

115TH CONGRESS
2D SESSION

H. R. 5745

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.

IN THE HOUSE OF REPRESENTATIVES

MAY 10, 2018

Mr. VEASEY (for himself, Mr. MCKINLEY, and Ms. EDDIE BERNICE JOHNSON of Texas) introduced the following bill; which was referred to the Committee on Science, Space, and Technology, and in addition to the Committees on Energy and Commerce, and Transportation and Infrastructure, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

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 2018”.

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

- Sec. 1. Short title; table of contents.
- Sec. 2. Definitions.
- Sec. 3. Repeal of clean coal power initiative.
- Sec. 4. Fossil energy objectives.
- Sec. 5. Carbon capture technologies for power systems.
- Sec. 6. Carbon storage validation and testing.
- Sec. 7. Carbon utilization.
- Sec. 8. Advanced energy systems.
- Sec. 9. Rare earth elements.
- Sec. 10. Interagency task force on carbon dioxide pipelines.
- Sec. 11. Methane hydrates research amendments.
- Sec. 12. Carbon removal.
- Sec. 13. Methane leak detection and mitigation.
- Sec. 14. National energy technology laboratory reforms.

3 **SEC. 2. DEFINITIONS.**

4 For purposes of this Act:

5 (1) DEPARTMENT.—The term “Department”
6 means the Department of Energy.

7 (2) SECRETARY.—The term “Secretary” means
8 the Secretary of Energy.

9 **SEC. 3. REPEAL OF CLEAN COAL POWER INITIATIVE.**

10 (a) REPEAL.—Subtitle A of title IV of the Energy
11 Policy Act of 2005 (42 U.S.C. 15801 note) is repealed.

12 (b) TECHNICAL AMENDMENT.—The table of contents
13 for the Energy Policy Act of 2005 (42 U.S.C. 15801 note)
14 is amended by striking the items related to subtitle A of
15 title IV.

16 **SEC. 4. FOSSIL ENERGY OBJECTIVES.**

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

1 (1) in subsection (a), by adding at the end the
2 following:

3 “(8) Improving the conversion, use, and storage
4 of carbon dioxide produced from fossil fuels.

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

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

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

16 “(12) Developing carbon utilization tech-
17 nologies, products, and methods, including carbon
18 use and reuse for commercial application.”;

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

21 “(1) \$825,000,000 for fiscal year 2019;

22 “(2) \$866,250,000 for fiscal year 2020;

23 “(3) \$909,563,000 for fiscal year 2021;

24 “(4) \$955,041,000 for fiscal year 2022; and

25 “(5) \$1,002,793,000 for fiscal year 2023.”; and

1 “(c) LARGE-SCALE PILOTS.—In supporting tech-
2 nology development activities under this section, the Sec-
3 retary is encouraged to support pilot projects that test car-
4 bon capture technologies on powers systems below the 100
5 megawatt scale, consistent with section 988(b).

6 “(d) COST AND PERFORMANCE GOALS.—In carrying
7 out the development, demonstration, and commercial ap-
8 plication activities under subsection (a), the Secretary
9 shall consider cost and performance goals to assist in the
10 transfer of carbon capture research to commercially viable
11 technologies.

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

13 “(1) IN GENERAL.—Not later than 1 year after
14 the date of the enactment of the Fossil Energy Re-
15 search and Development Act of 2018, the Secretary
16 shall award grants to one or more eligible entities
17 for the operation of not less than three Carbon Cap-
18 ture Test Centers (in this subsection, known as the
19 ‘Centers’) to provide unique testing capabilities for
20 innovative carbon capture technologies for power
21 systems.

22 “(2) PURPOSE.—The Centers shall—

23 “(A) advance research, development, dem-
24 onstration, and commercial application of car-

1 bon capture technologies for power systems;
2 and

3 “(B) test technologies that represent the
4 scale of technology development beyond labora-
5 tory testing, but not yet advanced to testing
6 under operational conditions at commercial
7 scale.

