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(Original Signature of Member)

115TH CONGRESS  
2D SESSION

**H. R.** \_\_\_\_\_

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**

Mr. VEASEY (for himself, Mr. MCKINLEY, and Ms. EDDIE BERNICE JOHNSON of Texas) introduced the following bill; which was referred to the Committee on \_\_\_\_\_

\_\_\_\_\_  
**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11 Policy Act of 2005 (42 U.S.C. 15801 note) is repealed.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           (3) by striking subsections (c) through (e) and  
2       inserting the following:

3       “(c) LIMITATION.—None of the funds authorized  
4       under this section may be used for Fossil Energy Environ-  
5       mental Restoration or Import/Export Authorization.”.

6       **SEC. 5. CARBON CAPTURE TECHNOLOGIES FOR POWER**  
7                               **SYSTEMS.**

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

11      **“SEC. 962. CARBON CAPTURE TECHNOLOGIES FOR POWER**  
12                               **SYSTEMS.**

13      “(a) IN GENERAL.—The Secretary shall conduct a  
14      program of research, development, demonstration, and  
15      commercial application of carbon capture technologies, in-  
16      cluding to facilitate the development and use of—

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

19              “(2) innovations to improve the efficiency of,  
20              and decrease emissions at, existing power plants;  
21              and

22              “(3) advanced separation technologies.

23      “(b) PRIORITIZATION.—The Secretary shall maintain  
24      robust investments in carbon capture technologies for coal  
25      applications.

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 1 or more eligible entities for  
17 the operation of not less than 3 Carbon Capture  
18 Test Centers (in this subsection, known as the ‘Cen-  
19 ters’) to provide unique testing capabilities for inno-  
20 vative carbon capture technologies for power sys-  
21 tems.

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 1 or more  
15          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 1 or more of the existing regional  
3       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  
16 transitioning the large-scale storage demonstrations under  
17 subsection (c) into integrated, commercial storage com-  
18 plexes. 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               programs 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        necessary tools and resources to advance its research
- 2        mission.