

115TH CONGRESS
2D SESSION

S. 2803

To amend the Energy Policy Act of 2005 to improve the conversion, use, and storage of carbon dioxide produced from fossil fuels, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MAY 8, 2018

Mr. MANCHIN (for himself and Ms. HEITKAMP) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To amend the Energy Policy Act of 2005 to improve the conversion, use, and storage of carbon dioxide produced from fossil fuels, 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.**

4 This Act may be cited as the “Fossil Energy Utiliza-
5 tion, Enhancement, and Leadership Act of 2018”.

6 **SEC. 2. FOSSIL ENERGY.**

7 Section 961(a) of the Energy Policy Act of 2005 (42
8 U.S.C. 16291(a)) is amended by adding at the end the
9 following:

1 “(8) Improving the conversion, use, and storage
2 of carbon dioxide produced from fossil fuels.”.

3 **SEC. 3. ESTABLISHMENT OF COAL TECHNOLOGY PRO-**
4 **GRAM.**

5 The Energy Policy Act of 2005 is amended by strik-
6 ing section 962 (42 U.S.C. 16292) and inserting the fol-
7 lowing:

8 **“SEC. 962. COAL TECHNOLOGY PROGRAM.**

9 “(a) DEFINITIONS.—In this section:

10 “(1) LARGE-SCALE PILOT PROJECT.—The term
11 ‘large-scale pilot project’ means a pilot project
12 that—

13 “(A) represents the scale of technology de-
14 velopment beyond laboratory development and
15 bench scale testing, but not yet advanced to the
16 point of being tested under real operational con-
17 ditions at commercial scale;

18 “(B) represents the scale of technology
19 necessary to gain the operational data needed
20 to understand the technical and performance
21 risks of the technology before the application of
22 that technology at commercial scale or in com-
23 mercial-scale demonstration; and

24 “(C) is large enough—

25 “(i) to validate scaling factors; and

1 “(ii) to demonstrate the interaction
 2 between major components so that control
 3 philosophies for a new process can be de-
 4 veloped and enable the technology to ad-
 5 vance from large-scale pilot plant applica-
 6 tion to commercial-scale demonstration or
 7 application.

8 “(2) NET-NEGATIVE CARBON DIOXIDE EMIS-
 9 SIONS PROJECT.—The term ‘net-negative carbon di-
 10 oxide emissions project’ means a project—

11 “(A) that employs a technology for
 12 thermochemical coconversion of coal and bio-
 13 mass fuels that—

14 “(i) uses a carbon capture system;
 15 and

16 “(ii) with carbon dioxide removal, the
 17 Secretary determines can provide elec-
 18 tricity, fuels, or chemicals with net-nega-
 19 tive carbon dioxide emissions from produc-
 20 tion and consumption of the end products,
 21 while removing atmospheric carbon dioxide;

22 “(B) that will proceed initially through a
 23 large-scale pilot project for which front-end en-
 24 gineering will be performed for bituminous, sub-
 25 bituminous, and lignite coals; and

“(C) through which each use of coal will be combined with the use of a regionally indigenous form of biomass energy, provided on a renewable basis, that is sufficient in quantity to allow for net-negative emissions of carbon dioxide (in combination with a carbon capture system), while avoiding impacts on food production activities.

“(3) PROGRAM.—The term ‘program’ means the program established under subsection (b)(1).

“(4) TRANSFORMATIONAL TECHNOLOGY.—

“(A) IN GENERAL.—The term ‘transformational technology’ means a power generation technology that represents a significant change in the methods used to convert energy that will enable a step change in performance, efficiency, and cost of electricity as compared to the technology in existence on the date of enactment of the Fossil Energy Utilization, Enhancement, and Leadership Act of 2018.