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

12 “(4) CRITERIA.—In selecting applications to
13 operate the Centers under this subsection, the Sec-
14 retary shall prioritize applicants that meet one or
15 more of the following criteria:

16 “(A) Applicants with access to existing or
17 planned research facilities with modular tech-
18 nology capabilities.

19 “(B) Institutions of higher education with
20 established expertise in engineering and design
21 for carbon capture technologies, or partnerships
22 with such institutions.

23 “(C) Applicants with access to existing re-
24 search and test facilities for pre-combustion,

1 post-combustion, or oxy-combustion tech-
2 nologies.

3 “(D) Applicants with test capabilities to
4 address scaling challenges of integrating carbon
5 capture technologies with utility scale power
6 plants.

7 “(5) CONSIDERATIONS.—In awarding funds for
8 the operation of the Centers under this subsection,
9 the Secretary shall ensure that—

10 “(A) the portfolio of Centers includes a di-
11 verse representation of regional and resource
12 characteristics; and

13 “(B) each new Center established using
14 such funds demonstrates unique research capa-
15 bilities, unique regional benefits, or new tech-
16 nology development opportunities.

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

23 “(7) COST SHARING.—The Secretary shall re-
24 quire cost sharing under this subsection in accord-
25 ance with section 988.

1 “(8) 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.—The Secretary may fund
7 large-scale demonstration projects for power systems
8 that test the scale of technology necessary to gain
9 the operational data needed to understand the tech-
10 nical and performance risks of the technology before
11 the application of the technology at commercial
12 scale, in accordance with this subsection.

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

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

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

1 “(A) financial strength;

2 “(B) construction schedule;

3 “(C) market risk; and

4 “(D) contractor history.

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

7 “(A) utilize technologies that have com-
8 pleted pilot-scale testing or the equivalent, as
9 determined by the Secretary;

10 “(B) secure and maintain agreements for
11 the utilization or sequestration of captured car-
12 bon dioxide; and

13 “(C) upon completion, demonstrate carbon
14 capture technologies on a power system pro-
15 ducing not less than 100 megawatts of power.

16 “(6) COST SHARING.—The Secretary shall re-
17 quire cost sharing under this subsection in accord-
18 ance with section 988.

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

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

- 1 “(1) \$300,000,000 for fiscal year 2019;
2 “(2) \$315,000,000 for fiscal year 2020;
3 “(3) \$330,750,000 for fiscal year 2021;
4 “(4) \$347,288,000 for fiscal year 2022; and
5 “(5) \$364,652,000 for fiscal year 2023.”.

6 (b) GAO STUDY.—

7 (1) IN GENERAL.—The Comptroller General of
8 the United States shall conduct a study of the De-
9 partment’s successes, failures, practices, and im-
10 provements in carrying out demonstration projects
11 for carbon capture technologies for power systems.
12 In conducting the study, the Comptroller General
13 shall consider, at a minimum—

14 (A) applicant and contractor qualifications;

15 (B) project management practices at the
16 Department;

17 (C) economic or market changes and other
18 factors impacting project viability;

19 (D) completion of third-party agreements,
20 including power purchase agreements and car-
21 bon dioxide offtake agreements;

22 (E) regulatory challenges; and

23 (F) construction challenges.

24 (2) REPORT.—Not later than 1 year after the
25 date of enactment of this Act, the Comptroller Gen-

1 eral of the United States shall submit to the Com-
2 mittee on Science, Space, and Technology of the
3 House of Representatives and the Committee on En-
4 ergy and Natural Resources of the Senate a report
5 on the results of the study required under paragraph
6 (1).

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

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

18 **SEC. 6. CARBON STORAGE VALIDATION AND TESTING.**

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

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

22 “(a) CARBON STORAGE.—The Secretary shall carry
23 out a program of research, development, and demonstra-
24 tion for carbon storage. The program shall—

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

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

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

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

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

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

22 “(7) provide information to State, local, and
23 Tribal governments, the Environmental Protection
24 Agency, and other appropriate entities, to support
25 development of a regulatory framework for commer-

1 cial-scale sequestration operations that ensure the
2 protection of human health and the environment.

