115TH CONGRESS
2D SESSION

S. _____

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

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

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.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Fossil Energy Utilization, Enhancement, and Leadership Act of 2018''.

SEC. 2. FOSSIL ENERGY.

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

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

SEC. 3. ESTABLISHMENT OF COAL TECHNOLOGY PROGRAM.

The Energy Policy Act of 2005 is amended by striking section 962 (42 U.S.C. 16292) and inserting the following:

''SEC. 962. COAL TECHNOLOGY PROGRAM.

''(a) DEFINITIONS.—In this section:

''(1) LARGE-SCALE PILOT PROJECT.—The term 'large-scale pilot project' means a pilot project that—

''(A) represents the scale of technology development beyond laboratory development and bench scale testing, but not yet advanced to the point of being tested under real operational conditions at commercial scale;

''(B) represents the scale of technology necessary to gain the operational data needed to understand the technical and performance risks of the technology before the application of that technology at commercial scale or in commercial-scale demonstration; and

''(C) is large enough—

''(i) to validate scaling factors; and

''(ii) to demonstrate the interaction between major components so that control philosophies for a new process can be developed and enable the technology to advance from large-scale pilot plant application to commercial-scale demonstration or application.

''(2) NET-NEGATIVE CARBON DIOXIDE EMISSIONS PROJECT.—The term 'net-negative carbon dioxide emissions project' means a project—

''(A) that employs a technology for thermochemical coconversion of coal and biomass fuels that—

''(i) uses a carbon capture system; and

''(ii) with carbon dioxide removal, the Secretary determines can provide electricity, fuels, or chemicals with net-negative carbon dioxide emissions from production and consumption of the end products, while removing atmospheric carbon dioxide;

''(B) that will proceed initially through a large-scale pilot project for which front-end engineering will be performed for bituminous, subbituminous, 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—

"(i) thermodynamic improvements in energy conversion and heat transfer, including—

"(I) oxygen combustion;

"(II) chemical looping; and

"(III) the replacement of steam cycles with supercritical carbon dioxide cycles;

"(ii) improvements in steam or carbon dioxide turbine technology;

"(iii) improvements in carbon capture systems technology;

"(iv) improvements in small-scale and modular coal-fired technologies with reduced carbon output or carbon capture that can support incremental power generation capacity additions; and

"(v) any other technology the Secretary recognizes as transformational technology.

"(b) COAL TECHNOLOGY PROGRAM.—

"(1) IN GENERAL.—The Secretary shall establish a coal technology program to ensure the continued use of the abundant, domestic coal resources of the United States through the development of tech-

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

''(2) REQUIREMENTS.—The program shall include—

''(A) a research and development program;

''(B) large-scale pilot projects;

''(C) demonstration projects;

''(D) net-negative carbon dioxide emissions projects; and

''(E) a front-end engineering and design program.

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

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

''(B) Achieve high conversion efficiencies.

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

"(D) Support small-scale and modular technologies to enable incremental capacity additions and load growth, in addition to large-scale generation technologies.

"(E) Support baseload operations for new and existing applications of coal generation.

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

"(G) Accelerate the development of technologies that have transformational energy conversion characteristics.

"(H) Validate safe geological storage of large volumes of anthropogenic sources of carbon dioxide and support the development of the infrastructure needed to support a carbon dioxide use and storage industry.

"(I) Examine methods of converting coal to other valuable products and commodities in addition to electricity.

"(4) CONSULTATIONS REQUIRED.—In carrying out the program, the Secretary shall—

"(A) undertake international collaborations, taking into consideration the recommendations of the National Coal Council;

"(B) use existing authorities to encourage international cooperation; and

"(C) consult with interested entities, including—

"(i) coal producers;

"(ii) industries that use coal;

"(iii) organizations that promote coal and advanced coal technologies;

"(iv) environmental organizations;

"(v) organizations representing workers; and

"(vi) organizations representing consumers.

"(c) REPORT.—

"(1) IN GENERAL.—Not later than 18 months after the date of enactment of the Fossil Energy Utilization, Enhancement, and Leadership Act of 2018, the Secretary shall submit to Congress a report describing the program goals and objectives adopted under subsection (b)(3).

