

116TH CONGRESS  
1ST SESSION

# H. R. 3607

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.

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## 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

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## 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.

1 *Be it enacted by the Senate and House of Representa-*  
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

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

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

- Sec. 1. Short title; table of contents.
- Sec. 2. Definitions.
- Sec. 3. Fossil energy objectives.
- Sec. 4. Carbon capture technologies.
- Sec. 5. Carbon storage validation and testing.
- Sec. 6. Carbon utilization.
- Sec. 7. Advanced energy systems.
- Sec. 8. Rare earth elements.
- Sec. 9. Methane hydrate research amendments.
- Sec. 10. Carbon removal.
- Sec. 11. Methane leak detection and mitigation.
- Sec. 12. Waste gas utilization.
- Sec. 13. National energy technology laboratory reforms.

1 **SEC. 2. DEFINITIONS.**

2 For purposes of this Act:

3 (1) DEPARTMENT.—The term “Department”  
4 means the Department of Energy.

5 (2) SECRETARY.—The term “Secretary” means  
6 the Secretary of Energy.

7 **SEC. 3. FOSSIL ENERGY OBJECTIVES.**

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

10 (1) in subsection (a)—

11 (A) by striking paragraph (2) and insert-  
12 ing the following:

13 “(2) Decreasing the cost of emissions control  
14 technologies for fossil energy production, generation,  
15 and delivery.”;

16 (B) by striking paragraph (7) and insert-  
17 ing the following:

18 “(7) Increasing the export of emissions control  
19 technologies from the United States for fossil en-

1 energy-related equipment, technology, and services.”;  
2 and

3 (C) by adding at the end the following:

4 “(8) Improving the conversion, use, and storage  
5 of carbon oxides.

6 “(9) Lowering greenhouse gas emissions for all  
7 fossil fuel production, generation, delivery, and utili-  
8 zation, to the maximum extent possible.

9 “(10) Preventing, predicting, monitoring, and  
10 mitigating the unintended leaking of methane, car-  
11 bon dioxide, or other fossil fuel-related emissions  
12 into the atmosphere.

13 “(11) Reducing water use, improving water  
14 reuse, and minimizing the surface and subsurface  
15 environmental impact in the development of uncon-  
16 ventional domestic oil and natural gas resources.

17 “(12) Developing carbon removal and utiliza-  
18 tion technologies, products, and methods that result  
19 in net reductions in greenhouse gas emissions, in-  
20 cluding direct air capture and storage and carbon  
21 use and reuse for commercial application.”;

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

24 “(1) \$825,000,000 for fiscal year 2020;

25 “(2) \$866,250,000 for fiscal year 2021;

1           “(3) \$909,563,000 for fiscal year 2022;  
2           “(4) \$955,041,000 for fiscal year 2023; and  
3           “(5) \$1,002,793,000 for fiscal year 2024.”; and  
4           (3) by striking subsections (c) through (e) and  
5           inserting the following:

6           “(c) **PRIORITIZATION.**—In carrying out this section,  
7           the Secretary shall prioritize technologies and strategies  
8           that have the potential to meet emissions reduction goals  
9           in the agreement of the twenty-first session of the Con-  
10          ference of the Parties to the United Nations Framework  
11          Convention on Climate Change.

12          “(d) **LIMITATION.**—None of the funds authorized  
13          under this section may be used for Fossil Energy Environ-  
14          mental Restoration or Import/Export Authorization.”.

15          **SEC. 4. CARBON CAPTURE TECHNOLOGIES.**

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

19          **“SEC. 962. CARBON CAPTURE TECHNOLOGIES.**

20          “(a) **IN GENERAL.**—The Secretary shall conduct a  
21          program of research, development, demonstration, and  
22          commercial application of carbon capture technologies,  
23          which shall include facilitation of the development and use  
24          of—

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

3           “(2) innovations to significantly decrease emis-  
4           sions at existing power plants; and

5           “(3) advanced separation technologies.

6           “(b) INVESTMENT.—As a part of the program under  
7           subsection (a), the Secretary shall maintain robust invest-  
8           ments in carbon capture technologies for coal and natural  
9           gas applications.

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

15          “(d) COST AND PERFORMANCE GOALS.—In carrying  
16          out the program under subsection (a), the Secretary shall  
17          establish cost and performance goals to assist in the tran-  
18          sition of carbon capture research to commercially viable  
19          technologies.

20          “(e) CARBON CAPTURE PILOT TEST CENTERS.—

21                 “(1) IN GENERAL.—As a part of the program  
22                 under subsection (a), not later than 1 year after the  
23                 date of the enactment of the Fossil Energy Research  
24                 and Development Act of 2019, the Secretary shall  
25                 award grants to eligible entities for the operation of

1 not less than three Carbon Capture Test Centers (in  
2 this subsection, known as the ‘Centers’) to provide  
3 unique testing capabilities for innovative carbon cap-  
4 ture technologies for power and industrial systems.

