

mental Restoration or Import/Export Authorization.

(2) Institutions of higher education

Of the funds authorized under subsection (c)(2), not less than 20 percent of the funds appropriated for each fiscal year shall be dedicated to research and development carried out at institutions of higher education.

(Pub. L. 109–58, title IX, §961, Aug. 8, 2005, 119 Stat. 889; Pub. L. 116–260, div. Z, title IV, §4001, Dec. 27, 2020, 134 Stat. 2527.)

Editorial Notes

REFERENCES IN TEXT

This part, referred to in subsecs. (a)(1) and (b), was in the original “this subtitle”, meaning subtitle F (§§961–968) of title IX of Pub. L. 109–58, Aug. 8, 2005, 119 Stat. 889, which enacted this part and provisions set out as notes under section 2001 of Title 30, Mineral Lands and Mining, and amended provisions set out as a note under section 1902 of Title 30. For complete classification of subtitle F to the Code, see Tables.

Section 16292 of this title, referred to in subsec. (c)(1), relating to coal and related technologies program, was repealed and a new section 16292 of this title, relating to carbon capture technology program, was enacted by Pub. L. 116–260, div. Z, title IV, §4002(a), Dec. 27, 2020, 134 Stat. 2528.

AMENDMENTS

2020—Subsec. (a). Pub. L. 116–260, §4001(5), designated second sentence of par. (1), as redesignated, as par. (2), inserted heading, and substituted “The programs described in paragraph (1) shall” for “Such programs”.

Pub. L. 116–260, §4001(4), designated existing provisions of subsec. (a) as par. (1), substituted “Establishment” for “In general” in subsec. heading, and inserted par. (1) heading.

Pub. L. 116–260, §4001(3), added subpars. (G) to (L) and struck out former subpar. (G), as redesignated, which read as follows: “Increasing the export of fossil energy-related equipment, technology, and services from the United States.”

Pub. L. 116–260, §4001(2), in subpar. (F), as redesignated, inserted “, 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 period at end.

Pub. L. 116–260, §4001(1), redesignated pars. (1) to (7) of subsec. (a) as subpars. (A) to (G), respectively, and realigned margins.

Subsec. (a)(3). Pub. L. 116–260, §4001(6), added par. (3).

§ 16291a. Property interests

That for all programs funded under Fossil Energy appropriations in this and subsequent Acts, the Secretary may vest fee title or other property interests acquired under projects in any entity, including the United States.

(Pub. L. 113–76, div. D, title III, Jan. 17, 2014, 128 Stat. 165.)

Editorial Notes

CODIFICATION

Section was enacted as part of the Energy and Water Development and Related Agencies Appropriations Act, 2014, and also as part of the Consolidated Appropriations Act, 2014, and not as part of the Energy Policy Act of 2005 which comprises this chapter.

Statutory Notes and Related Subsidiaries

DEFINITIONS

For definition of “this [Act]”, referred to in text, see section 3 of Pub. L. 113–76, set out as a note under section 1 of Title 1, General Provisions.

§ 16292. 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 sig-

nificant 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 December 27, 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);

(D) a front-end engineering and design program for carbon capture technologies; and

(E) a front-end engineering and design program for carbon dioxide transport infrastructure necessary to enable deployment of carbon capture, utilization, and storage technologies.

(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 December 27, 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 car-

rying 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 op-

erating 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 December 27, 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;

(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; and

(E) for activities under the front-end engineering and design program described in subsection (b)(2)(E), \$100,000,000 for the period of fiscal years 2022 through 2026.

(2) Cost sharing for large-scale pilot projects

Activities under subsection (b)(2)(B) shall be subject to the cost-sharing requirements of section 16352(b) of this title.

(e) Carbon capture test centers

(1) In general

Not later than 2 years after December 27, 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 December 27, 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.

(Pub. L. 109–58, title IX, §962, as added Pub. L. 116–260, div. Z, title IV, §4002(a), Dec. 27, 2020, 134 Stat. 2528; amended Pub. L. 117–58, div. D, title III, §40303, Nov. 15, 2021, 135 Stat. 988.)

Editorial Notes

PRIOR PROVISIONS

A prior section 16292, Pub. L. 109–58, title IX, §962, Aug. 8, 2005, 119 Stat. 890, related to coal and related technologies program, prior to repeal by Pub. L. 116–260, div. Z, title IV, §4002(a), Dec. 27, 2020, 134 Stat. 2528.

AMENDMENTS

2021—Subsec. (b)(2)(D). Pub. L. 117–58, §40303(1)(B), substituted “program for carbon capture technologies; and” for “program.”

Subsec. (b)(2)(E). Pub. L. 117–58, §40303(1)(A), (C), added subpar. (E).

Subsec. (d)(1)(E). Pub. L. 117–58, §40303(2), added subpar. (E).

Statutory Notes and Related Subsidiaries

WAGE RATE REQUIREMENTS

For provisions relating to rates of wages to be paid to laborers and mechanics on projects for construction, alteration, or repair work funded under div. D or an amendment by div. D of Pub. L. 117–58, including au-

thority of Secretary of Labor, see section 18851 of this title.

FINDINGS

Pub. L. 117–58, div. D, title III, §40301, Nov. 15, 2021, 135 Stat. 986, provided that: “Congress finds that—

“(1) the industrial sector is integral to the economy of the United States—

“(A) providing millions of jobs and essential products; and

“(B) demonstrating global leadership in manufacturing and innovation;

“(2) carbon capture and storage technologies are necessary for reducing hard-to-abate emissions from the industrial sector, which emits nearly 25 percent of carbon dioxide emissions in the United States;

“(3) carbon removal and storage technologies, including direct air capture, must be deployed at large-scale in the coming decades to remove carbon dioxide directly from the atmosphere;

“(4) large-scale deployment of carbon capture, removal, utilization, transport, and storage—

“(A) is critical for achieving mid-century climate goals; and

“(B) will drive regional economic development, technological innovation, and high-wage employment;

“(5) carbon capture, removal, and utilization technologies require a backbone system of shared carbon dioxide transport and storage infrastructure to enable large-scale deployment, realize economies of scale, and create an interconnected carbon management market;

“(6) carbon dioxide transport infrastructure and permanent geological storage are proven and safe technologies with existing Federal and State regulatory frameworks;

“(7) carbon dioxide transport and storage infrastructure share similar barriers to deployment previously faced by other types of critical national infrastructure, such as high capital costs and chicken-and-egg challenges, that require Federal and State support, in combination with private investment, to be overcome; and

“(8) each State should take into consideration, with respect to new carbon dioxide transportation infrastructure—

“(A) qualifying the infrastructure as pollution control devices under applicable laws (including regulations) of the State; and

“(B) establishing a waiver of ad valorem and property taxes for the infrastructure for a period of not less than 10 years.”

§ 16293. 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.

(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, demonstration, and commercialization 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;

(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; and

(I) evaluating the quantity, location, and timing of geologic carbon storage deployment that may be needed, and developing strategies and resources to enable the deployment.

(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