3 “(b) GEOLOGIC SETTINGS.—In carrying out research
4 activities under this section, the Secretary shall consider
5 a variety of candidate geologic settings, including—

6 “(1) operating oil and gas fields;

7 “(2) depleted oil and gas fields;

8 “(3) residual oil zones;

9 “(4) unconventional reservoirs and rock types;

10 “(5) unmineable coal seams;

11 “(6) deep saline formations;

12 “(7) deep geologic systems that may be used as
13 engineered reservoirs to extract economical quan-
14 tities of brine from geothermal resources of low per-
15 meability or porosity; and

16 “(8) deep geologic systems containing in situ
17 carbon dioxide mineralization formations.

18 “(c) REGIONAL CARBON SEQUESTRATION PARTNER-
19 SHIPS.—

20 “(1) IN GENERAL.—The Secretary shall carry
21 out large-scale carbon sequestration demonstrations
22 for geologic containment of carbon dioxide to collect
23 and validate information on the cost and feasibility
24 of commercial deployment of technologies for the
25 geologic containment of carbon dioxide. The Sec-

1 retary may fund new demonstrations or expand the
2 work completed at one or more of the existing re-
3 gional carbon sequestration partnerships.

4 “(2) DEMONSTRATION COMPONENTS.—Each
5 demonstration described in paragraph (1) shall in-
6 clude longitudinal tests involving carbon dioxide in-
7 jection and monitoring, mitigation, and verification
8 operations.

9 “(3) CLEARINGHOUSE.—The National Energy
10 Technology Laboratory shall act as a clearinghouse
11 of shared information and resources for the regional
12 carbon sequestration partnerships and any new dem-
13 onstrations funded under this section.

14 “(4) REPORT.—Not later than 1 year after the
15 date of enactment of the Fossil Energy Research
16 and Development Act of 2018, the Secretary shall
17 provide to the Committee on Science, Space, and
18 Technology of the House of Representatives and the
19 Committee on Energy and Natural Resources of the
20 Senate a report that—

21 “(A) assesses the progress of all regional
22 carbon sequestration partnerships;

23 “(B) identifies the remaining challenges in
24 achieving carbon sequestration that is reliable

1 and safe for the environment and public health;
2 and

3 “(C) creates a roadmap to integrate geo-
4 logic sequestration sites and carbon utilization
5 with large sources of carbon dioxide in the
6 United States economy.

7 “(5) LARGE-SCALE CARBON SEQUESTRATION.—
8 For purposes of this subsection, ‘large-scale carbon
9 sequestration’ means the injection of more than
10 1,000,000 tons of carbon dioxide annually or a scale
11 that demonstrates the ability to inject and sequester
12 several million metric tons carbon dioxide for at
13 least 10 years.

14 “(d) INTEGRATED STORAGE PROJECTS.—The Sec-
15 retary may carry out a program for purposes of transition-
16 ing the large-scale storage demonstrations under sub-
17 section (c) into integrated, commercial storage complexes.
18 The program shall focus on—

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

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

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

4 “(4) any other activities the Secretary deems
5 necessary to transition the large scale demonstration
6 storage projects into commercial ventures.

7 “(e) COST SHARING.—The Secretary shall require
8 cost sharing under this section in accordance with section
9 988.

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

13 “(1) \$105,000,000 for fiscal year 2019;

14 “(2) \$110,250,000 for fiscal year 2020;

15 “(3) \$115,763,000 for fiscal year 2021;

16 “(4) \$121,551,000 for fiscal year 2022; and

17 “(5) \$127,628,000 for fiscal year 2023.”.