5 “(2) PURPOSE.—Each Center shall—

6 “(A) advance research, development, dem-  
7 onstration, and commercial application of car-  
8 bon capture technologies for power and indus-  
9 trial systems; and

10 “(B) test technologies that represent the  
11 scale of technology development beyond labora-  
12 tory testing, but not yet advanced to testing  
13 under operational conditions at commercial  
14 scale.

15 “(3) APPLICATION.—An entity seeking to oper-  
16 ate a Center under this subsection shall submit to  
17 the Secretary an application at such time and in  
18 such manner as the Secretary may require.

19 “(4) PRIORITY CRITERIA.—In selecting applica-  
20 tions to operate a Center under this subsection, the  
21 Secretary shall prioritize applicants that—

22 “(A) have access to existing or planned re-  
23 search facilities with modular technology capa-  
24 bilities;

1           “(B) are institutions of higher education  
2           with established expertise in engineering and  
3           design for carbon capture technologies, or part-  
4           nerships with such institutions;

5           “(C) have access to existing research and  
6           test facilities for pre-combustion, post-combus-  
7           tion, or oxy-combustion technologies; or

8           “(D) have test capabilities to address scal-  
9           ing challenges of integrating carbon capture  
10          technologies with utility scale power plants.

11          “(5) CONSIDERATIONS.—In awarding grants  
12          for the operation of the Centers under this sub-  
13          section, the Secretary shall ensure that—

14               “(A) the portfolio of Centers includes a di-  
15               verse representation of regional and resource  
16               characteristics; and

17               “(B) each new Center demonstrates unique  
18               research capabilities, unique regional benefits,  
19               or new technology development opportunities.

20          “(6) SCHEDULE.—Each grant to operate a  
21          Center under this subsection shall be awarded for a  
22          term of not more than 5 years, subject to the avail-  
23          ability of appropriations. The Secretary may renew  
24          such 5-year term without limit, subject to a rigorous  
25          merit review.

1           “(7) TERMINATION.—To the extent otherwise  
2 authorized by law, the Secretary may eliminate a  
3 Center during any 5-year term described in para-  
4 graph (6) if such Center is underperforming.

5           “(f) DEMONSTRATIONS.—

6           “(1) IN GENERAL.—As a part of the program  
7 under subsection (a), the Secretary may provide  
8 grants for large-scale demonstration projects for  
9 power and industrial systems that test the scale of  
10 technology necessary to gain the operational data  
11 needed to understand the technical and performance  
12 risks of the technology before the application of the  
13 technology at commercial scale, in accordance with  
14 this subsection.

15           “(2) ENGINEERING AND DESIGN STUDIES.—  
16 The Secretary is authorized to fund front-end engi-  
17 neering and design studies in addition to, or in ad-  
18 vance of, issuing an award for a demonstration  
19 project under this subsection.

20           “(3) APPLICATION.—An entity seeking an  
21 award to conduct a demonstration project under this  
22 subsection shall submit to the Secretary an applica-  
23 tion at such time and in such manner as the Sec-  
24 retary may require.



1           “(4) LIMITATIONS.—The Secretary shall only  
2 provide an award under this subsection after review-  
3 ing each applicant and application regarding—

4                   “(A) financial strength;

5                   “(B) construction schedule;

6                   “(C) market risk; and

7                   “(D) contractor history.

8           “(5) REQUIREMENTS.—A demonstration project  
9 funded under this subsection shall—

10                   “(A) utilize technologies that have com-  
11 pleted pilot-scale testing or the equivalent, as  
12 determined by the Secretary;

13                   “(B) secure and maintain agreements for  
14 the utilization or sequestration of captured car-  
15 bon dioxide; and

16                   “(C) upon completion, demonstrate carbon  
17 capture technologies on a power or industrial  
18 system capable of capturing not less than  
19 100,000 tons of carbon dioxide annually.

20           “(g) DEFINITION OF POWER SYSTEM.—In this sec-  
21 tion, the term ‘power system’ means any electricity gener-  
22 ating unit that utilizes fossil fuels to generate electricity  
23 provided to the electric grid or directly to a consumer.

1       “(h) AUTHORIZATION OF APPROPRIATIONS.—For ac-  
2       tivities under this section, there are authorized to be ap-  
3       propriated to the Secretary—

4               “(1) \$300,000,000 for fiscal year 2020;

5               “(2) \$315,000,000 for fiscal year 2021;

6               “(3) \$330,750,000 for fiscal year 2022;

7               “(4) \$347,288,000 for fiscal year 2023; and

8               “(5) \$364,652,000 for fiscal year 2024.”.

9       (b) GAO STUDY.—

10           (1) IN GENERAL.—Not later than 1 year after  
11       the date of enactment of this Act, the Comptroller  
12       General of the United States shall submit to the  
13       Committee on Science, Space, and Technology of the  
14       House of Representatives and the Committee on En-  
15       ergy and Natural Resources of the Senate a report  
16       on the results of a study of the Department’s suc-  
17       cesses, failures, practices, and improvements in car-  
18       rying out demonstration projects for carbon capture  
19       technologies for power and industrial systems. In  
20       conducting the study, the Comptroller General shall  
21       consider—

22               (A) applicant and contractor qualifications;

23               (B) project management practices at the  
24       Department;

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

3 (D) completion of third-party agreements,  
4 including power purchase agreements and car-  
5 bon dioxide offtake agreements;

6 (E) regulatory challenges; and

7 (F) construction challenges.

