

(1) to assess and monitor—

(A) potential changes in lifecycle carbon dioxide and other greenhouse gas emissions; and

(B) other environmental safety indicators of new technologies, practices, processes, or methods used in enhanced hydrocarbon recovery as part of the activities authorized under section 16293 of this title;

(2) to identify and assess novel uses for carbon, including the conversion of carbon and carbon oxides for commercial and industrial products and other products with potential market value;

(3) to identify and assess carbon capture technologies for industrial systems; and

(4) to identify and assess alternative uses for raw coal and processed coal products in all phases that result in no significant emissions of carbon dioxide or other pollutants, including products derived from carbon engineering, carbon fiber, and coal conversion methods.

**(b) Demonstration programs for the purpose of commercialization**

**(1) In general**

Not later than 180 days after December 27, 2020, as part of the program established under subsection (a), the Secretary shall establish a 2-year demonstration program in each of the 2 major coal-producing regions of the United States for the purpose of partnering with private institutions in coal mining regions to accelerate the commercial deployment of coal-carbon products.

**(2) Cost sharing**

Activities under paragraph (1) shall be subject to the cost-sharing requirements of section 16352 of this title.

**(c) Carbon Utilization Research Center**

**(1) In general**

In carrying out the program under subsection (a), the Secretary shall establish and operate a national Carbon Utilization Research Center (referred to in this subsection as the “Center”), which shall focus on early stage research and development activities including—

(A) post-combustion and pre-combustion capture of carbon dioxide;

(B) advanced compression technologies for new and existing fossil fuel-fired power plants;

(C) technologies to convert carbon dioxide to valuable products and commodities; and

(D) advanced carbon dioxide storage technologies that consider a range of storage regimes.

**(2) Selection**

The Secretary shall—

(A) select the Center under this subsection on a competitive, merit-reviewed basis; and

(B) consider applications from the National Laboratories, institutions of higher education, multiinstitutional collaborations, and other appropriate entities.

**(3) Existing centers**

In selecting the Center under this subsection, the Secretary shall prioritize carbon

utilization research centers in existence on December 27, 2020.

**(4) Duration**

The Center established under this subsection shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

**(5) Renewal**

On the expiration of any period of support of the Center, the Secretary may renew support for the Center, on a merit-reviewed basis, for a period of not more than 5 years.

**(6) Termination**

Consistent with the existing authorities of the Department, the Secretary may terminate the Center for cause during the performance period.

**(d) Authorization of appropriations**

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

(1) \$54,000,000 for fiscal year 2021;

(2) \$55,250,000 for fiscal year 2022;

(3) \$56,562,500 for fiscal year 2023;

(4) \$57,940,625 for fiscal year 2024; and

(5) \$59,387,656 for fiscal year 2025.

**(e) Coordination**

The Secretary shall coordinate the activities authorized in this section with the activities authorized in section 16298 of this title as part of one consolidated program at the Department. Nothing in section 16298 of this title shall be construed as limiting the authorities provided in this section.

(Pub. L. 109–58, title IX, §969A, as added Pub. L. 116–260, div. Z, title IV, §4004(a)(1), Dec. 27, 2020, 134 Stat. 2539.)

**§ 16298b. High efficiency turbines**

**(a) In general**

The Secretary, acting through the Assistant Secretary for Fossil Energy (referred to in this section as the “Secretary”), shall establish a multiyear, multiphase program (referred to in this section as the “program”) of research, development, and technology demonstration to improve the efficiency of gas turbines used in power generation systems and aviation.