18 **SEC. 7. CARBON UTILIZATION.**

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

22 **“SEC. 969. CARBON UTILIZATION.**

23 “(a) IN GENERAL.—The Secretary shall carry out a
24 program of research, development, and demonstration for
25 carbon utilization. The program shall—

1 “(1) assess and monitor potential changes in
2 life cycle carbon dioxide emissions, and other envi-
3 ronmental safety indicators of new technologies,
4 practices, processes, or methods, used in enhanced
5 hydrocarbon recovery;

6 “(2) identify and evaluate novel uses for car-
7 bon, including the conversion of carbon dioxide for
8 commercial and industrial products, such as—

9 “(A) chemicals;

10 “(B) plastics;

11 “(C) building materials;

12 “(D) fuels;

13 “(E) cement; or

14 “(F) products of coal utilization in power
15 systems (as such term is defined in section
16 962(e)), or other applications; and

17 “(3) identify and develop alternative uses for
18 coal, including products derived from carbon engi-
19 neering, carbon fiber, and coal conversion methods.

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

23 “(1) \$25,000,000 for fiscal year 2019;

24 “(2) \$26,250,000 for fiscal year 2020;

25 “(3) \$27,562,500 for fiscal year 2021;

1 “(4) \$28,940,625 for fiscal year 2022; and
2 “(5) \$30,387,656 for fiscal year 2023.”.

3 (b) STUDY.—The Secretary shall enter into an agree-
4 ment with the National Academies to conduct a study as-
5 sessing the barriers and opportunities related to commer-
6 cializing carbon dioxide in the United States. Such study
7 shall—

8 (1) analyze the technical feasibility and related
9 challenges to commercializing carbon dioxide, includ-
10 ing—

11 (A) creating a national system of carbon
12 dioxide pipelines;

13 (B) mitigating environmental impacts; and

14 (C) regional economic challenges and op-
15 portunities;

16 (2) identify potential markets, industries, or
17 sectors that may benefit from greater access to com-
18 mercial carbon dioxide;

19 (3) assess the current state of infrastructure
20 and any necessary updates to allow for the integra-
21 tion of safe and reliable carbon dioxide transpor-
22 tation, utilization, and storage;

23 (4) estimate the economic impact of a well-inte-
24 grated national carbon dioxide pipeline system;

1 (5) assess the global status and progress of car-
2 bon utilization technologies (both chemical and bio-
3 logical) in practice today that utilize waste carbon
4 (including carbon dioxide, carbon monoxide, meth-
5 ane, and biogas) from power generation, biofuels
6 production, and other industrial processes;

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

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

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

21 (9) assess current research efforts, including
22 basic, applied, engineering, and computational, that
23 are addressing these challenges and identify gaps in
24 the current research portfolio; and

1 (10) develop a comprehensive research agenda
2 that addresses both long- and short-term research
3 needs and opportunities.

4 **SEC. 8. ADVANCED ENERGY SYSTEMS.**

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. 969A. ADVANCED ENERGY SYSTEMS.**

9 “(a) IN GENERAL.—The Secretary shall conduct a
10 program of research, development, demonstration, and
11 commercial application to improve the efficiency and reli-
12 ability of, and to reduce emissions from, fossil fuel power
13 generation in the following areas:

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

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

21 “(3) Advanced combustion systems, including
22 oxy-combustion systems and chemical looping.

23 “(4) Fuel cell technologies for low-cost, high-ef-
24 ficiency, fuel-flexible, modular power systems, includ-
25 ing solid oxide fuel cell technology for commercial,

1 residential, and distributed generation systems,
2 using improved manufacturing production and pro-
3 cesses.

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

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

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

14 “(b) PRIORITY.—In carrying out the program under
15 subsection (a), the Secretary is encouraged to prioritize
16 transformational technologies that enable a step change
17 in performance, efficiency, or cost of electricity as com-
18 pared to the technology in existence on the date of enact-
19 ment of this section.

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

23 “(1) \$118,000,000 for fiscal year 2019;

24 “(2) \$123,900,000 for fiscal year 2020;

25 “(3) \$130,095,000 for fiscal year 2021;

1 “(4) \$136,600,000 for fiscal year 2022; and

2 “(5) \$143,430,000 for fiscal year 2023.”.

