

1           **DIVISION Z—ENERGY ACT OF**  
 2   **2020**

3 **SEC. 101. SHORT TITLE; TABLE OF CONTENTS.**

4           (a) **SHORT TITLE.**—This division may be cited as the  
 5 “Energy Act of 2020”.

6           (b) **TABLE OF CONTENTS.**—The table of contents for  
 7 this Act is as follows:

DIVISION Z—ENERGY ACT OF 2020

Sec. 101. Short title; table of contents.

TITLE I—EFFICIENCY

- Sec. 1001. Coordination of energy retrofitting assistance for schools.
- Sec. 1002. Use of energy and water efficiency measures in Federal buildings.
- Sec. 1003. Energy efficient data centers.
- Sec. 1004. Energy-efficient and energy-saving information technologies.
- Sec. 1005. Extended Product System Rebate Program.
- Sec. 1006. Energy Efficient Transformer Rebate Program.
- Sec. 1007. Smart building acceleration.
- Sec. 1008. Modifications to the ceiling fan energy conservation standard.
- Sec. 1009. Report on electrochromic glass.
- Sec. 1010. Energy and water for sustainability.
- Sec. 1011. Weatherization Assistance Program.
- Sec. 1012. Federal Energy Management Program.
- Sec. 1013. CHP Technical Assistance Partnership Program.
- Sec. 1014. Smart energy water efficiency pilot program.

TITLE II—NUCLEAR

- Sec. 2001. Advanced Nuclear Fuel Availability.
- Sec. 2002. Amendments to definitions in Energy Policy Act of 2005.
- Sec. 2003. Nuclear energy research, development, demonstration, and commercial application programs.
- Sec. 2004. High-performance computation collaborative research program.
- Sec. 2005. Nuclear energy budget plan.
- Sec. 2006. Organization and administration of programs.
- Sec. 2007. Extension and expansion of limitations on importation of uranium from Russian Federation.
- Sec. 2008. Fusion energy research.

TITLE III—RENEWABLE ENERGY AND STORAGE

Subtitle A—Renewable Energy Research and Development

- Sec. 3001. Water power research and development.
- Sec. 3002. Advanced geothermal innovation leadership.
- Sec. 3003. Wind energy research and development.

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- Sec. 3004. Solar energy research and development.
- Sec. 3005. Hydroelectric production incentives and efficiency improvements.
- Sec. 3006. Conforming amendments.

## Subtitle B—Natural Resources Provisions

- Sec. 3101. Definitions.
- Sec. 3102. Program to improve eligible project permit coordination.
- Sec. 3103. Increasing economic certainty.
- Sec. 3104. National goal for renewable energy production on Federal land.
- Sec. 3105. Facilitation of coproduction of geothermal energy on oil and gas leases.
- Sec. 3106. Savings clause.

## Subtitle C—Energy Storage

- Sec. 3201. Better energy storage technology.
- Sec. 3202. Energy storage technology and microgrid assistance program.

## TITLE IV—CARBON MANAGEMENT

- Sec. 4001. Fossil energy.
- Sec. 4002. Establishment of carbon capture technology program.
- Sec. 4003. Carbon storage validation and testing.
- Sec. 4004. Carbon utilization program.
- Sec. 4005. High efficiency turbines.
- Sec. 4006. National energy technology laboratory reforms.
- Sec. 4007. Study on Blue Hydrogen Technology.
- Sec. 4008. Produced water research and development.

## TITLE V—CARBON REMOVAL

- Sec. 5001. Carbon removal.
- Sec. 5002. Carbon dioxide removal task force and report.

## TITLE VI—INDUSTRIAL AND MANUFACTURING TECHNOLOGIES

- Sec. 6001. Purpose.
- Sec. 6002. Coordination of research and development of energy efficient technologies for industry.
- Sec. 6003. Industrial emissions reduction technology development program.
- Sec. 6004. Industrial Technology Innovation Advisory Committee.
- Sec. 6005. Technical assistance program to implement industrial emissions reduction.
- Sec. 6006. Development of national smart manufacturing plan.