8 (2) CONSIDERATION.—The Secretary shall con-  
9 sider any relevant recommendations, as determined  
10 by the Secretary, provided in the report required  
11 under paragraph (1), and shall adopt such rec-  
12 ommendations as the Secretary considers appro-  
13 priate.

14 (3) POWER SYSTEM DEFINED.—In this section,  
15 the term “power system” means any electricity gen-  
16 erating unit that utilizes fossil fuels to generate elec-  
17 tricity provided to the electric grid or directly to a  
18 consumer.

19 **SEC. 5. CARBON STORAGE VALIDATION AND TESTING.**

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

22 **“SEC. 963. CARBON STORAGE VALIDATION AND TESTING.**

23 “(a) CARBON STORAGE.—The Secretary, in consulta-  
24 tion with the Administrator of the Environmental Protec-  
25 tion Agency, shall carry out a program of research, devel-

1 opment, and demonstration for carbon storage. The pro-  
2 gram shall—

3 “(1) in coordination with relevant Federal agen-  
4 cies, develop and maintain mapping tools and re-  
5 sources that assess the capacity of geologic storage  
6 formations in the United States;

7 “(2) develop monitoring tools, modeling of geo-  
8 logic formations, and analyses to predict and verify  
9 carbon dioxide containment and account for seques-  
10 tered carbon dioxide in geologic storage sites;

11 “(3) research potential environmental, safety,  
12 and health impacts in the event of a leak to the at-  
13 mosphere or to an aquifer, and any corresponding  
14 mitigation actions or responses to limit harmful con-  
15 sequences;

16 “(4) evaluate the interactions of carbon dioxide  
17 with formation solids and fluids, including the pro-  
18 pensity of injections to induce seismic activity;

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

21 “(6) determine the fate of carbon dioxide con-  
22 current with and following injection into geologic  
23 formations;

24 “(7) support cost and business model assess-  
25 ments to examine the economic viability of tech-

1 nologies and systems developed under this program;  
2 and

3 “(8) provide information to State, local, and  
4 Tribal governments, the Environmental Protection  
5 Agency, and other appropriate entities, to support  
6 development of a regulatory framework for commer-  
7 cial-scale sequestration operations that ensure the  
8 protection of human health and the environment.

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

13 “(1) operating oil and gas fields;

14 “(2) depleted oil and gas fields;

15 “(3) residual oil zones;

16 “(4) unconventional reservoirs and rock types;

17 “(5) unmineable coal seams;

18 “(6) saline formations in both sedimentary and  
19 basaltic geologies;

20 “(7) geologic systems that may be used as engi-  
21 neered reservoirs to extract economical quantities of  
22 brine from geothermal resources of low permeability  
23 or porosity; and

24 “(8) geologic systems containing in situ carbon  
25 dioxide mineralization formations.

1       “(c) REGIONAL CARBON SEQUESTRATION PARTNER-  
2 SHIPS.—

3           “(1) IN GENERAL.—The Secretary shall carry  
4 out large-scale carbon sequestration demonstrations  
5 for geologic containment of carbon dioxide to collect  
6 and validate information on the cost and feasibility  
7 of commercial deployment of technologies for the  
8 geologic containment of carbon dioxide. The Sec-  
9 retary may fund new demonstrations or expand the  
10 work completed at one or more of the existing re-  
11 gional carbon sequestration partnerships.

12           “(2) DEMONSTRATION COMPONENTS.—Each  
13 demonstration described in paragraph (1) shall in-  
14 clude longitudinal tests involving carbon dioxide in-  
15 jection and monitoring, mitigation, and verification  
16 operations.

17           “(3) CLEARINGHOUSE.—The National Energy  
18 Technology Laboratory shall act as a clearinghouse  
19 of shared information and resources for the regional  
20 carbon sequestration partnerships and any new dem-  
21 onstrations funded under this section.

22           “(4) REPORT.—Not later than 1 year after the  
23 date of enactment of the Fossil Energy Research  
24 and Development Act of 2019, the Secretary shall  
25 provide to the Committee on Science, Space, and

1 Technology of the House of Representatives and the  
2 Committee on Energy and Natural Resources of the  
3 Senate a report that—

4 “(A) assesses the progress of all regional  
5 carbon sequestration partnerships;

6 “(B) identifies the remaining challenges in  
7 achieving carbon sequestration that is reliable  
8 and safe for the environment and public health;  
9 and

10 “(C) creates a roadmap for Department of  
11 Energy carbon storage research and develop-  
12 ment activities through 2030 with the goal of  
13 reducing economic and policy barriers to com-  
14 mercial carbon sequestration.