“(B) INCLUSIONS.—The term ‘transformational technology’ includes a broad range of technology improvements, including—

1 “(i) thermodynamic improvements in
2 energy conversion and heat transfer, in-
3 cluding—

4 “(I) oxygen combustion;

5 “(II) chemical looping; and

6 “(III) the replacement of steam
7 cycles with supercritical carbon diox-
8 ide cycles;

9 “(ii) improvements in steam or carbon
10 dioxide turbine technology;

11 “(iii) improvements in carbon capture
12 systems technology;

13 “(iv) improvements in small-scale and
14 modular coal-fired technologies with re-
15 duced carbon output or carbon capture
16 that can support incremental power gen-
17 eration capacity additions; and

18 “(v) any other technology the Sec-
19 retary recognizes as transformational tech-
20 nology.

21 “(b) COAL TECHNOLOGY PROGRAM.—

22 “(1) IN GENERAL.—The Secretary shall estab-
23 lish a coal technology program to ensure the contin-
24 ued use of the abundant, domestic coal resources of
25 the United States through the development of tech-

1 nologies that will significantly improve the efficiency,
2 effectiveness, costs, and environmental performance
3 of coal use.

4 “(2) REQUIREMENTS.—The program shall in-
5 clude—

6 “(A) a research and development program;

7 “(B) large-scale pilot projects;

8 “(C) demonstration projects;

9 “(D) net-negative carbon dioxide emissions
10 projects; and

11 “(E) a front-end engineering and design
12 program.

13 “(3) PROGRAM GOALS AND OBJECTIVES.—In
14 consultation with the interested entities described in
15 paragraph (4)(C), the Secretary shall develop goals
16 and objectives for the program to be applied to the
17 technologies developed within the program, taking
18 into consideration the following objectives:

19 “(A) Ensure reliable, low-cost power from
20 new and existing coal plants.

21 “(B) Achieve high conversion efficiencies.

22 “(C) Address emissions of carbon dioxide
23 through high-efficiency platforms and carbon
24 capture from new and existing coal plants.

1 “(D) Support small-scale and modular
2 technologies to enable incremental capacity ad-
3 ditions and load growth, in addition to large-
4 scale generation technologies.

5 “(E) Support baseload operations for new
6 and existing applications of coal generation.

7 “(F) Further reduce emissions of criteria
8 pollutants and reduce the use and manage the
9 discharge of water in power plant operations.

10 “(G) Accelerate the development of tech-
11 nologies that have transformational energy con-
12 version characteristics.

13 “(H) Validate safe geological storage of
14 large volumes of anthropogenic sources of car-
15 bon dioxide and support the development of the
16 infrastructure needed to support a carbon diox-
17 ide use and storage industry.

18 “(I) Examine methods of converting coal
19 to other valuable products and commodities in
20 addition to electricity.

21 “(4) CONSULTATIONS REQUIRED.—In carrying
22 out the program, the Secretary shall—

23 “(A) undertake international collabora-
24 tions, taking into consideration the rec-
25 ommendations of the National Coal Council;

1 “(B) use existing authorities to encourage
2 international cooperation; and

3 “(C) consult with interested entities, in-
4 cluding—

5 “(i) coal producers;

6 “(ii) industries that use coal;

7 “(iii) organizations that promote coal
8 and advanced coal technologies;

9 “(iv) environmental organizations;

10 “(v) organizations representing work-
11 ers; and

12 “(vi) organizations representing con-
13 sumers.

14 “(c) REPORT.—

15 “(1) IN GENERAL.—Not later than 18 months
16 after the date of enactment of the Fossil Energy
17 Utilization, Enhancement, and Leadership Act of
18 2018, the Secretary shall submit to Congress a re-
19 port describing the program goals and objectives
20 adopted under subsection (b)(3).

21 “(2) UPDATE.—Not less frequently than once
22 every 2 years after the initial report is submitted
23 under paragraph (1), the Secretary shall submit to
24 Congress a report describing the progress made to-

1 wards achieving the program goals and objectives
 2 adopted under subsection (b)(3).