3 **SEC. 9. RARE EARTH ELEMENTS.**

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

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

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

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

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

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

25 “(1) \$20,000,000 for fiscal year 2019;

- 1 “(2) \$21,000,000 for fiscal year 2020;
2 “(3) \$22,050,000 for fiscal year 2021;
3 “(4) \$23,153,000 for fiscal year 2022; and
4 “(5) \$24,310,000 for fiscal year 2023.”.

5 **SEC. 10. INTERAGENCY TASK FORCE ON CARBON DIOXIDE**
6 **PIPELINES.**

7 (a) **IN GENERAL.**—Not later than 90 days after the
8 date of enactment of this Act, the Secretary shall convene
9 an interagency task force to assess the potential for a na-
10 tional system of carbon dioxide pipelines.

11 (b) **MEMBERSHIP.**—The task force described in sub-
12 section (a) shall include representation from each of the
13 following:

- 14 (1) The Department of Energy.
15 (2) The Department of the Interior.
16 (3) The Environmental Protection Agency.
17 (4) The Department of Transportation.
18 (5) The Federal Energy Regulatory Commis-
19 sion.
20 (6) Other Federal agencies identified by the
21 Secretary.
22 (7) State, local, or Tribal governments.

23 (c) **DUTIES.**—The task force described in subsection
24 (a) shall—

1 (1) conduct annual workshops with relevant
2 Federal agencies to discuss the potential of and
3 progress toward an accessible and functioning na-
4 tional system of carbon dioxide pipelines, open to
5 representatives from—

6 (A) industry;

7 (B) State, local, and Tribal governments;

8 (C) academic researchers;

9 (D) environmental organizations; and

10 (E) other stakeholders as identified by the

11 Secretary;

12 (2) the Secretary shall provide public notice not
13 less than 60 days before conducting each workshop
14 under paragraph (1), to ensure all interested parties
15 can attend;

16 (3) provide to the Committee on Science, Space,
17 and Technology of the House of Representatives and
18 the Committee on Energy and Natural Resources of
19 the Senate an annual report summarizing the activi-
20 ties and progress of the task force; and

21 (4) in place of the final such annual report,
22 submit to the relevant congressional committees a
23 report laying out a roadmap for the successful estab-
24 lishment of a national carbon dioxide pipeline sys-
25 tem, including aspects related to—

1 (A) engineering, building, siting, and main-
2 tenance of the system;

3 (B) permitting and insuring pipelines;

4 (C) Federal and State policy challenges;

5 (D) incentives or resources to encourage
6 the utilization of the most advanced leak detec-
7 tion and mitigation technologies and monitoring
8 capabilities;

9 (E) regulating the national system to en-
10 sure safety and minimal environmental impacts;
11 and

12 (F) possible integrations into the current
13 pipeline systems.

14 (d) SUNSET.—The authority for the task force under
15 this section expires on the date that is 5 years after the
16 date on which the task force first convenes.

17 **SEC. 11. METHANE HYDRATES RESEARCH AMENDMENTS.**

18 (a) IN GENERAL.—Section 4(b) of the Methane Hy-
19 drate Research and Development Act of 2000 (30 U.S.C.
20 2003(b)) is amended to read as follows:

21 “(b) GRANTS, CONTRACTS, COOPERATIVE AGREE-
22 MENTS, INTERAGENCY FUNDS TRANSFER AGREEMENTS,
23 AND FIELD WORK PROPOSALS.—

24 “(1) ASSISTANCE AND COORDINATION.—In car-
25 rying out the program of methane hydrate research

1 and development authorized by this section, the Sec-
2 retary may award grants, or enter into contracts or
3 cooperative agreements to—

4 “(A) conduct basic and applied research—

5 “(i) to identify and assess deposits of
6 methane hydrate; and

7 “(ii) to identify the environmental,
8 health, and safety impacts of methane hy-
9 drate development;

10 “(B) assess and develop technologies to
11 mitigate environmental impacts of the commer-
12 cial development of methane hydrate as an en-
13 ergy resource and to reduce the public health
14 and safety risks of drilling through methane hy-
15 drates;

16 “(C) conduct basic and applied research to
17 assess and mitigate the environmental impact of
18 hydrate degassing (including natural degassing
19 and degassing associated with commercial de-
20 velopment); or

21 “(D) expand education and training pro-
22 grams in methane hydrate resource research
23 and resource development through fellowships
24 or other means for graduate education and
25 training.