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

20 “(d) INTEGRATED STORAGE PROJECTS.—The Sec-  
21 retary may carry out a program for the purpose of  
22 transitioning the large-scale carbon sequestration dem-  
23 onstration projects under subsection (c) into integrated,  
24 commercial storage complexes. The program shall focus  
25 on—

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

4           “(2) understanding the technical and commer-  
5           cial viability of storage sites;

6           “(3) developing the qualification processes that  
7           will be necessary for a diverse range of geologic stor-  
8           age sites to commercially accept carbon dioxide; and

9           “(4) any other activities the Secretary deter-  
10          mines necessary to transition the large scale dem-  
11          onstration storage projects into commercial ventures.

12          “(e) COST SHARING.—The Secretary shall require  
13          cost sharing under this section in accordance with section  
14          988.

15          “(f) AUTHORIZATION OF APPROPRIATIONS.—For ac-  
16          tivities under this section, there are authorized to be ap-  
17          propriated to the Secretary—

18                 “(1) \$120,000,000 for fiscal year 2020;

19                 “(2) \$126,000,000 for fiscal year 2021;

20                 “(3) \$132,300,000 for fiscal year 2022;

21                 “(4) \$138,915,000 for fiscal year 2023; and

22                 “(5) \$145,860,750 for fiscal year 2024.”.



1 **SEC. 6. CARBON UTILIZATION.**

2 (a) PROGRAM.—Subtitle F of title IX of the Energy  
3 Policy Act of 2005 (42 U.S.C. 16291 et seq.) is amended  
4 by adding at the end the following:

5 **“SEC. 969. CARBON UTILIZATION.**

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

9 “(1) assess and monitor potential changes in  
10 life cycle carbon dioxide and other greenhouse gas  
11 emissions, and other environmental safety indicators  
12 of new technologies, practices, processes, or meth-  
13 ods, used in enhanced hydrocarbon recovery as part  
14 of the activities authorized in section 963 of the En-  
15 ergy Policy Act of 2005 (42 U.S.C. 16293);

16 “(2) identify and evaluate novel uses for car-  
17 bon, including the conversion of carbon dioxide, in a  
18 manner that, on a full life-cycle basis, achieves a  
19 permanent reduction in, or avoidance of a net in-  
20 crease in carbon dioxide in the atmosphere, for use  
21 in commercial and industrial products, such as—

22 “(A) chemicals;

23 “(B) plastics;

24 “(C) building materials;

25 “(D) fuels;

26 “(E) cement;

1           “(F) products of coal utilization in power  
2           systems (as such term is defined in section  
3           962(e)), or other applications; or

4           “(G) other products with demonstrated  
5           market value;

6           “(3) carbon capture technologies for industrial  
7           systems;

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

13          “(b) AUTHORIZATION OF APPROPRIATIONS.—For ac-  
14          tivities under this section, there are authorized to be ap-  
15          propriated to the Secretary—

16                 “(1) \$25,000,000 for fiscal year 2020;

17                 “(2) \$26,250,000 for fiscal year 2021;

18                 “(3) \$27,562,500 for fiscal year 2022;

19                 “(4) \$28,940,625 for fiscal year 2023; and

20                 “(5) \$30,387,656 for fiscal year 2024.”.

21          (b) STUDY.—The Secretary shall enter into an agree-  
22          ment with the National Academies to conduct a study as-  
23          sessing the barriers, and opportunities related to the com-  
24          mercial application of carbon dioxide in the United States.  
25          Such study shall—

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

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

7                   (B) mitigating environmental and land-  
8 owner impacts; and

9                   (C) regional economic challenges and op-  
10 portunities;

11           (2) identify potential markets, industries, or  
12 sectors that may benefit from greater access to com-  
13 mercial carbon dioxide;

14           (3) assess the current state of infrastructure  
15 and any necessary updates to allow for the integra-  
16 tion of safe and reliable carbon dioxide transpor-  
17 tation, utilization, and storage;

18           (4) estimate the economic, climate, and environ-  
19 mental impacts of any well-integrated national car-  
20 bon dioxide pipeline system, including suggestions  
21 for policies that could improve the economic impact  
22 of the system;

23           (5) assess the global status and progress of car-  
24 bon utilization technologies (both chemical and bio-  
25 logical) in practice today that utilize waste carbon

1 (including carbon dioxide, carbon monoxide, meth-  
2 ane, and biogas) from power generation, biofuels  
3 production, and other industrial processes;

4 (6) identify emerging technologies and ap-  
5 proaches for carbon utilization that show promise  
6 for scale-up, demonstration, deployment, and com-  
7 mercialization;

8 (7) analyze the factors associated with making  
9 carbon utilization technologies viable at a commer-  
10 cial scale, including carbon waste stream availability,  
11 economics, market capacity, energy and lifecycle re-  
12 quirements;

13 (8) assess the major technical challenges associ-  
14 ated with increasing the commercial viability of car-  
15 bon reuse technologies, and identify the research and  
16 development questions that will address those chal-  
17 lenges;

18 (9) assess current research efforts, including  
19 engineering and computational, that are addressing  
20 these challenges and identify gaps in the current re-  
21 search portfolio; and