3 “(d) FUNDING.—

4 “(1) AUTHORIZATION OF APPROPRIATIONS.—

5 There are authorized to be appropriated to the Sec-
 6 retary to carry out this section, to remain available
 7 until expended—

8 “(A) for activities under the research and
 9 development program component described in
 10 subsection (b)(2)(A)—

11 “(i) \$200,000,000 for each of fiscal
 12 years 2019 and 2020; and

13 “(ii) \$150,000,000 for each of fiscal
 14 years 2021 through 2023;

15 “(B) for activities under the demonstration
 16 projects program component described in sub-
 17 section (b)(2)(C)—

18 “(i) \$50,000,000 for each of fiscal
 19 years 2019 and 2020;

20 “(ii) \$150,000,000 for fiscal year
 21 2021; and

22 “(iii) \$200,000,000 for each of fiscal
 23 years 2022 and 2023;

24 “(C) subject to paragraph (2), for activi-
 25 ties under the large-scale pilot projects program

1 component described in subsection (b)(2)(B),
 2 \$250,000,000 for each of fiscal years 2019
 3 through 2023;

4 “(D) for activities under the net-negative
 5 carbon dioxide emissions projects program com-
 6 ponent described in subsection (b)(2)(D),
 7 \$22,000,000 for each of fiscal years 2019
 8 through 2023; and

9 “(E) for activities under the front-end en-
 10 gineering and design program described in sub-
 11 section (b)(2)(E), \$50,000,000 for each of fis-
 12 cal years 2019 through 2023.

13 “(2) COST SHARING FOR LARGE-SCALE PILOT
 14 PROJECTS.—Activities under subsection (b)(2)(B)
 15 shall be subject to the cost-sharing requirements of
 16 section 988(b).”.

17 **SEC. 4. REPORT ON CARBON DIOXIDE CAPTURE CON-**
 18 **TRACTING AUTHORITY.**

19 Section 963 of the Energy Policy Act of 2005 (42
 20 U.S.C. 16293) is amended by adding at the end the fol-
 21 lowing:

22 “(e) REPORT ON CARBON DIOXIDE CAPTURE CON-
 23 TRACTING AUTHORITY.—

1 “(1) DEFINITION OF ELECTRIC GENERATION
2 UNIT.—In this subsection, the term ‘electric genera-
3 tion unit’ means an electric generation unit that—

4 “(A) uses coal-based generation tech-
5 nology; and

6 “(B) is capable of capturing carbon dioxide
7 emissions from the unit.

8 “(2) REPORT.—Not later than 180 days after
9 the date of enactment of the Fossil Energy Utiliza-
10 tion, Enhancement, and Leadership Act of 2018, the
11 Secretary shall prepare and submit to the appro-
12 priate committees of Congress a report that—

13 “(A) describes the costs and benefits of en-
14 tering into long-term binding contracts on be-
15 half of the Federal Government with qualified
16 parties to provide support for capturing carbon
17 dioxide from electricity generated at an electric
18 generation unit or carbon dioxide captured from
19 an electric generation unit and sold to a pur-
20 chaser for—

21 “(i) the recovery of crude oil; or

22 “(ii) other purposes for which a com-
23 mercial market exists;

24 “(B) contains an analysis of how the De-
25 partment would establish, implement, and

1 maintain a contracting program described in
 2 subparagraph (A); and

3 “(C) outlines options for how contracts
 4 may be structured, and regulations that would
 5 be necessary, to implement a contracting pro-
 6 gram described in subparagraph (A).”.

7 **SEC. 5. CARBON UTILIZATION PROGRAM.**

8 (a) IN GENERAL.—Subtitle F of title IX of the En-
 9 ergy Policy Act of 2005 (42 U.S.C. 16291 et seq.) is
 10 amended by adding at the end the following:

11 **“SEC. 969. CARBON UTILIZATION PROGRAM.**

12 “(a) IN GENERAL.—The Secretary shall carry out a
 13 program of research, development, and demonstration for
 14 carbon utilization—

15 “(1) to assess and monitor—

16 “(A) potential changes in lifecycle carbon
 17 dioxide emissions; and

18 “(B) other environmental safety indicators
 19 of new technologies, practices, processes, or
 20 methods used in enhanced hydrocarbon recov-
 21 ery; and

22 “(2) to identify and evaluate novel uses for car-
 23 bon, including the conversion of carbon dioxide for
 24 commercial and industrial products, such as—

25 “(A) chemicals;

1 “(B) plastics;
2 “(C) building materials;
3 “(D) fuels;
4 “(E) cement; or
5 “(F) products of coal utilization in power
6 systems or other applications.