## TITLE VII—CRITICAL MINERALS

- Sec. 7001. Rare earth elements.
- Sec. 7002. Mineral security.
- Sec. 7003. Monitoring mineral investments under Belt and Road Initiative of People's Republic of China.

## TITLE VIII—GRID MODERNIZATION

- Sec. 8001. Smart grid regional demonstration initiative.
- Sec. 8002. Smart grid modeling, visualization, architecture, and controls.
- Sec. 8003. Integrated energy systems.

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- Sec. 8004. Grid integration research and development.
- Sec. 8005. Advisory committee.
- Sec. 8006. Coordination of efforts.
- Sec. 8007. Technology demonstration on the distribution grid.
- Sec. 8008. Voluntary model pathways.
- Sec. 8009. Performance metrics for electricity infrastructure providers.
- Sec. 8010. Voluntary State, regional, and local electricity distribution planning.
- Sec. 8011. Micro-grid and integrated micro-grid systems program.
- Sec. 8012. Technical amendments; authorization of appropriations.
- Sec. 8013. Indian energy.
- Sec. 8014. Report on electricity access and reliability.
- Sec. 8015. Net metering study and evaluation.

## TITLE IX—DEPARTMENT OF ENERGY INNOVATION

- Sec. 9001. Office of technology transitions.
- Sec. 9002. Lab partnering service pilot program.
- Sec. 9003. Technology commercialization fund.
- Sec. 9004. Streamlining prize competitions.
- Sec. 9005. Milestone-based demonstration projects.
- Sec. 9006. Other transaction authority extension.
- Sec. 9007. Technology transfer reports and evaluation.
- Sec. 9008. Veterans' health initiative.
- Sec. 9009. Sustainable Transportation Research and Development.
- Sec. 9010. Loan program office title XVII reform.
- Sec. 9011. Established Program to Stimulate Competitive Research.

## TITLE X—ARPA-E AMENDMENTS

- Sec. 10001. ARPA-E amendments.

## TITLE XI—OTHER MATTERS

- Sec. 11001. Low-Dose Radiation Research.
- Sec. 11002. Authorization.
- Sec. 11003. Sense of Congress.
- Sec. 11004. Addressing insufficient compensation of employees and other personnel of the Federal Energy Regulatory Commission.
- Sec. 11005. Report on the authority of the Secretary of Energy to implement flexible compensation models.

1                   **TITLE I—EFFICIENCY**2   **SEC. 1001. COORDINATION OF ENERGY RETROFITTING AS-**  
3                   **SISTANCE FOR SCHOOLS.**

4           (a) DEFINITION OF SCHOOL.—In this section, the  
5 term “school” means—

6                   (1) an elementary school or secondary school  
7           (as defined in section 8101 of the Elementary and

1 Secondary Education Act of 1965 (20 U.S.C.  
2 7801));

3 (2) an institution of higher education (as de-  
4 fined in section 101(a) of the Higher Education Act  
5 of 1965 (20 U.S.C. 1001(a)));

6 (3) a postsecondary vocational institution (as  
7 defined in section 102(c) of the Higher Education  
8 Act of 1965 (20 U.S.C. 1002(c)));

9 (4) a school of the defense dependents' edu-  
10 cation system under the Defense Dependents' Edu-  
11 cation Act of 1978 (20 U.S.C. 921 et seq.) or estab-  
12 lished under section 2164 of title 10, United States  
13 Code;

14 (5) a school operated by the Bureau of Indian  
15 Education;

16 (6) a tribally controlled school (as defined in  
17 section 5212 of the Tribally Controlled Schools Act  
18 of 1988 (25 U.S.C. 2511)); and

19 (7) a Tribal College or University (as defined in  
20 section 316(b) of the Higher Education Act of 1965  
21 (20 U.S.C. 1059c(b))).