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

1 **SEC. 7. ADVANCED ENERGY SYSTEMS.**

2 Subtitle F of title IX of the Energy Policy Act of  
3 2005 (42 U.S.C. 16291 et seq.) is further amended by  
4 adding at the end the following:

5 **“SEC. 969A. ADVANCED ENERGY SYSTEMS.**

6 “(a) IN GENERAL.—The Secretary shall conduct a  
7 program, with the purpose of reducing emissions from fos-  
8 sil fuel power generation by not less than 50 percent, of  
9 research, development, demonstration, and commercial ap-  
10 plication with respect to the following:

11 “(1) High-efficiency turbines for any advanced  
12 power system that will lead to natural gas turbine  
13 combined cycle efficiency of 67 percent or combus-  
14 tion turbine efficiency of 50 percent.

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

18 “(3) Advanced combustion systems, including  
19 oxy-combustion systems and chemical looping.

20 “(4) Fuel cell technologies for low-cost, high-ef-  
21 ficiency, fuel-flexible, modular power systems, includ-  
22 ing solid oxide fuel cell technology for commercial,  
23 residential, and distributed generation systems,  
24 using improved manufacturing production and proc-  
25 esses.

1           “(5) Gasification systems to enable carbon cap-  
2           ture, improve efficiency, and reduce capital and op-  
3           erating costs.

4           “(6) Thermal cycling with ramping or rapid  
5           black start capabilities that do not compromise effi-  
6           ciency or environmental performance.

7           “(7) Small-scale and modular coal-fired tech-  
8           nologies with reduced carbon outputs or carbon cap-  
9           ture that can support incremental power generation  
10          capacity additions.

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

16          “(c) AUTHORIZATION OF APPROPRIATIONS.—For ac-  
17          tivities under this section, there are authorized to be ap-  
18          propriated to the Secretary—

19                 “(1) \$150,000,000 for fiscal year 2020;

20                 “(2) \$157,500,000 for fiscal year 2021;

21                 “(3) \$165,375,000 for fiscal year 2022;

22                 “(4) \$173,643,750 for fiscal year 2023; and

23                 “(5) \$182,325,938 for fiscal year 2024.”.

1 **SEC. 8. RARE EARTH ELEMENTS.**

2 Subtitle F of title IX of the Energy Policy Act of  
3 2005 (42 U.S.C. 16291 et seq.) is further amended by  
4 adding at the end the following:

5 **“SEC. 969B. RARE EARTH ELEMENTS.**

6 “(a) IN GENERAL.—In coordination with the relevant  
7 Federal agencies, the Secretary shall conduct research to  
8 develop and assess methods to separate and recover rare  
9 earth elements and other strategic minerals and coprod-  
10 ucts from coal and coal byproduct streams. The program  
11 shall—

12 “(1) develop advanced rare earth element sepa-  
13 ration and extraction processes using coal-based re-  
14 sources as feedstock materials;

15 “(2) assess the technical and economic feasi-  
16 bility of recovering rare earth elements from coal-  
17 based resources and validate such feasibility with  
18 prototype systems producing salable, high-purity  
19 rare earth elements from coal-based resources; and

20 “(3) assess and mitigate any environmental and  
21 public health impacts of recovering rare earth ele-  
22 ments from coal-based resources.

23 “(b) AUTHORIZATION OF APPROPRIATIONS.—For ac-  
24 tivities under this section, there are authorized to be ap-  
25 propriated to the Secretary—

26 “(1) \$23,000,000 for fiscal year 2020;

- 1           “(2) \$24,150,000 for fiscal year 2021;  
2           “(3) \$25,357,500 for fiscal year 2022;  
3           “(4) \$26,625,375 for fiscal year 2023; and  
4           “(5) \$27,956,644 for fiscal year 2024.”.

5 **SEC. 9. METHANE HYDRATE RESEARCH AMENDMENTS.**

6           (a) IN GENERAL.—Section 4(b) of the Methane Hy-  
7 drate Research and Development Act of 2000 (30 U.S.C.  
8 2003(b)) is amended to read as follows:

9           “(b) GRANTS, CONTRACTS, COOPERATIVE AGREE-  
10 MENTS, INTERAGENCY FUNDS TRANSFER AGREEMENTS,  
11 AND FIELD WORK PROPOSALS.—

12           “(1) ASSISTANCE AND COORDINATION.—In car-  
13 rying out the program of methane hydrate research  
14 and development authorized by this section, the Sec-  
15 retary may award grants, or enter into contracts or  
16 cooperative agreements to—

17           “(A) conduct research to identify the envi-  
18 ronmental, health, and safety impacts of meth-  
19 ane hydrate development;

20           “(B) assess and develop technologies to  
21 mitigate environmental impacts of the explo-  
22 ration and commercial development of methane  
23 hydrates as an energy resource, including the  
24 use of seismic testing, and to reduce the public



1 health and safety risks of drilling through  
2 methane hydrates;

3 “(C) conduct research to assess and miti-  
4 gate the environmental impact of hydrate  
5 degassing (including natural degassing and  
6 degassing associated with commercial develop-  
7 ment); or

8 “(D) expand education and training pro-  
9 grams in methane hydrate resource research  
10 and resource development through fellowships  
11 or other means for graduate education and  
12 training.

