

(4) For the Office of Arctic Energy under section 7144d of this title \$25,000,000 for each of fiscal years 2007 through 2009.

**(d) Extended authorization**

There are authorized to be appropriated to the Secretary for the Office of Arctic Energy established under section 7144d of this title \$25,000,000 for each of fiscal years 2010 through 2012.

**(e) Limitations**

**(1) Uses**

None of the funds authorized under this section may be used for Fossil Energy Environmental 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.)

REFERENCES IN TEXT

This part, referred to in subssecs. (a) 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.

**§ 16292. Coal and related technologies program**

**(a) In general**

In addition to the programs authorized under subchapter IV, the Secretary shall conduct a program of technology research, development, demonstration, and commercial application for coal and power systems, including programs to facilitate production and generation of coal-based power through—

- (1) innovations for existing plants (including mercury removal);
- (2) gasification systems;
- (3) advanced combustion systems;
- (4) turbines for synthesis gas derived from coal;
- (5) carbon capture and sequestration research and development;
- (6) coal-derived chemicals and transportation fuels;
- (7) liquid fuels derived from low rank coal water slurry;
- (8) solid fuels and feedstocks;
- (9) advanced coal-related research;
- (10) advanced separation technologies; and
- (11) fuel cells for the operation of synthesis gas derived from coal.

**(b) Cost and performance goals**

**(1) In general**

In carrying out programs authorized by this section, during each of calendar years 2008, 2010, 2012, and 2016, and during each fiscal year beginning after September 30, 2021, the Secretary shall identify cost and performance goals for coal-based technologies that would

permit the continued cost-competitive use of coal for the production of electricity, chemical feedstocks, and transportation fuels.

**(2) Administration**

In establishing the cost and performance goals, the Secretary shall—

(A) consider activities and studies undertaken as of August 8, 2005, by industry in cooperation with the Department in support of the identification of the goals;

(B) consult with interested entities, including—

- (i) coal producers;
- (ii) industries using coal;
- (iii) organizations that promote coal and advanced coal technologies;
- (iv) environmental organizations;
- (v) organizations representing workers; and
- (vi) organizations representing consumers;

(C) not later than 120 days after August 8, 2005, publish in the Federal Register proposed draft cost and performance goals for public comments; and

(D) not later than 180 days after August 8, 2005, and every 4 years thereafter, submit to Congress a report describing the final cost and performance goals for the technologies that includes—

- (i) a list of technical milestones; and
- (ii) an explanation of how programs authorized in this section will not duplicate the activities authorized under the Clean Coal Power Initiative authorized under subchapter IV.

**(c) Powder River Basin and Fort Union lignite coal mercury removal**

**(1) In general**

In addition to the programs authorized by subsection (a), the Secretary shall establish a program to test and develop technologies to control and remove mercury emissions from subbituminous coal mined in the Powder River Basin, and Fort Union lignite coals, that are used for the generation of electricity.

**(2) Efficacy of mercury removal technology**

In carrying out the program under paragraph (1), the Secretary shall examine the efficacy of mercury removal technologies on coals described in that paragraph that are blended with other types of coal.

**(d) Fuel cells**

**(1) In general**

The Secretary shall conduct a program of research, development, demonstration, and commercial application on fuel cells for low-cost, high-efficiency, fuel-flexible, modular power systems.

**(2) Demonstrations**

The demonstrations referred to in paragraph (1) shall include solid oxide fuel cell technology for commercial, residential, and transportation applications, and distributed generation systems, using improved manufacturing production and processes.

(Pub. L. 109–58, title IX, §962, Aug. 8, 2005, 119 Stat. 890.)

## REFERENCES IN TEXT

Subchapter IV, referred to in subssecs. (a) and (b)(2)(D)(ii), was in the original “title IV”, meaning title IV of Pub. L. 109–58, Aug. 8, 2005, 119 Stat. 749, which enacted subchapter IV of this chapter and subchapter XIII (§13571 et seq.) of chapter 134 of this title, amended sections 201, 202a, 203, and 207 of Title 30, Mineral Lands and Mining, and enacted provisions set out as notes under section 15801 of this title and section 201 of Title 30. For complete classification of title IV to the Code, see Tables.