22 (b) DESIGNATION OF LEAD AGENCY.—The Secretary  
23 of Energy (in this section referred to as the “Secretary”),  
24 acting through the Office of Energy Efficiency and Re-  
25 newable Energy, shall act as the lead Federal agency for

1 coordinating and disseminating information on existing  
2 Federal programs and assistance that may be used to help  
3 initiate, develop, and finance energy efficiency, renewable  
4 energy, and energy retrofitting projects for schools.

5 (c) REQUIREMENTS.—In carrying out coordination  
6 and outreach under subsection (b), the Secretary shall—

7 (1) in consultation and coordination with the  
8 appropriate Federal agencies, carry out a review of  
9 existing programs and financing mechanisms (in-  
10 cluding revolving loan funds and loan guarantees)  
11 available in or from the Department of Agriculture,  
12 the Department of Energy, the Department of Edu-  
13 cation, the Department of the Treasury, the Internal  
14 Revenue Service, the Environmental Protection  
15 Agency, and other appropriate Federal agencies with  
16 jurisdiction over energy financing and facilitation  
17 that are currently used or may be used to help ini-  
18 tiate, develop, and finance energy efficiency, renew-  
19 able energy, and energy retrofitting projects for  
20 schools;

21 (2) establish a Federal cross-departmental col-  
22 laborative coordination, education, and outreach ef-  
23 fort to streamline communication and promote avail-  
24 able Federal opportunities and assistance described  
25 in paragraph (1), for energy efficiency, renewable

1 energy, and energy retrofitting projects that enables  
2 States, local educational agencies, and schools—

3 (A) to use existing Federal opportunities  
4 more effectively; and

5 (B) to form partnerships with Governors,  
6 State energy programs, local educational, finan-  
7 cial, and energy officials, State and local gov-  
8 ernment officials, nonprofit organizations, and  
9 other appropriate entities, to support the initi-  
10 ation of the projects;

11 (3) provide technical assistance for States, local  
12 educational agencies, and schools to help develop  
13 and finance energy efficiency, renewable energy, and  
14 energy retrofitting projects—

15 (A) to increase the energy efficiency of  
16 buildings or facilities;

17 (B) to install systems that individually  
18 generate energy from renewable energy re-  
19 sources;

20 (C) to establish partnerships to leverage  
21 economies of scale and additional financing  
22 mechanisms available to larger clean energy ini-  
23 tiatives; or

24 (D) to promote—

1 (i) the maintenance of health, environ-  
2 mental quality, and safety in schools, in-  
3 cluding the ambient air quality, through  
4 energy efficiency, renewable energy, and  
5 energy retrofit projects; and

6 (ii) the achievement of expected en-  
7 ergy savings and renewable energy produc-  
8 tion through proper operations and main-  
9 tenance practices;

10 (4) develop and maintain a single online re-  
11 source website with contact information for relevant  
12 technical assistance and support staff in the Office  
13 of Energy Efficiency and Renewable Energy for  
14 States, local educational agencies, and schools to ef-  
15 fectively access and use Federal opportunities and  
16 assistance described in paragraph (1) to develop en-  
17 ergy efficiency, renewable energy, and energy retro-  
18 fitting projects; and

19 (5) establish a process for recognition of schools  
20 that—

21 (A) have successfully implemented energy  
22 efficiency, renewable energy, and energy retro-  
23 fitting projects; and

1 (B) are willing to serve as resources for  
2 other local educational agencies and schools to  
3 assist initiation of similar efforts.

4 (d) REPORT.—Not later than 180 days after the date  
5 of enactment of this Act, the Secretary shall submit to  
6 Congress a report describing the implementation of this  
7 section.