1 “(2) ENVIRONMENTAL MONITORING AND RE-
2 SEARCH.—The Secretary shall conduct a long-term
3 environmental monitoring and research program to
4 study the effects of production from methane hy-
5 drate reservoirs.

6 “(3) COMPETITIVE PEER REVIEW.—Funds
7 made available to carry out paragraphs (1) and (2)
8 shall be made available based on a competitive proc-
9 ess using external scientific peer review of proposed
10 research.”.

11 (b) CONFORMING AMENDMENT.—Section 4(e) of
12 such Act (30 U.S.C. 2003(e)) is amended in the matter
13 preceding paragraph (1) by striking “subsection (b)(1)”
14 and inserting “paragraphs (1) and (2) of subsection (b)”.

15 (c) AUTHORIZATION OF APPROPRIATIONS.—Section
16 7 of such Act (30 U.S.C. 2006) is amended to read as
17 follows:

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

19 “There are authorized to be appropriated to the Sec-
20 retary to carry out this Act \$15,000,000, to remain avail-
21 able until expended, for each of fiscal years 2019 through
22 2023.”.

1 **SEC. 12. CARBON REMOVAL.**

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. 969C. CARBON REMOVAL.**

6 “(a) **ESTABLISHMENT.**—The Secretary, in coordina-
7 tion with the appropriate Federal agencies, shall establish
8 a research, development, and demonstration program to
9 test, validate, or improve technologies and strategies to re-
10 move carbon dioxide from the atmosphere on a large scale.
11 The program may include activities in—

12 “(1) direct air capture technologies;

13 “(2) bioenergy with carbon capture and seques-
14 tration;

15 “(3) enhanced geological weathering;

16 “(4) agricultural and grazing practices;

17 “(5) forest management and afforestation; and

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

20 “(b) **CONSIDERATIONS.**—The program under this
21 section shall identify and develop carbon removal tech-
22 nologies and strategies that consider the following:

23 “(1) Land use changes.

24 “(2) Ocean acidification.

25 “(3) Net greenhouse gas emissions.

26 “(4) Commercial viability.

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

2 “(6) Potential for carbon reductions on a
3 gigaton scale.

4 “(7) Economic co-benefits.

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

11 “(d) ACCOUNTING.—The Department shall collabo-
12 rate with the Environmental Protection Agency and other
13 relevant agencies to develop and improve accounting
14 frameworks and tools to accurately measure carbon re-
15 moval and sequestration methods and technologies across
16 the Federal Government.

17 “(e) AIR CAPTURE TECHNOLOGY PRIZE.—Not later
18 than 1 year after the date of enactment of this Act, as
19 part of the program carried out under this section, the
20 Secretary shall carry out a program to award competitive
21 technology prizes for carbon dioxide capture from media
22 in which the concentration of carbon dioxide is less than
23 1 percent by volume (in this subsection, known as ‘dilute
24 media’). In carrying out this subsection, the Secretary
25 shall—

1 “(1) in accordance with section 24 of the Ste-
2 venson-Wydler Technology Innovation Act of 1980,
3 develop requirements for—

4 “(A) the prize competition process;

5 “(B) minimum performance standards for
6 projects eligible to participate in the prize com-
7 petition; and

8 “(C) monitoring and verification proce-
9 dures for projects selected to receive a prize
10 award;

11 “(2) establish minimum levels for the capture of
12 carbon dioxide from dilute media that are required
13 to qualify for a prize award; and

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

15 “(A) A design for a promising capture
16 technology that will—

17 “(i) be operated on a demonstration
18 scale; and

19 “(ii) have the potential to achieve sig-
20 nificant reduction in the level of carbon di-
21 oxide in the atmosphere.

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

24 “(C) An operational capture technology on
25 a commercial scale.