**(b) Program elements**

The program shall—

(1) support first-of-a-kind engineering and detailed gas turbine design for small-scale and utility-scale electric power generation, including—

(A) high temperature materials, including superalloys, coatings, and ceramics;

(B) improved heat transfer capability;

(C) manufacturing technology required to construct complex 3-dimensional geometry parts with improved aerodynamic capability;

(D) combustion technology to produce higher firing temperature while lowering nitrogen oxide and carbon monoxide emissions per unit of output;

(E) advanced controls and systems integration;

(F) advanced high performance compressor technology; and

(G) validation facilities for the testing of components and subsystems;

(2) include technology demonstration through component testing, subscale testing, and full-scale testing in existing fleets;

(3) include field demonstrations of the developed technology elements to demonstrate technical and economic feasibility;

(4) assess overall combined cycle and simple cycle system performance;

(5) increase fuel flexibility by enabling gas turbines to operate with high proportions of, or pure, hydrogen or other renewable gas fuels;

(6) enhance foundational knowledge needed for low-emission combustion systems that can work in high-pressure, high-temperature environments required for high-efficiency cycles;

(7) increase operational flexibility by reducing turbine start-up times and improving the ability to accommodate flexible power demand; and

(8) include any other elements necessary to achieve the goals described in subsection (c), as determined by the Secretary, in consultation with private industry.

**(c) Program goals**

**(1) In general**

The goals of the program shall be—

(A) in phase I, to develop a conceptual design of, and to develop and demonstrate the technology required for—

(i) advanced high efficiency gas turbines to achieve, on a lower heating value basis—

(I) a combined cycle efficiency of not less than 65 percent; or

(II) a simple cycle efficiency of not less than 47 percent; and

(ii) aviation gas turbines to achieve a 25 percent reduction in fuel burn by improving fuel efficiency to existing best-in-class turbo-fan engines; and

(B) in phase II, to develop a conceptual design of advanced high efficiency gas turbines that can achieve, on a lower heating value basis—

(i) a combined cycle efficiency of not less than 67 percent; or

(ii) a simple cycle efficiency of not less than 50 percent.

**(2) Additional goals**

If a goal described in paragraph (1) has been achieved, the Secretary, in consultation with private industry and the National Academy of Sciences, may develop additional goals or phases for advanced gas turbine research and development.

**(d) Financial assistance**

**(1) In general**

The Secretary may provide financial assistance, including grants, to carry out the program.

**(2) Proposals**

Not later than 180 days after December 27, 2020, the Secretary shall solicit proposals from

industry, small businesses, universities, and other appropriate parties for conducting activities under this section.

**(3) Considerations**

In selecting proposed projects to receive financial assistance under this subsection, the Secretary shall give special consideration to the extent to which the proposed project will—

(A) stimulate the creation or increased retention of jobs in the United States; and

(B) promote and enhance technology leadership in the United States.

**(4) Competitive awards**

The Secretary shall provide financial assistance under this subsection on a competitive basis, with an emphasis on technical merit.

**(5) Cost sharing**

Financial assistance provided under this subsection shall be subject to the cost sharing requirements of section 16352 of this title.

**(e) Authorization of appropriations**

There is authorized to be appropriated to carry out this section \$50,000,000 for each of fiscal years 2021 through 2025.

(Pub. L. 109–58, title IX, § 969B, as added Pub. L. 116–260, div. Z, title IV, § 4005(a), Dec. 27, 2020, 134 Stat. 2542.)

**§ 16298c. National Energy Technology Laboratory reforms**

**(a) Special hiring authority for scientific, engineering, and project management personnel**

**(1) In general**

The Director of the National Energy Technology Laboratory (referred to in this section as the “Director”) may—

(A) make appointments to positions in the National Energy Technology Laboratory to assist in meeting a specific project or research need, without regard to civil service laws, of individuals who—

(i) have an advanced scientific or engineering background; or

(ii) have a business background and can assist in specific technology-to-market needs;

(B) fix the basic pay of any employee appointed under subparagraph (A) at a rate not to exceed level II of the Executive Schedule under section 5313 of title 5; and

(C) pay any employee appointed under subparagraph (A) payments in addition to the basic pay fixed under subparagraph (B), subject to the condition that the total amount of additional payments paid to an employee under this subparagraph for any 12-month period shall not exceed the least of—

(i) \$25,000;

(ii) the amount equal to 25 percent of the annual rate of basic pay of that employee; and

(iii) the amount of the limitation that is applicable for a calendar year under section 5307(a)(1) of title 5.

**(2) Limitations**

**(A) In general**

The term of any employee appointed under paragraph (1)(A) shall not exceed 3 years.