8 **SEC. 1002. USE OF ENERGY AND WATER EFFICIENCY MEAS-**  
9 **URES IN FEDERAL BUILDINGS.**

10 (a) REPORTS.—Section 548(b) of the National En-  
11 ergy Conservation Policy Act (42 U.S.C. 8258(b)) is  
12 amended—

13 (1) in paragraph (3), by striking “and” at the  
14 end;

15 (2) in paragraph (4), by striking the period at  
16 the end and inserting “; and”; and

17 (3) by adding at the end the following:

18 “(5)(A) the status of the energy savings per-  
19 formance contracts and utility energy service con-  
20 tracts of each agency, to the extent that the infor-  
21 mation is not duplicative of information provided to  
22 the Secretary under a separate authority;

23 “(B) the quantity and investment value of the  
24 contracts for the previous year;



1           “(C) the guaranteed energy savings, or for con-  
2           tracts without a guarantee, the estimated energy  
3           savings, for the previous year, as compared to the  
4           measured energy savings for the previous year;

5           “(D) a forecast of the estimated quantity and  
6           investment value of contracts anticipated in the fol-  
7           lowing year for each agency; and

8           “(E)(i) a comparison of the information de-  
9           scribed in subparagraph (B) and the forecast de-  
10          scribed in subparagraph (D) in the report of the  
11          previous year; and

12          “(ii) if applicable, the reasons for any dif-  
13          ferences in the data compared under clause (i).”.

14          (b) DEFINITION OF ENERGY CONSERVATION MEAS-  
15          URES.—Section 551(4) of the National Energy Conserva-  
16          tion Policy Act (42 U.S.C. 8259(4)) is amended by strik-  
17          ing “or retrofit activities” and inserting “retrofit activi-  
18          ties, or energy consuming devices and required support  
19          structures”.

20          (c) AUTHORITY TO ENTER INTO CONTRACTS.—Sec-  
21          tion 801(a)(2)(F) of the National Energy Conservation  
22          Policy Act (42 U.S.C. 8287(a)(2)(F)) is amended—

23                  (1) in clause (i), by striking “or” at the end;

24                  (2) in clause (ii), by striking the period at the  
25          end and inserting “; or”; and

1           (3) by adding at the end the following:

2                   “(iii) limit the recognition of oper-  
3                   ation and maintenance savings associated  
4                   with systems modernized or replaced with  
5                   the implementation of energy conservation  
6                   measures, water conservation measures, or  
7                   any combination of energy conservation  
8                   measures and water conservation meas-  
9                   ures.”.

10           (d) MISCELLANEOUS AUTHORITY; EXCLUDED CON-  
11 TRACTS.—Section 801(a)(2) of the National Energy Con-  
12 servation Policy Act (42 U.S.C. 8287(a)(2)) is amended  
13 by adding at the end the following:

14                   “(H) MISCELLANEOUS AUTHORITY.—Not-  
15                   withstanding subtitle I of title 40, United  
16                   States Code, a Federal agency may accept, re-  
17                   tain, sell, or transfer, and apply the proceeds of  
18                   the sale or transfer of, any energy and water  
19                   incentive, rebate, grid services revenue, or cred-  
20                   it (including a renewable energy certificate) to  
21                   fund a contract under this title.

22                   “(I) EXCLUDED CONTRACTS.—A contract  
23                   entered into under this title may not be for  
24                   work performed—

1                   “(i) at a Federal hydroelectric facility  
2                   that provides power marketed by a Power  
3                   Marketing Administration; or

4                   “(ii) at a hydroelectric facility owned  
5                   and operated by the Tennessee Valley Au-  
6                   thority established under the Tennessee  
7                   Valley Authority Act of 1933 (16 U.S.C.  
8                   831 et seq.).”.

9           (e) PAYMENT OF COSTS.—Section 802 of the Na-  
10          tional Energy Conservation Policy Act (42 U.S.C. 8287a)  
11          is amended by striking “(and related operation and main-  
12          tenance expenses)” and inserting “, including related op-  
13          erations and maintenance expenses”.