1 “(f) INTRA-AGENCY RESEARCH.—The Secretary
2 shall encourage and promote crosscutting research and de-
3 velopment in bioenergy with carbon capture and seques-
4 tration within the Department.

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

8 “(1) \$45,000,000 for fiscal year 2018,
9 \$15,000,000 of which are authorized to carry out
10 subsection (e);

11 “(2) \$31,500,000 for fiscal year 2019;

12 “(3) \$33,075,000 for fiscal year 2019;

13 “(4) \$34,729,000 for fiscal year 2019; and

14 “(5) \$36,465,000 for fiscal year 2020.”.

15 **SEC. 13. METHANE LEAK DETECTION AND MITIGATION.**

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

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

20 “(a) IN GENERAL.—The Secretary, in coordination
21 with the appropriate Federal agencies, shall carry out a
22 program of methane leak detection and mitigation re-
23 search, development, demonstration, and commercial ap-
24 plication for technologies and methods that significantly

1 reduce emissions. In carrying out the program, the Sec-
2 retary 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 methane leaks across the United States.

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

12 “(1) Historical data of methane leaks.

13 “(2) Public health consequences.

14 “(3) Public safety.

15 “(4) Novel materials and designs for pipelines,
16 compressor stations, components, and well casings.

17 “(5) Regional geologic traits.

18 “(6) Induced and natural seismicity.

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

22 “(1) \$20,000,000 for fiscal years 2019;

23 “(2) \$21,000,000 for fiscal years 2020;

24 “(3) \$22,050,000 for fiscal years 2021;

25 “(4) \$23,153,000 for fiscal years 2022; and

1 “(5) \$24,310,000 for fiscal years 2023.”.

2 (b) REPORT.—Not later than 1 year after the date
3 of enactment of this Act, the Secretary, in coordination
4 with the Secretary of Transportation, shall submit to the
5 Committee on Science, Space, and Technology, the Com-
6 mittee on Transportation and Infrastructure, and the
7 Committee on Energy and Commerce of the House of
8 Representatives and the Committee on Energy and Nat-
9 ural Resources and the Committee on Commerce, Science,
10 and Transportation of the Senate a report on mitigating
11 natural gas storage leaks. The report shall include the fol-
12 lowing:

13 (1) A quantitative study to evaluate the key un-
14 certainties related to the costs and benefits of
15 downhole safety valves for the natural gas storage
16 industry in the United States, including—

17 (A) malfunction and failure rates of mod-
18 ern downhole safety valve designs;

19 (B) the frequency of well failures; and

20 (C) alternative emergency valve designs.

21 (2) A systematic assessment of casing wall
22 thickness assessment tools, which shall—

23 (A) consider multiple tool types and ref-
24 erence wells; and

1 (B) rigorously test and compare the ability
2 of these tools and techniques to identify, locate,
3 and characterize corroded well casings.

4 **SEC. 14. NATIONAL ENERGY TECHNOLOGY LABORATORY**
5 **REFORMS.**

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

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

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

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

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

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

24 (C) pay any employee appointed under this
25 section payments in addition to basic pay, ex-

1 cept that the total amount of additional pay-
2 ments paid to an employee under this sub-
3 section for any 12-month period shall not ex-
4 ceed the least of—

5 (i) \$25,000;

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

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

13 (2) LIMITATIONS.—

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

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

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

24 (1) IN GENERAL.—The Secretary shall establish
25 mechanisms under which the Director of the Na-

1 tional Energy Technology Laboratory may use an
2 amount of funds equal to an amount that is not less
3 than 2 percent and not more than 4 percent of all
4 funds available to the Laboratory for the following
5 purposes:

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

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

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

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

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

1 (3) ANNUAL REPORT ON USE OF AUTHORITY.—
2 Not later than March 1 of each year, the Secretary
3 shall submit to the Committee on Science, Space,
4 and Technology of the House of Representatives and
5 the Committee on Energy and Natural Resources of
6 the Senate a report on the use of the authority
7 under this subsection during the preceding fiscal
8 year.

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

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

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

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

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

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