7 “(b) AUTHORIZATION OF APPROPRIATIONS.—There
8 are authorized to be appropriated to the Secretary to carry
9 out this section—

10 “(1) \$15,000,000 for fiscal year 2019;
11 “(2) \$16,000,000 for fiscal year 2020; and
12 “(3) \$17,000,000 for fiscal year 2021.”.

13 (b) STUDY.—

14 (1) IN GENERAL.—The Secretary of Energy
15 shall enter into an agreement with the National
16 Academies of Sciences, Engineering, and Medicine
17 under which the National Academies of Sciences,
18 Engineering, and Medicine shall conduct a study to
19 assess any barriers and opportunities relating to
20 commercializing carbon dioxide in the United States.

21 (2) REQUIREMENTS.—The study under para-
22 graph (1) shall—

23 (A) analyze challenges to commercializing
24 carbon dioxide, including—

- 1 (i) creating a national system of car-
- 2 bon dioxide pipelines;
- 3 (ii) mitigating environmental impacts;
- 4 and
- 5 (iii) regional economic challenges and
- 6 opportunities;
- 7 (B) identify potential markets, industries,
- 8 or sectors that may benefit from greater access
- 9 to commercial carbon dioxide;
- 10 (C) assess—
- 11 (i) the state of infrastructure as of
- 12 the date of the study; and
- 13 (ii) any necessary updates to infra-
- 14 structure to allow for the integration of
- 15 safe and reliable carbon dioxide transpor-
- 16 tation, utilization, and storage;
- 17 (D) estimate the economic impact of a
- 18 well-integrated national carbon dioxide pipeline
- 19 system;
- 20 (E) assess the global status and progress
- 21 of carbon utilization technologies (both chemical
- 22 and biological) in practice as of the date of the
- 23 study that utilize waste carbon, including car-
- 24 bon dioxide, carbon monoxide, methane, and

1 biogas, from power generation, biofuels produc-
2 tion, and other industrial processes;

3 (F) identify emerging technologies and ap-
4 proaches for carbon utilization that show prom-
5 ise for scale-up, demonstration, deployment,
6 and commercialization;

7 (G) analyze the factors associated with
8 making carbon utilization technologies viable at
9 a commercial scale, including carbon waste
10 stream availability, economics, market capacity,
11 energy, and lifecycle requirements;

12 (H)(i) assess the major technical chal-
13 lenges associated with increasing the commer-
14 cial viability of carbon reuse technologies; and

15 (ii) identify the research and development
16 questions that will address the challenges de-
17 scribed in clause (i);

18 (I)(i) assess research efforts being carried
19 out as of the date of the study, including basic,
20 applied, engineering, and computational re-
21 search efforts, that are addressing the chal-
22 lenges described in subparagraph (H)(i); and

23 (ii) identify gaps in the research efforts
24 under clause (i); and

1 (J) develop a comprehensive research agen-
 2 da that addresses long- and short-term research
 3 needs and opportunities.

4 (3) DEADLINE.—Not later than 180 days after
 5 the date of enactment of this Act, the National
 6 Academies of Sciences, Engineering, and Medicine
 7 shall submit to the Secretary of Energy a report de-
 8 scribing the results of the study under paragraph
 9 (1).

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

12 (a) IN GENERAL.—Not later than 60 days after the
 13 date on which the study under section 5(b)(1) is sub-
 14 mitted, the Secretary of Energy (referred to in this section
 15 as the “Secretary”) shall convene an interagency task
 16 force (referred to in this section as the “task force”) to
 17 assess the potential for a national system of carbon dioxide
 18 pipelines.