14          (f) DEFINITION OF ENERGY SAVINGS.—Section  
15          804(2) of the National Energy Conservation Policy Act  
16          (42 U.S.C. 8287c(2)) is amended—

17               (1) in subparagraph (A), by striking “federally  
18               owned building or buildings or other federally owned  
19               facilities” and inserting “Federal building (as de-  
20               fined in section 551)” each place it appears;

21               (2) in subparagraph (C), by striking “; and”  
22               and inserting a semicolon;

23               (3) in subparagraph (D), by striking the period  
24               at the end and inserting a semicolon; and

25               (4) by adding at the end the following:

1           “(E) the use, sale, or transfer of any en-  
2           ergy and water incentive, rebate, grid services  
3           revenue, or credit (including a renewable energy  
4           certificate); and

5           “(F) any revenue generated from a reduc-  
6           tion in energy or water use, more efficient  
7           waste recycling, or additional energy generated  
8           from more efficient equipment.”.

9           (g) ENERGY AND WATER CONSERVATION MEAS-  
10          URES.—Section 543 of the National Energy Conservation  
11          Policy Act (42 U.S.C. 8253) is amended—

12           (1) in the section heading, by inserting “**AND**  
13          **WATER**” after “**ENERGY**”;

14           (2) in subsection (b)—

15           (A) in the subsection heading, by inserting  
16          “AND WATER” after “ENERGY”; and

17           (B) by striking paragraphs (1) and (2) and  
18          inserting the following:

19           “(1) IN GENERAL.—Each agency shall—

20           (A) not later than October 1, 2022, to  
21          the maximum extent practicable, begin install-  
22          ing in Federal buildings owned by the United  
23          States all energy and water conservation meas-  
24          ures determined by the Secretary to be life cycle

1 cost-effective (as defined in subsection (f)(1));  
2 and

3 “(B) complete the installation described in  
4 subparagraph (A) as soon as practicable after  
5 the date referred to in that subparagraph.

6 “(2) EXPLANATION OF NONCOMPLIANCE.—

7 “(A) IN GENERAL.—If an agency fails to  
8 comply with paragraph (1), the agency shall  
9 submit to the Secretary, using guidelines devel-  
10 oped by the Secretary, an explanation of the  
11 reasons for the failure.

12 “(B) REPORT TO CONGRESS.—Not later  
13 than January 1, 2022, and every 2 years there-  
14 after, the Secretary shall submit to Congress a  
15 report that describes any noncompliance by an  
16 agency with the requirements of paragraph  
17 (1).”;

18 (3) in subsection (c)(1)—

19 (A) in subparagraph (A)—

20 (i) in the matter preceding clause (i),  
21 by striking “An agency” and inserting  
22 “The head of each agency”; and

23 (ii) by inserting “or water” after “en-  
24 ergy” each place it appears; and

1 (B) in subparagraph (B)(i), by inserting  
2 “or water” after “energy”;

3 (4) in subsection (d)(2), by inserting “and  
4 water” after “energy”;

5 (5) in subsection (e)—

6 (A) in the subsection heading, by inserting  
7 “AND WATER” after “ENERGY”;

8 (B) in paragraph (1)—

9 (i) in the first sentence—

10 (I) by striking “October 1, 2012”  
11 and inserting “October 1, 2022”;

12 (II) by inserting “and water”  
13 after “energy”; and

14 (III) by inserting “and water”  
15 after “electricity”;

16 (ii) in the second sentence, by insert-  
17 ing “and water” after “electricity”; and

18 (iii) in the fourth sentence, by insert-  
19 ing “and water” after “energy”;

20 (C) in paragraph (2)—

21 (i) in subparagraph (A)—

22 (I) by striking “and” before  
23 “Federal”; and

1 (II) by inserting “and any other  
2 person the Secretary deems nec-  
3 essary,” before “shall”;

4 (ii) in subparagraph (B)—

5 (I) in clause (i)(II), by inserting  
6 “and water” after “energy” each  
7 place it appears;

