

**Calendar No. 176**116<sup>TH</sup> CONGRESS  
1<sup>ST</sup> SESSION**S. 1052****[Report No. 116-74]**

To authorize the Office of Fossil Energy to develop advanced separation technologies for the extraction and recovery of rare earth elements and minerals from coal and coal byproducts, and for other purposes.

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**IN THE SENATE OF THE UNITED STATES**

APRIL 4, 2019

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

AUGUST 16, 2019

Reported under authority of the order of the Senate of August 1, 2019, by  
Ms. MURKOWSKI, with an amendment

[Strike out all after the enacting clause and insert the part printed in *italie*]

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**A BILL**

To authorize the Office of Fossil Energy to develop advanced separation technologies for the extraction and recovery of rare earth elements and minerals from coal and coal byproducts, 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,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “Rare Earth Element  
3 Advanced Coal Technologies Act”.

4 **SEC. 2. FINDINGS.**

5 Congress finds that—

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

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

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

16 (4) China maintains a near monopoly of the  
17 global supply chain of rare earth elements and crit-  
18 ical minerals;

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

24 (6) rare earth elements—

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

1 (i) the lanthanides, which are lan-  
2 thanum (La), cerium (Ce), praseodymium  
3 (Pr), neodymium (Nd), samarium (Sm),  
4 europium (Eu), gadolinium (Gd), terbium  
5 (Tb), dysprosium (Dy), holmium (Ho), er-  
6 bium (Er), thulium (Tm), ytterbium (Yb),  
7 and lutetium (Lu); and

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

10 (B) can be divided into—

11 (i) light rare earth elements, which  
12 are lanthanum (La), cerium (Ce), praseo-  
13 dymium (Pr), neodymium (Nd), pro-  
14 methium (Pm), and samarium (Sm); and

15 (ii) heavy rare earth elements, which  
16 are scandium (Sc), yttrium (Y), gado-  
17 linium (Gd), terbium (Tb), dysprosium  
18 (Dy), holmium (Ho), erbium (Er), thulium  
19 (Tm), ytterbium (Yb), and lutetium (Lu);  
20 and

21 (7) it is in the interest of the Federal Govern-  
22 ment—

23 (A) to guide responsible domestic produc-  
24 tion methods of rare earth elements and min-  
25 erals to ensure industry and consumers in the

1 United States have access to a reliable domestic  
2 supply of valuable rare earth elements and min-  
3 erals; and

4 (B)(i) to identify the areas of highest po-  
5 tential interruption in the global supply chain of  
6 rare earth elements and minerals; and

7 (ii) to strengthen the position of the  
8 United States in that supply chain by miti-  
9 gating potential interruptions through the de-  
10 velopment of advanced separation technologies  
11 for coal and coal byproducts.

12 **SEC. 3. PROGRAM FOR EXTRACTION AND RECOVERY OF**  
13 **RARE EARTH ELEMENTS AND MINERALS**  
14 **FROM COAL AND COAL BYPRODUCTS.**

15 (a) IN GENERAL.—The Secretary of Energy, acting  
16 through the Assistant Secretary for Fossil Energy (re-  
17 ferred to in this Act as the “Secretary”), shall carry out  
18 a program under which the Secretary shall develop ad-  
19 vanced separation technologies for the extraction and re-  
20 covery of rare earth elements and minerals from coal and  
21 coal byproducts.

22 (b) AUTHORIZATION OF APPROPRIATIONS.—There is  
23 authorized to be appropriated to the Secretary to carry  
24 out the program described in subsection (a) \$23,000,000  
25 for each of fiscal years 2020 through 2027.

1 **SEC. 4. ASSESSMENT AND REPORT.**

2 (a) ~~IN GENERAL.~~—Not later than 1 year after the  
3 date of enactment of this Act, the Secretary, in consulta-  
4 tion with the Secretary of Defense and the Secretary of  
5 the Interior, shall carry out, and submit to the Committee  
6 on Energy and Natural Resources of the Senate and the  
7 Committee on Energy and Commerce of the House of  
8 Representatives—

9 (1) an assessment—

10 (A) identifying and ranking the rare earth  
11 elements that—

12 (i) are most important to consumers  
13 in the United States;

14 (ii) are most jeopardized in the global  
15 supply chain; and

16 (iii) will have the greatest impact to  
17 consumers in the United States in the  
18 event of a disruption in the global supply  
19 chain;

20 (B) evaluating the development of ad-  
21 vanced separation technologies for the extrac-  
22 tion and recovery of rare earth elements and  
23 minerals from coal and coal byproducts (re-  
24 ferred to in this subsection as the “tech-  
25 nologies”);

1           (C) identifying and evaluating the results  
2 of the development of the technologies, includ-  
3 ing the results with respect to the extraction  
4 and recovery of each rare earth element;

5           (D) determining what the technologies are  
6 capable of producing;

7           (E) evaluating the performance of the  
8 technologies, including what the technologies—

9                 (i) succeed and fail at accomplishing;

10                and

11                (ii) can and cannot do cost-effectively;

12                and

13           (F)(i) evaluating the market impact on  
14 each rare earth mineral of the penetration of  
15 commercially viable technologies; and

16                (ii) how the penetration of commercially  
17 viable coal-based technology will impact the  
18 global supply chain; and

19           (2) a report analyzing—

20                (A) the additional resources required for  
21 the development of commercial-ready deploy-  
22 ment of technologies that are second generation  
23 and transformational; and

1           ~~(B)~~ the market impact of processes to  
2           treat and recover rare earth elements and min-  
3           erals from acid mine drainage from coal mines.

4           ~~(b) REQUIREMENT.—~~In carrying out the assessment  
5           and report under subsection (a), the Secretary shall focus  
6           on the rare earth elements determined by the Secretary  
7           to be most critical to the national security of the United  
8           States.

9           **SECTION 1. SHORT TITLE.**

10           *This Act may be cited as the “Rare Earth Element*  
11 *Advanced Coal Technologies Act”.*

12           **SEC. 2. PROGRAM FOR EXTRACTION AND RECOVERY OF**  
13                           **RARE EARTH ELEMENTS AND MINERALS**  
14                           **FROM COAL AND COAL BYPRODUCTS.**

15           ~~(a) IN GENERAL.—~~*The Secretary of Energy, acting*  
16 *through the Assistant Secretary for Fossil Energy (referred*  
17 *to in this Act as the “Secretary”), shall carry out a pro-*  
18 *gram under which the Secretary shall develop advanced sep-*  
19 *aration technologies for the extraction and recovery of rare*  
20 *earth elements and minerals from coal and coal byproducts.*

21           ~~(b) AUTHORIZATION OF APPROPRIATIONS.—~~*There is*  
22 *authorized to be appropriated to the Secretary to carry out*  
23 *the program described in subsection (a) \$23,000,000 for*  
24 *each of fiscal years 2020 through 2027.*

1 **SEC. 3. REPORT.**

2       *Not later than 1 year after the date of enactment of*  
3 *this Act, the Secretary shall submit to the Committee on*  
4 *Energy and Natural Resources of the Senate and the Com-*  
5 *mittee on Energy and Commerce of the House of Represent-*  
6 *atives a report evaluating the development of advanced sep-*  
7 *aration technologies for the extraction and recovery of rare*  
8 *earth elements and minerals from coal and coal byproducts,*  
9 *including acid mine drainage from coal mines.*





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