**§ 16293. Carbon capture and sequestration research, development, and demonstration program**

**(a) In general**

The Secretary shall carry out a 10-year carbon capture and sequestration research, development, and demonstration program to develop carbon dioxide capture and sequestration technologies related to industrial sources of carbon dioxide for use—

- (1) in new coal utilization facilities; and
- (2) on the fleet of coal-based units in existence on August 8, 2005.

**(b) Objectives**

The objectives of the program under subsection (a) shall be—

- (1) to develop carbon dioxide capture technologies, including adsorption and absorption techniques and chemical processes, to remove the carbon dioxide from gas streams containing carbon dioxide potentially amenable to sequestration;
- (2) to develop technologies that would directly produce concentrated streams of carbon dioxide potentially amenable to sequestration;
- (3) to increase the efficiency of the overall system to reduce the quantity of carbon dioxide emissions released from the system per megawatt generated;
- (4) in accordance with the carbon dioxide capture program, to promote a robust carbon sequestration program and continue the work of the Department, in conjunction with the private sector, through regional carbon sequestration partnerships; and
- (5) to expedite and carry out large-scale testing of carbon sequestration systems in a range of geologic formations that will provide information on the cost and feasibility of deployment of sequestration technologies.

**(c) Programmatic activities**

**(1) Fundamental science and engineering research and development and demonstration supporting carbon capture and sequestration technologies and carbon use activities**

**(A) In general**

The Secretary shall carry out fundamental science and engineering research (including laboratory-scale experiments, numeric modeling, and simulations) to develop and document the performance of new approaches to capture and sequester, or use carbon dioxide to lead to an overall reduction of carbon dioxide emissions.

**(B) Program integration**

The Secretary shall ensure that fundamental research carried out under this para-

graph is appropriately applied to energy technology development activities, the field testing of carbon sequestration, and carbon use activities, including—

- (i) development of new or advanced technologies for the capture and sequestration of carbon dioxide;
- (ii) development of new or advanced technologies that reduce the cost and increase the efficacy of advanced compression of carbon dioxide required for the sequestration of carbon dioxide;
- (iii) modeling and simulation of geologic sequestration field demonstrations;
- (iv) quantitative assessment of risks relating to specific field sites for testing of sequestration technologies;
- (v) research and development of new and advanced technologies for carbon use, including recycling and reuse of carbon dioxide; and
- (vi) research and development of new and advanced technologies for the separation of oxygen from air.

**(2) Field validation testing activities**

**(A) In general**

The Secretary shall promote, to the maximum extent practicable, regional carbon sequestration partnerships to conduct geologic sequestration tests involving carbon dioxide injection and monitoring, mitigation, and verification operations in a variety of candidate geologic settings, including—

- (i) operating oil and gas fields;
- (ii) depleted oil and gas fields;
- (iii) unmineable coal seams;
- (iv) deep saline formations;
- (v) deep geologic systems that may be used as engineered reservoirs to extract economical quantities of heat from geothermal resources of low permeability or porosity; and
- (vi) deep geologic systems containing basalt formations.

**(B) Objectives**

The objectives of tests conducted under this paragraph shall be—

- (i) to develop and validate geophysical tools, analysis, and modeling to monitor, predict, and verify carbon dioxide containment;
- (ii) to validate modeling of geologic formations;
- (iii) to refine sequestration capacity estimated for particular geologic formations;
- (iv) to determine the fate of carbon dioxide concurrent with and following injection into geologic formations;
- (v) to develop and implement best practices for operations relating to, and monitoring of, carbon dioxide injection and sequestration in geologic formations;
- (vi) to assess and ensure the safety of operations related to geologic sequestration of carbon dioxide;
- (vii) to allow the Secretary to promulgate policies, procedures, requirements, and guidance to ensure that the objectives