8 (II) in clause (ii), by inserting  
9 “and water” after “energy”; and

10 (III) in clause (iv), by inserting  
11 “and water” after “energy”; and

12 (iii) by adding at the end the fol-  
13 lowing:

14 “(C) UPDATE.—Not later than 180 days  
15 after the date of enactment of this subpara-  
16 graph, the Secretary shall update the guidelines  
17 established under subparagraph (A) to take into  
18 account water efficiency requirements under  
19 this section.”;

20 (D) in paragraph (3), in the matter pre-  
21 ceeding subparagraph (A), by striking “estab-  
22 lished under paragraph (2)” and inserting “up-  
23 dated under paragraph (2)(C)”;

24 (E) in paragraph (4)—

25 (i) in subparagraph (A)—

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1 (I) by striking “this paragraph”  
2 and inserting “the Energy Act of  
3 2020”; and

4 (II) by inserting “and water” be-  
5 fore “use in”; and

6 (ii) in subparagraph (B)(ii), in the  
7 matter preceding subclause (I), by insert-  
8 ing “and water” after “energy”; and

9 (6) in subsection (f)—

10 (A) in paragraph (1)—

11 (i) by redesignating subparagraphs  
12 (E), (F), and (G) as subparagraphs (F),  
13 (G), and (H), respectively; and

14 (ii) by inserting after subparagraph  
15 (D) the following:

16 “(E) ONGOING COMMISSIONING.—The  
17 term ‘ongoing commissioning’ means an ongo-  
18 ing process of commissioning using monitored  
19 data, the primary goal of which is to ensure  
20 continuous optimum performance of a facility,  
21 in accordance with design or operating needs,  
22 over the useful life of the facility, while meeting  
23 facility occupancy requirements.”;

24 (B) in paragraph (2)—



1 (i) in subparagraph (A), by inserting  
2 “and water” before “use”;

3 (ii) in subparagraph (B)—

4 (I) by striking “energy” before  
5 “efficiency”; and

6 (II) by inserting “or water” be-  
7 fore “use”; and

8 (iii) by adding at the end the fol-  
9 lowing:

10 “(C) ENERGY MANAGEMENT SYSTEM.—An  
11 energy manager designated for a facility under  
12 subparagraph (A) shall take into consider-  
13 ation—

14 “(i) the use of a system to manage  
15 energy and water use at the facility; and

16 “(ii) the applicability of the certifi-  
17 cation of the facility in accordance with the  
18 International Organization for Standard-  
19 ization standard numbered 50001 and en-  
20 titled ‘Energy Management Systems’.”;

21 (C) by striking paragraphs (3) and (4) and  
22 inserting the following:

23 “(3) ENERGY AND WATER EVALUATIONS AND  
24 COMMISSIONING.—

1           “(A) EVALUATIONS.—Except as provided  
2           in subparagraph (B), not later than the date  
3           that is 180 days after the date of enactment of  
4           the Energy Act of 2020, and annually there-  
5           after, each energy manager shall complete, for  
6           the preceding calendar year, a comprehensive  
7           energy and water evaluation and recommis-  
8           sioning or retrocommissioning for approxi-  
9           mately 25 percent of the facilities of the appli-  
10          cable agency that meet the criteria under para-  
11          graph (2)(B) in a manner that ensures that an  
12          evaluation of each facility is completed not less  
13          frequently than once every 4 years.