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

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

''(d) FUNDING.—

''(1) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section, to remain available until expended—

''(A) for activities under the research and development program component described in subsection (b)(2)(A)—

''(i) $200,000,000 for each of fiscal years 2019 and 2020; and

''(ii) $150,000,000 for each of fiscal years 2021 through 2023;

''(B) for activities under the demonstration projects program component described in subsection (b)(2)(C)—

''(i) $50,000,000 for each of fiscal years 2019 and 2020;

''(ii) $150,000,000 for fiscal year 2021; and

''(iii) $200,000,000 for each of fiscal years 2022 and 2023;

''(C) subject to paragraph (2), for activities under the large-scale pilot projects program

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

"(D) for activities under the net-negative carbon dioxide emissions projects program component described in subsection (b)(2)(D), $22,000,000 for each of fiscal years 2019 through 2023; and

"(E) for activities under the front-end engineering and design program described in subsection (b)(2)(E), $50,000,000 for each of fiscal years 2019 through 2023.

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

SEC. 4. REPORT ON CARBON DIOXIDE CAPTURE CONTRACTING AUTHORITY.

Section 963 of the Energy Policy Act of 2005 (42 U.S.C. 16293) is amended by adding at the end the following:

"(e) REPORT ON CARBON DIOXIDE CAPTURE CONTRACTING AUTHORITY.—

"(1) DEFINITION OF ELECTRIC GENERATION UNIT.—In this subsection, the term 'electric generation unit' means an electric generation unit that—

"(A) uses coal-based generation technology; and

"(B) is capable of capturing carbon dioxide emissions from the unit.

"(2) REPORT.—Not later than 180 days after the date of enactment of the Fossil Energy Utilization, Enhancement, and Leadership Act of 2018, the Secretary shall prepare and submit to the appropriate committees of Congress a report that—

"(A) describes the costs and benefits of entering into long-term binding contracts on behalf of the Federal Government with qualified parties to provide support for capturing carbon dioxide from electricity generated at an electric generation unit or carbon dioxide captured from an electric generation unit and sold to a purchaser for—

"(i) the recovery of crude oil; or

"(ii) other purposes for which a commercial market exists;

"(B) contains an analysis of how the Department would establish, implement, and

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

''(C) outlines options for how contracts may be structured, and regulations that would be necessary, to implement a contracting program described in subparagraph (A).''.

SEC. 5. CARBON UTILIZATION PROGRAM.

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

''SEC. 969. CARBON UTILIZATION PROGRAM.

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

''(1) to assess and monitor—

''(A) potential changes in lifecycle carbon dioxide emissions; and

''(B) other environmental safety indicators of new technologies, practices, processes, or methods used in enhanced hydrocarbon recovery; and

''(2) to identify and evaluate novel uses for carbon, including the conversion of carbon dioxide for commercial and industrial products, such as—

''(A) chemicals;

''(B) plastics;

''(C) building materials;

''(D) fuels;

''(E) cement; or

''(F) products of coal utilization in power systems or other applications.

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

''(1) $15,000,000 for fiscal year 2019;

''(2) $16,000,000 for fiscal year 2020; and

''(3) $17,000,000 for fiscal year 2021.''.

(b) STUDY.—

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

(2) REQUIREMENTS.—The study under paragraph (1) shall—

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

(i) creating a national system of carbon dioxide pipelines;

(ii) mitigating environmental impacts; and

(iii) regional economic challenges and opportunities;

(B) identify potential markets, industries, or sectors that may benefit from greater access to commercial carbon dioxide;

(C) assess—

(i) the state of infrastructure as of the date of the study; and

(ii) any necessary updates to infrastructure to allow for the integration of safe and reliable carbon dioxide transportation, utilization, and storage;

(D) estimate the economic impact of a well-integrated national carbon dioxide pipeline system;

(E) assess the global status and progress of carbon utilization technologies (both chemical and biological) in practice as of the date of the study that utilize waste carbon, including carbon dioxide, carbon monoxide, methane, and

biogas, from power generation, biofuels production, and other industrial processes;

(F) identify emerging technologies and approaches for carbon utilization that show promise for scale-up, demonstration, deployment, and commercialization;

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

(H)(i) assess the major technical challenges associated with increasing the commercial viability of carbon reuse technologies; and

(ii) identify the research and development questions that will address the challenges described in clause (i);

(I)(i) assess research efforts being carried out as of the date of the study, including basic, applied, engineering, and computational research efforts, that are addressing the challenges described in subparagraph (H)(i); and

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

(J) develop a comprehensive research agenda that addresses long- and short-term research needs and opportunities.