13 “(2) ENVIRONMENTAL MONITORING AND RE-  
14 SEARCH.—The Secretary shall conduct a long-term  
15 environmental monitoring and research program to  
16 study the effects of production from methane hy-  
17 drate reservoirs.

18 “(3) COMPETITIVE PEER REVIEW.—Funds  
19 made available to carry out paragraphs (1) and (2)  
20 shall be made available based on a competitive proc-  
21 ess using external scientific peer review of proposed  
22 research.”.

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

1 preceding paragraph (1) by striking “subsection (b)(1)”  
2 and inserting “paragraphs (1) and (2) of subsection (b)”.

3 (c) AUTHORIZATION OF APPROPRIATIONS.—Section  
4 7 of such Act (30 U.S.C. 2006) is amended to read as  
5 follows:

6 **“SEC. 7. AUTHORIZATION OF APPROPRIATIONS.**

7 “There are authorized to be appropriated to the Sec-  
8 retary to carry out this Act \$15,000,000, to remain avail-  
9 able until expended, for each of fiscal years 2020 through  
10 2024.”.

11 **SEC. 10. CARBON REMOVAL.**

12 Subtitle F of title IX of the Energy Policy Act of  
13 2005 (42 U.S.C. 16291 et seq.) is further amended by  
14 adding at the end the following:

15 **“SEC. 969C. CARBON REMOVAL.**

16 “(a) ESTABLISHMENT.—The Secretary, in coordina-  
17 tion with the appropriate Federal agencies, shall establish  
18 a research, development, and demonstration program to  
19 remove carbon dioxide from the atmosphere on a large  
20 scale. The program may include activities in—

21 “(1) direct air capture and storage technologies;

22 “(2) enhanced carbon mineralization;

23 “(3) bioenergy with carbon capture and seques-  
24 tration;

25 “(4) agricultural and grazing practices;

1           “(5) forest management and afforestation; and

2           “(6) planned or managed carbon sinks, includ-  
3           ing natural and artificial.

4           “(b) PRIORITIZATION.—In carrying out the program  
5           established in subsection (a), the Secretary shall  
6           prioritize—

7           “(1) the activities described in paragraphs (1)  
8           and (2) of subsection (a), acting through the Assist-  
9           ant Secretary for Fossil Energy; and

10           “(2) the activities described in subsection  
11           (a)(3), acting through the Assistant Secretary for  
12           Energy Efficiency and Renewable Energy and the  
13           Assistant Secretary for Fossil Energy.

14           “(c) CONSIDERATIONS.—The program under this  
15           section shall identify and develop carbon removal tech-  
16           nologies and strategies that consider the following:

17           “(1) Land use changes, including impacts on  
18           natural and managed ecosystems.

19           “(2) Ocean acidification.

20           “(3) Net greenhouse gas emissions.

21           “(4) Commercial viability.

22           “(5) Potential for near-term impact.

23           “(6) Potential for carbon reductions on a  
24           gigaton scale.

25           “(7) Economic co-benefits.

1       “(d) ACCOUNTING.—The Department shall collabo-  
2 rate with the Environmental Protection Agency and other  
3 relevant agencies to develop and improve accounting  
4 frameworks and tools to accurately measure carbon re-  
5 moval and sequestration methods and technologies across  
6 the Federal Government.

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

14               “(1) in accordance with section 24 of the Ste-  
15 venson-Wydler Technology Innovation Act of 1980  
16 (15 U.S.C. 3719), develop requirements for—

17                       “(A) the prize competition process;

18                       “(B) minimum performance standards for  
19 projects eligible to participate in the prize com-  
20 petition; and

21                       “(C) monitoring and verification proce-  
22 dures for projects selected to receive a prize  
23 award;

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

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

5               “(A) A design for a promising capture  
6 technology that will—

7                   “(i) be operated on a demonstration  
8 scale; and

9                   “(ii) have the potential to achieve sig-  
10 nificant reduction in the level of carbon di-  
11 oxide in the atmosphere.

12               “(B) A successful bench-scale demonstra-  
13 tion of a capture technology.

14               “(C) An operational capture technology on  
15 a commercial scale.

16           “(f) DIRECT AIR CAPTURE TEST CENTER.—

17               “(1) IN GENERAL.—Not later than 1 year after  
18 the date of enactment of the Fossil Energy Research  
19 and Development Act of 2019, the Secretary shall  
20 award grants to one or more eligible entities for the  
21 operation of one or more test centers (in this sub-  
22 section, known as ‘Centers’) to provide unique test-  
23 ing capabilities for innovative direct air capture and  
24 storage technologies.