14          “(B) EXCEPTIONS.—An evaluation and re-  
15          commissioning or retrocommissioning shall not  
16          be required under subparagraph (A) with re-  
17          spect to a facility that, as of the date on which  
18          the evaluation and recommissioning or  
19          retrocommissioning would occur—

20                  “(i) has had a comprehensive energy  
21                  and water evaluation during the preceding  
22                  8-year period;

23                  “(ii)(I) has been commissioned, re-  
24                  commissioned, or retrocommissioned dur-  
25                  ing the preceding 10-year period; or

1                   “(II) is under ongoing commissioning,  
2 recommissioning, or retrocommissioning;

3                   “(iii) has not had a major change in  
4 function or use since the previous evalua-  
5 tion and recommissioning or  
6 retrocommissioning;

7                   “(iv) has been benchmarked with pub-  
8 lic disclosure under paragraph (8) during  
9 the preceding calendar year; and

10                  “(v)(I) based on the benchmarking de-  
11 scribed in clause (iv), has achieved at a fa-  
12 cility level the most recent cumulative en-  
13 ergy savings target under subsection (a)  
14 compared to the earlier of—

15                   “(aa) the date of the most recent  
16 evaluation; or

17                   “(bb) the date—

18                   “(AA) of the most recent  
19 commissioning, recommissioning,  
20 or retrocommissioning; or

21                   “(BB) on which ongoing  
22 commissioning began; or

23                  “(II) has a long-term contract in  
24 place guaranteeing energy savings at least

1 as great as the energy savings target under  
2 subclause (I).

3 “(4) IMPLEMENTATION OF IDENTIFIED ENERGY  
4 AND WATER EFFICIENCY MEASURES.—

5 “(A) IN GENERAL.—Not later than 2 years  
6 after the date of completion of each evaluation  
7 under paragraph (3), each energy manager  
8 shall implement any energy- or water-saving  
9 measure that—

10 “(i) the Federal agency identified in  
11 the evaluation; and

12 “(ii) is life cycle cost-effective, as de-  
13 termined by evaluating an individual meas-  
14 ure or a bundle of measures with varying  
15 paybacks.

16 “(B) PERFORMANCE CONTRACTING.—Each  
17 Federal agency shall use performance con-  
18 tracting to address at least 50 percent of the  
19 measures identified under subparagraph  
20 (A)(i).”;

21 (D) in paragraph (7)(B)(ii)(II), by insert-  
22 ing “and water” after “energy”; and

23 (E) in paragraph (9)(A), in the matter  
24 preceding clause (i), by inserting “and water”  
25 after “energy”.

1 (h) CONFORMING AMENDMENT.—The table of con-  
2 tents for the National Energy Conservation Policy Act  
3 (Public Law 95–619; 92 Stat. 3206) is amended by strik-  
4 ing the item relating to section 543 and inserting the fol-  
5 lowing:

“Sec. 543. Energy and water management requirements.”.

6 **SEC. 1003. ENERGY EFFICIENT DATA CENTERS.**

7 Section 453 of the Energy Independence and Security  
8 Act of 2007 (42 U.S.C. 17112) is amended—

9 (1) in subsection (b)—

10 (A) in paragraph (2)(D)(iv), by striking  
11 “determined by the organization” and inserting  
12 “proposed by the stakeholders”; and

13 (B) by striking paragraph (3); and

14 (2) by striking subsections (e) through (g) and  
15 inserting the following:

16 “(c) STAKEHOLDER INVOLVEMENT.—

17 “(1) IN GENERAL.—The Secretary and the Ad-  
18 ministrator shall carry out subsection (b) in collabo-  
19 ration with the information technology industry and  
20 other key stakeholders, with the goal of producing  
21 results that accurately reflect the most relevant and  
22 useful information.

23 “(2) CONSIDERATIONS.—In carrying out the  
24 collaboration described in paragraph (1), the Sec-

1       retary and the Administrator shall pay particular at-  
2       tention to organizations that—

3               “(A) have members with expertise in en-  
4               ergy efficiency and in the development, oper-  
5               ation, and functionality of data centers, infor-  
6               mation technology equipment, and software, in-  
7               cluding representatives of hardware manufac-  
8               turers, data center operators, and facility man-  
9               agers;

10              “(B) obtain and address input from the  
11              National Laboratories (as that term is defined  
12              in section 2 of the Energy Policy Act of 2005  
13              (42 U.S.C. 15801)) or any institution of higher  
14              education, research institution, industry asso-  
15              ciation, company, or public interest group with  
16              applicable expertise;

17              “(C) follow—

18                      “(i) commonly accepted procedures  
19                      for the development of specifications; and

20                      “(ii) accredited standards development  
21                      processes; or

22              “(D) have a mission to promote energy ef-  
23              ficiency for data centers and information tech-  
24              nology.