19 (b) MEMBERSHIP.—The task force shall include rep-
 20 resentatives of each of the following:

- 21 (1) The Department of Energy.
- 22 (2) The Department of the Interior.
- 23 (3) The Environmental Protection Agency.
- 24 (4) The Department of Transportation.

1 (5) The Federal Energy Regulatory Commis-
2 sion.

3 (6) Other Federal agencies identified by the
4 Secretary.

5 (7) State, local, and Tribal governments.

6 (c) ANNUAL WORKSHOPS.—

7 (1) IN GENERAL.—The task force shall conduct
8 annual workshops to discuss the potential of, and
9 progress toward, an accessible and functioning na-
10 tional system of carbon dioxide pipelines.

11 (2) PARTICIPANTS.—The annual workshops
12 under paragraph (1) shall be—

13 (A) conducted with representatives of rel-
14 evant Federal agencies; and

15 (B) open to representatives from—

16 (i) industry;

17 (ii) State, local, and Tribal govern-
18 ments;

19 (iii) academic researchers;

20 (iv) environmental organizations; and

21 (v) other stakeholders identified by
22 the Secretary.

23 (3) PUBLIC NOTICE.—Not later than 60 days
24 before the date on which the task force conducts an
25 annual workshop under paragraph (1), the Secretary

1 shall provide public notice of the annual workshop to
2 ensure all interested parties can attend.

3 (4) REPORTS.—

4 (A) ANNUAL REPORTS.—The Secretary
5 shall submit to the Committee on Energy and
6 Natural Resources of the Senate and the Com-
7 mittees on Energy and Commerce and Science,
8 Space, and Technology of the House of Rep-
9 resentatives an annual report summarizing the
10 activities and progress of the task force.

11 (B) FINAL REPORT.—Not later than 1
12 year after the termination date described in
13 subsection (d), the Secretary shall submit to the
14 Committee on Energy and Natural Resources of
15 the Senate and the Committees on Energy and
16 Commerce and Science, Space, and Technology
17 of the House of Representatives a final report
18 laying out a plan for the successful establish-
19 ment of a national carbon dioxide pipeline sys-
20 tem, including a description of—

21 (i) the plan for engineering, building,
22 siting, and maintenance of a national car-
23 bon dioxide pipeline system;

1 (ii) the plan for permitting and insur-
2 ing pipelines under a national carbon diox-
3 ide pipeline system;

4 (iii) any Federal and State policy
5 challenges to establishing a national carbon
6 dioxide pipeline system;

7 (iv) incentives or resources necessary
8 to encourage the use of the most advanced
9 leak detection and mitigation technologies
10 and monitoring capabilities available in a
11 national carbon dioxide pipeline system;

12 (v) how a national carbon dioxide
13 pipeline system should be regulated to en-
14 sure safety and minimal environmental im-
15 pacts; and

16 (vi) how a national carbon dioxide
17 pipeline system might be integrated into
18 the pipeline systems in existence as of the
19 date of the establishment of a national car-
20 bon dioxide pipeline system.

21 (d) SUNSET.—The authority for the task force under
22 this section shall terminate on the date that is 3 years
23 after the date on which the task force first convenes.

1 **SEC. 7. RARE EARTH ELEMENT ADVANCED COAL TECH-**
2 **NOLOGIES.**

3 (a) FINDINGS.—Congress finds that—

4 (1) the United States is largely dependent on
5 foreign imports for the domestic supply of rare earth
6 elements and minerals in the United States;

7 (2) as of the date of enactment of this Act, the
8 United States does not have domestic production ca-
9 pability for, or a guaranteed supply chain of, rare
10 earth elements and minerals, particularly in times of
11 national crisis;

12 (3) access to certain rare earth elements and
13 minerals is critical for the national security of the
14 United States;

15 (4) China maintains a near monopoly of the
16 global supply chain of rare earth elements and min-
17 erals;

18 (5) the successful development of commercially
19 viable refining methods of rare earth elements and
20 minerals from coal byproducts could lead to new eco-
21 nomic development opportunities in parts of the
22 United States most affected by the downturn of the
23 coal industry;