25               “(2) PURPOSE.—Each Center shall—

1           “(A) advance research, development, dem-  
2           onstration, and commercial application of direct  
3           air capture and storage technologies;

4           “(B) support pilot plant and full-scale  
5           demonstration projects and test technologies  
6           that represent the scale of technology develop-  
7           ment beyond laboratory testing but not yet ad-  
8           vanced to test under operational conditions at  
9           commercial scale;

10           “(C) develop front-end engineering design  
11           and economic analysis; and

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

14           “(3) PRIORITY CRITERIA.—In selecting applica-  
15           tions to operate a Center under this subsection, the  
16           Secretary shall prioritize applicants that—

17           “(A) have access to existing or planned re-  
18           search facilities;

19           “(B) are institutions of higher education  
20           with established expertise in engineering for di-  
21           rect air capture technologies, or partnerships  
22           with such institutions; or

23           “(C) have access to existing research and  
24           test facilities for bulk materials design and test-

1           ing, component design and testing, or profes-  
2           sional engineering design.

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

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

13          “(g) LARGE-SCALE PILOTS AND DEMONSTRA-  
14          TIONS.—In supporting the technology development activi-  
15          ties under this section, the Secretary is encouraged to sup-  
16          port carbon removal pilot and demonstration projects, in-  
17          cluding—

18                 “(1) pilot projects that test direct air capture  
19                 systems capable of capturing 10 to 100 tonnes of  
20                 carbon oxides per year to provide data for dem-  
21                 onstration-scale projects; and

22                 “(2) direct air capture demonstration projects  
23                 capable of capturing greater than 1,000 tonnes of  
24                 carbon oxides per year.

1       “(h) INTRA-AGENCY RESEARCH.—In carrying out  
2 the program established in (a), the Secretary shall encour-  
3 age and promote collaborations among relevant offices and  
4 agencies within the Department.

5       “(i) AUTHORIZATION OF APPROPRIATIONS.—For ac-  
6 tivities under this section, there are authorized to be ap-  
7 propriated to the Secretary—

8           “(1) \$75,000,000 for fiscal year 2020,  
9       \$15,000,000 of which are authorized to carry out  
10 subsection (e);

11           “(2) \$63,000,000 for fiscal year 2021;

12           “(3) \$66,150,000 for fiscal year 2022;

13           “(4) \$69,458,000 for fiscal year 2023; and

14           “(5) \$72,930,000 for fiscal year 2024.”.

15 **SEC. 11. METHANE LEAK DETECTION AND MITIGATION.**

16       Subtitle F of title IX of the Energy Policy Act of  
17 2005 (42 U.S.C. 16291 et seq.) is further amended by  
18 adding at the end the following:

19 **“SEC. 969D. METHANE LEAK DETECTION AND MITIGATION.**

20       “(a) IN GENERAL.—The Secretary, in consultation  
21 with the Administrator of the Environmental Protection  
22 Agency and other appropriate Federal agencies, shall  
23 carry out a program of methane leak detection and mitiga-  
24 tion research, development, demonstration, and commer-  
25 cial application for technologies and methods that signifi-



1 cantly reduce emissions. In carrying out the program, the  
2 Secretary shall—

3 “(1) develop cooperative agreements with State  
4 or local governments or private entities to provide  
5 technical assistance to—

6 “(A) prevent or respond to methane leaks,  
7 including detection, mitigation, and identifica-  
8 tion of leaks throughout the natural gas infra-  
9 structure (which includes natural gas storage,  
10 pipelines, and natural gas production sites); and

11 “(B) protect public health in the event of  
12 a major methane leak;

13 “(2) promote demonstration and adoption of ef-  
14 fective methane emissions-reduction technologies in  
15 the private sector;

16 “(3) in coordination with representatives from  
17 private industry, State and local governments, and  
18 institutions of higher education, create a publicly ac-  
19 cessible resource for best practices in the design,  
20 construction, maintenance, performance, monitoring,  
21 and incident response for—

22 “(A) pipeline systems;

23 “(B) wells;

24 “(C) compressor stations;

25 “(D) storage facilities; and

1 “(E) other vulnerable infrastructure;

2 “(4) identify high-risk characteristics of pipe-  
3 lines, wells, and materials, geologic risk factors, or  
4 other key factors that increase the likelihood of  
5 methane leaks; and

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

10 “(b) CONSIDERATIONS.—In carrying out the pro-  
11 gram under this section, the Secretary shall consider the  
12 following:

13 “(1) Historical data of methane leaks.

14 “(2) Public health consequences.

15 “(3) Public safety.

16 “(4) Novel materials and designs for pipelines,  
17 compressor stations, components, and wells (includ-  
18 ing casing, cement, wellhead).

19 “(5) Regional geologic traits.

20 “(6) Induced and natural seismicity.

21 “(c) AUTHORIZATION OF APPROPRIATIONS.—For ac-  
22 tivities under this section, there are authorized to be ap-  
23 propriated to the Secretary—

24 “(1) \$22,000,000 for fiscal year 2020;

25 “(2) \$23,100,000 for fiscal year 2021;

- 1           “(3) \$24,255,000 for fiscal year 2022;  
2           “(4) \$25,467,750 for fiscal year 2023; and  
3           “(5) \$26,741,138 for fiscal year 2024.”.

