUDGING CRITERIA.—The prize committee for each prize competition shall establish judging criteria for the competition that shall include, at a minimum—

(A) potential for the solution to become a commercial product or service or advance knowledge to further the public good;

(B) consideration of how likely the solution is to lead to subsequent research, development, deployment, or manufacturing in the United States;

(C) the degree to which the solution will lower the climate footprint of the United States; and

(D) the degree to which the solution will lower the global climate footprint.

(5) CONSIDERATION.—In carrying out this section, the committee shall take into consideration the best practices provided for in the challenges and prizes toolkit made publicly available on December 15, 2016, by the General Services Administration.

(c) PRIZE COMPETITIONS.—In carrying out the program, the Secretary shall offer prize awards for any of the following:

(1) Solutions to capture carbon emissions from sources that would otherwise be emitted to the atmosphere.

(2) Solutions to convert carbon emissions to a beneficial use that does not result in near-term re-release into the atmosphere, unless such re-release offsets the emission of additional carbon into the atmosphere, such that the net effect of the solution is to reduce the overall amount of carbon being emitted to the atmosphere.

(3) Other solutions that have potential to achieve reduction in greenhouse gas emissions associated with fossil-based energy production.

(d) ACCEPTANCE OF FUNDS.—In addition to such sums as may be appropriated or otherwise made available to the Secretary to award prizes under this section, the Secretary may accept funds from other Federal agencies, private sector entities, and State and local governments to award prizes under this section. The Secretary may not give any special consideration relating to the selection of awards under the prize competition to any private sector entity or individual in return for a donation to the Secretary or prize committee.

(e) ELIGIBILITY.—Notwithstanding section 24(g)(3) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719(g)(3)), a group may be eligible for an award under this section if one or more members of such group is a citizen or permanent resident of the United States.

(f) COMPLETION OF PRIZE COMPETITIONS.—The prize competitions carried out under this section shall be completed not later than the date that is 5 years after the program is established under subsection (a).

(g) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated $15,000,000 to carry out this section, to remain available until expended.

SEC. 16. TABLE OF CONTENTS AMENDMENTS.

The table of contents for the Energy Policy Act of 2005 (42 U.S.C. 15801 note) is amended by amending the items relating to subtitle F of title IX to read as follows:

Union Calendar No. 410

116TH CONGRESS
2D SESSION

H. R. 3607

[Report No. 116–510]

A BILL

To amend the Energy Policy Act of 2005 to direct Federal research in fossil energy and to promote the development and demonstration of environmentally responsible coal and natural gas technologies, and for other purposes.

SEPTEMBER 17, 2020

Reported with an amendment; committed to the Committee of the Whole House on the State of the Union and ordered to be printed