

- (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 subsecs. (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 paragraph 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 of this subparagraph are met in large-scale testing and deployment activities for carbon capture and sequestration that are funded by the Department of Energy; and

(viii) to provide information to States, 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.

**(3) Large-scale carbon dioxide sequestration testing**

**(A) In general**

The Secretary shall conduct not less than 7 initial large-scale sequestration tests, not including the FutureGen project, for geologic containment of carbon dioxide to collect and validate information on the cost and feasibility of commercial deployment of technologies for geologic containment of carbon dioxide. These 7 tests may include any Regional Partnership projects awarded as of December 19, 2007.

**(B) Diversity of formations to be studied**

In selecting formations for study under this paragraph, the Secretary shall consider a variety of geologic formations across the United States, and require characterization and modeling of candidate formations, as determined by the Secretary.

**(C) Source of carbon dioxide for large-scale sequestration tests**

In the process of any acquisition of carbon dioxide for sequestration tests under subparagraph (A), the Secretary shall give preference to sources of carbon dioxide from industrial sources. To the extent feasible, the Secretary shall prefer tests that would facilitate the creation of an integrated system of capture, transportation and sequestration

of carbon dioxide. The preference provided for under this subparagraph shall not delay the implementation of the large-scale sequestration tests under this paragraph.

**(D) Definition**

For purposes of this paragraph, the term “large-scale” means the injection of more than 1,000,000 tons of carbon dioxide from industrial sources annually or a scale that demonstrates the ability to inject and sequester several million metric tons of industrial source carbon dioxide for a large number of years.

**(4) Preference in project selection from meritorious proposals**

In making competitive awards under this subsection, subject to the requirements of section 16353 of this title, the Secretary shall—

(A) give preference to proposals from partnerships among industrial, academic, and government entities; and

(B) require recipients to provide assurances that all laborers and mechanics employed by contractors and subcontractors in the construction, repair, or alteration of new or existing facilities performed in order to carry out a demonstration or commercial application activity authorized under this subsection shall be paid wages at rates not less than those prevailing on similar construction in the locality, as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, and the Secretary of Labor shall, with respect to the labor standards in this paragraph, have the authority and functions set forth in Reorganization Plan Numbered 14 of 1950 (15 Fed. Reg. 3176; 5 U.S.C. Appendix) and section 3145 of title 40.

**(5) Cost sharing**

Activities under this subsection shall be considered research and development activities that are subject to the cost sharing requirements of section 16352(b) of this title.

**(6) Program review and report**

During fiscal year 2011, the Secretary shall—

(A) conduct a review of programmatic activities carried out under this subsection; and

(B) make recommendations with respect to continuation of the activities.

**(d) Authorization of appropriations**

There are authorized to be appropriated to carry out this section—

- (1) \$240,000,000 for fiscal year 2008;
- (2) \$240,000,000 for fiscal year 2009;
- (3) \$240,000,000 for fiscal year 2010;
- (4) \$240,000,000 for fiscal year 2011; and
- (5) \$240,000,000 for fiscal year 2012.

(Pub. L. 109–58, title IX, §963, Aug. 8, 2005, 119 Stat. 891; Pub. L. 110–140, title VII, §702(a), Dec. 19, 2007, 121 Stat. 1704.)

AMENDMENTS

2007—Pub. L. 110–140, §702(a)(1), substituted “and sequestration research, development, and demonstration” for “research and development” in section catchline.

Subsec. (a). Pub. L. 110–140, §702(a)(2), in introductory provisions, substituted “and sequestration research, development, and demonstration” for “research and development” and “capture and sequestration technologies related to industrial sources of carbon dioxide” for “capture technologies on combustion-based systems”.

Subsec. (b)(5). Pub. L. 110–140, §702(a)(3), added par. (5).

Subsecs. (c), (d). Pub. L. 110–140, §702(a)(4), added subsecs. (c) and (d) and struck out former subsec. (c). Text of former subsec. (c) read as follows: “From amounts authorized under section 16291(b) of this title, the following sums are authorized for activities described in subsection (a)(2):

- “(1) \$25,000,000 for fiscal year 2006;
- “(2) \$30,000,000 for fiscal year 2007; and
- “(3) \$35,000,000 for fiscal year 2008.”

EFFECTIVE DATE OF 2007 AMENDMENT

Amendment by Pub. L. 110–140 effective on the date that is 1 day after Dec. 19, 2007, see section 1601 of Pub. L. 110–140, set out as an Effective Date note under section 1824 of Title 2, The Congress.

**§ 16294. Research and development for coal mining technologies**

**(a) Establishment**

The Secretary shall carry out a program for research and development on coal mining technologies.

**(b) Cooperation**

In carrying out the program, the Secretary shall cooperate with appropriate Federal agencies, coal producers, trade associations, equipment manufacturers, institutions of higher education with mining engineering departments, and other relevant entities.

**(c) Program**

The research and development activities carried out under this section shall—

(1) be guided by the mining research and development priorities identified by the Mining Industry of the Future Program and in the recommendations from relevant reports of the National Academy of Sciences on mining technologies;

(2) include activities exploring minimization of contaminants in mined coal that contribute to environmental concerns including development and demonstration of electromagnetic wave imaging ahead of mining operations;

(3) develop and demonstrate coal bed electromagnetic wave imaging, spectroscopic reservoir analysis technology, and techniques for horizontal drilling in order to—

- (A) identify areas of high coal gas content;
- (B) increase methane recovery efficiency;
- (C) prevent spoilage of domestic coal reserves; and
- (D) minimize water disposal associated with methane extraction; and

(4) expand mining research capabilities at institutions of higher education.

(Pub. L. 109–58, title IX, §964, Aug. 8, 2005, 119 Stat. 892.)

**§ 16295. Oil and gas research programs**

**(a) In general**

The Secretary shall conduct a program of research, development, demonstration, and commercial application of oil and gas, including—