24 (6) rare earth elements—

25 (A) comprise 17 elements on the periodic
26 table, including—

(i) the lanthanides, which are lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), promethium (Pm), samarium (Sm), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), and lutetium (Lu); and

(ii) transition elements, which are scandium (Sc) and yttrium (Y); and

(B) can be divided into—

(i) light rare earth elements, which are lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), promethium (Pm), and samarium (Sm); and

(ii) heavy rare earth elements, which are scandium (Sc), yttrium (Y), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), and lutetium (Lu); and

(7) it is in the interest of the Federal Government—

(A) to guide responsible domestic production of rare earth elements and minerals to en-

sure industry and consumers in the United States have access to a reliable domestic supply of valuable rare earth elements and minerals; and

(B)(i) to identify the areas of highest potential interruption in the global supply chain of rare earth elements and minerals; and

(ii) to strengthen the position of the United States in that supply chain by mitigating potential interruptions through the development of advanced coal technologies.

(b) PROGRAM FOR EXTRACTION AND RECOVERY OF RARE EARTH ELEMENTS AND MINERALS FROM COAL AND COAL BYPRODUCTS.—

(1) IN GENERAL.—The Secretary of Energy, acting through the Assistant Secretary for Fossil Energy (referred to in this subsection as the “Secretary”), shall carry out a program under which the Secretary shall develop advanced separation technologies for the extraction and recovery of rare earth elements and minerals from coal and coal byproducts.

(2) AUTHORIZATION OF APPROPRIATIONS.—

There is authorized to be appropriated to the Secretary to carry out the program described in para-

graph (1) \$20,000,000 for each of fiscal years 2019 through 2026.

(c) ASSESSMENT AND REPORT.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Secretary of Energy, in consultation with the Secretary of Defense (referred to in this subsection as the “Secretary”), shall carry out, and submit to the Committee on Energy and Natural Resources of the Senate and the Committees on Energy and Commerce and Science, Space, and Technology of the House of Representatives—

(A) an assessment—

(i) identifying and ranking the rare earth elements that—

(I) are most important to consumers in the United States;

(II) are most jeopardized in the global supply chain; and

(III) will have the greatest impact to consumers in the United States in the event of a disruption in the global supply chain;

(ii) evaluating the development of advanced separation technologies for the ex-

traction and recovery of rare earth elements and minerals from coal and coal by-products (referred to in this paragraph as the “technologies”);

(iii) identifying and evaluating the results of the development of the technologies, including the results with respect to the extraction and recovery of each rare earth element;

(iv) determining what the technologies are capable of producing;

(v) evaluating the performance of the technologies, including what the technologies—

(I) succeed and fail at accomplishing; and

(II) can and cannot do cost-effectively; and

(vi)(I) evaluating the market impact on each rare earth mineral of the penetration of commercially viable technologies; and

(II) how the penetration of commercially viable coal-based technology will impact the global supply chain; and

1 (B) a report analyzing—

2 (i) the additional resources required
3 for the development of commercial-ready
4 deployment of technologies that are second
5 generation and transformational; and

6 (ii) the market impact of processes to
7 treat and recover rare earth elements and
8 minerals from sludge generated during
9 treatment of acid mine drainage from coal
10 mines.

11 (2) REQUIREMENT.—In carrying out the as-
12 sessment and report under paragraph (1), the Sec-
13 retary shall focus on the rare earth elements deter-
14 mined by the Secretary to be most critical to the na-
15 tional security of the United States.

16 **SEC. 8. RESEARCH AND DEVELOPMENT OF NATURAL GAS.**

17 Nothing in this Act or an amendment made by this
18 Act precludes the Secretary of Energy from using funds
19 authorized to be made available by this Act or an amend-
20 ment made by this Act for the research and development
21 of natural gas if the Secretary of Energy determines that
22 the funding results in the investment in technologies that
23 are primarily developed and tested for coal-based applica-
24 tions.

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