(3) DEADLINE.—Not later than 180 days after the date of enactment of this Act, the National Academies of Sciences, Engineering, and Medicine shall submit to the Secretary of Energy a report describing the results of the study under paragraph (1).

SEC. 6. INTERAGENCY TASK FORCE ON CARBON DIOXIDE PIPELINES.

(a) IN GENERAL.—Not later than 60 days after the date on which the study under section 5(b)(1) is submitted, the Secretary of Energy (referred to in this section as the ''Secretary'') shall convene an interagency task force (referred to in this section as the ''task force'') to assess the potential for a national system of carbon dioxide pipelines.

(b) MEMBERSHIP.—The task force shall include representatives of each of the following:

(1) The Department of Energy.

(2) The Department of the Interior.

(3) The Environmental Protection Agency.

(4) The Department of Transportation.

(5) The Federal Energy Regulatory Commission.

(6) Other Federal agencies identified by the Secretary.

(7) State, local, and Tribal governments.

(c) ANNUAL WORKSHOPS.—

(1) IN GENERAL.—The task force shall conduct annual workshops to discuss the potential of, and progress toward, an accessible and functioning national system of carbon dioxide pipelines.

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

(A) conducted with representatives of relevant Federal agencies; and

(B) open to representatives from—

(i) industry;

(ii) State, local, and Tribal governments;

(iii) academic researchers;

(iv) environmental organizations; and

(v) other stakeholders identified by the Secretary.

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

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

(4) REPORTS.—

(A) ANNUAL REPORTS.—The Secretary shall 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 an annual report summarizing the activities and progress of the task force.

(B) FINAL REPORT.—Not later than 1 year after the termination date described in subsection (d), the Secretary shall 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 final report laying out a plan for the successful establishment of a national carbon dioxide pipeline system, including a description of—

(i) the plan for engineering, building, siting, and maintenance of a national carbon dioxide pipeline system;

(ii) the plan for permitting and insuring pipelines under a national carbon dioxide pipeline system;

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

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

(v) how a national carbon dioxide pipeline system should be regulated to ensure safety and minimal environmental impacts; and

(vi) how a national carbon dioxide pipeline system might be integrated into the pipeline systems in existence as of the date of the establishment of a national carbon dioxide pipeline system.

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

SEC. 7. RARE EARTH ELEMENT ADVANCED COAL TECHNOLOGIES.

(a) FINDINGS.—Congress finds that—

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

(2) as of the date of enactment of this Act, the United States does not have domestic production capability for, or a guaranteed supply chain of, rare earth elements and minerals, particularly in times of national crisis;

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

(4) China maintains a near monopoly of the global supply chain of rare earth elements and minerals;

(5) the successful development of commercially viable refining methods of rare earth elements and minerals from coal byproducts could lead to new economic development opportunities in parts of the United States most affected by the downturn of the coal industry;

(6) rare earth elements—

(A) comprise 17 elements on the periodic 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

(B) a report analyzing—

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

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

(2) REQUIREMENT.—In carrying out the assessment and report under paragraph (1), the Secretary shall focus on the rare earth elements determined by the Secretary to be most critical to the national security of the United States.

SEC. 8. RESEARCH AND DEVELOPMENT OF NATURAL GAS.

Nothing in this Act or an amendment made by this Act precludes the Secretary of Energy from using funds authorized to be made available by this Act or an amendment made by this Act for the research and development of natural gas if the Secretary of Energy determines that the funding results in the investment in technologies that are primarily developed and tested for coal-based applications.