4 **SEC. 12. WASTE GAS UTILIZATION.**

5           Subtitle F of title IX of the Energy Policy Act of  
6 2005 (42 U.S.C. 16291 et seq.) is further amended by  
7 adding at the end the following:

8 **“SEC. 969E. WASTE GAS UTILIZATION.**

9           “The Secretary shall carry out a program of research,  
10 development, and demonstration for waste gas utilization.

11 The program shall—

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

17           “(2) develop advanced gas conversion tech-  
18 nologies that are modular and compact, and may le-  
19 verage advanced manufacturing technologies;

20           “(3) support demonstration activities at oper-  
21 ating oil and gas facilities to test the performance  
22 and cost-effectiveness of new gas conversion tech-  
23 nologies; and

24           “(4) assess and monitor potential changes in  
25 life cycle greenhouse gas emissions that may result

1 from the use of technologies developed under this  
2 program.”.

3 **SEC. 13. NATIONAL ENERGY TECHNOLOGY LABORATORY**  
4 **REFORMS.**

5 (a) SPECIAL HIRING AUTHORITY FOR SCIENTIFIC,  
6 ENGINEERING, AND PROJECT MANAGEMENT PER-  
7 SONNEL.—

8 (1) IN GENERAL.—The Director of the National  
9 Energy Technology Laboratory shall have the au-  
10 thority to—

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

15 (i) have an advanced scientific or en-  
16 gineering background; or

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

20 (B) fix the basic pay of any employee ap-  
21 pointed under this section at a rate not to ex-  
22 ceed level II of the Executive Schedule; and

23 (C) pay any employee appointed under this  
24 section payments in addition to basic pay, ex-  
25 cept that the total amount of additional pay-

1           ments paid to an employee under this sub-  
2           section for any 12-month period shall not ex-  
3           ceed the least of—

4                   (i) \$25,000;

5                   (ii) the amount equal to 25 percent of  
6           the annual rate of basic pay of that em-  
7           ployee; and

8                   (iii) the amount of the limitation that  
9           is applicable for a calendar year under sec-  
10          tion 5307(a)(1) of title 5, United States  
11          Code.

12          (2) LIMITATIONS.—

13               (A) IN GENERAL.—The term of any em-  
14          ployee appointed under this section shall not ex-  
15          ceed 3 years.

16               (B) FULL-TIME EMPLOYEES.—Not more  
17          than 10 full-time employees appointed under  
18          this subsection may be employed at the Na-  
19          tional Energy Technology Laboratory at any  
20          given time.

21          (b) DISCRETIONARY RESEARCH AND DEVELOP-  
22          MENT.—

23               (1) IN GENERAL.—The Secretary shall establish  
24          mechanisms under which the Director of the Na-  
25          tional Energy Technology Laboratory may use an

1 amount that is, in total, not less than 2 percent and  
2 not more than 4 percent of all funds available to the  
3 Laboratory for the following purposes:

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

7 (B) To fund technology development pro-  
8 grams that support the transition of tech-  
9 nologies developed by the Laboratory into the  
10 commercial market.

11 (C) To fund workforce development activi-  
12 ties to strengthen external engineering and  
13 manufacturing partnerships to ensure safe, effi-  
14 cient, productive, and useful fossil energy tech-  
15 nology production.

16 (D) To fund the revitalization, recapitaliza-  
17 tion, or minor construction of the Laboratory  
18 infrastructure.

19 (2) PRIORITIZATION.—The Director shall  
20 prioritize innovative experiments and proposals pro-  
21 posed by scientists and researchers at the National  
22 Energy Technology Laboratory.

23 (3) ANNUAL REPORT ON USE OF AUTHORITY.—  
24 Not later than March 1 of each year, the Secretary  
25 shall submit to the Committee on Science, Space,

1 and Technology of the House of Representatives and  
2 the Committee on Energy and Natural Resources of  
3 the Senate a report on the use of the authority  
4 under this subsection during the preceding fiscal  
5 year.

6 (c) LABORATORY OPERATIONS.—The Secretary shall  
7 delegate human resources operations of the National En-  
8 ergy Technology Laboratory to the Director of the Na-  
9 tional Energy Technology Laboratory.

10 (d) REVIEW.—Not later than 2 years after the date  
11 of enactment of this Act, the Secretary shall submit to  
12 the Committee on Science, Space, and Technology of the  
13 House of Representatives and the Committee on Energy  
14 and Natural Resources of the Senate a report assessing  
15 the National Energy Technology Laboratory’s manage-  
16 ment and research. The report shall include—

17 (1) an assessment of the quality of science and  
18 research at the National Energy Technology Labora-  
19 tory relative to similar work at other national lab-  
20 oratories;

21 (2) a review of the effectiveness of authorities  
22 provided in subsections (a) and (b); and

23 (3) recommendations for policy changes within  
24 the Department and legislative changes to provide  
25 the National Energy Technology Laboratory the nec-

- 1      essary tools and resources to advance its research
- 2      mission.

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