1           “(d) MEASUREMENTS AND SPECIFICATIONS.—The  
2 Secretary and the Administrator shall consider and assess  
3 the adequacy of the specifications, measurements, best  
4 practices, and benchmarks described in subsection (b) for  
5 use by the Federal Energy Management Program, the En-  
6 ergy Star Program, and other efficiency programs of the  
7 Department of Energy or the Environmental Protection  
8 Agency.

9           “(e) STUDY.—

10           “(1) DEFINITION OF REPORT.—In this sub-  
11 section, the term ‘report’ means the report of the  
12 Lawrence Berkeley National Laboratory entitled  
13 ‘United States Data Center Energy Usage Report’  
14 and dated June 2016, which was prepared as an up-  
15 date to the ‘Report to Congress on Server and Data  
16 Center Energy Efficiency’, published on August 2,  
17 2007, pursuant to section 1 of Public Law 109–431  
18 (120 Stat. 2920).

19           “(2) STUDY.—Not later than 4 years after the  
20 date of enactment of the Energy Act of 2020, the  
21 Secretary, in collaboration with the Administrator,  
22 shall make available to the public an update to the  
23 report that provides—

24           “(A) a comparison and gap analysis of the  
25 estimates and projections contained in the re-

1 port with new data regarding the period from  
2 2015 through 2019;

3 “(B) an analysis considering the impact of  
4 information technologies, including  
5 virtualization and cloud computing, in the pub-  
6 lic and private sectors;

7 “(C) an evaluation of the impact of the  
8 combination of cloud platforms, mobile devices,  
9 social media, and big data on data center en-  
10 ergy usage;

11 “(D) an evaluation of water usage in data  
12 centers and recommendations for reductions in  
13 that water usage; and

14 “(E) updated projections and recommenda-  
15 tions for best practices through fiscal year  
16 2025.

17 “(f) DATA CENTER ENERGY PRACTITIONER PRO-  
18 GRAM.—

19 “(1) IN GENERAL.—The Secretary, in collabo-  
20 ration with key stakeholders and the Director of the  
21 Office of Management and Budget, shall maintain a  
22 data center energy practitioner program that pro-  
23 vides for the certification of energy practitioners  
24 qualified to evaluate the energy usage and efficiency



1 opportunities in federally owned and operated data  
2 centers.

3 “(2) EVALUATIONS.—Each Federal agency  
4 shall consider having the data centers of the agency  
5 evaluated once every 4 years by energy practitioners  
6 certified pursuant to the program, whenever prac-  
7 ticable using certified practitioners employed by the  
8 agency.

9 “(g) OPEN DATA INITIATIVE.—

10 “(1) IN GENERAL.—The Secretary, in collabo-  
11 ration with key stakeholders and the Director of the  
12 Office of Management and Budget, shall establish  
13 an open data initiative relating to energy usage at  
14 federally owned and operated data centers, with the  
15 purpose of making the data available and accessible  
16 in a manner that encourages further data center in-  
17 novation, optimization, and consolidation.

18 “(2) CONSIDERATION.—In establishing the ini-  
19 tiative under paragraph (1), the Secretary shall con-  
20 sider using the online Data Center Maturity Model.

21 “(h) INTERNATIONAL SPECIFICATIONS AND  
22 METRICS.—The Secretary, in collaboration with key  
23 stakeholders, shall actively participate in efforts to har-  
24 monize global specifications and metrics for data center  
25 energy and water efficiency.

1           “(i) DATA CENTER UTILIZATION METRIC.—The Sec-  
2 retary, in collaboration with key stakeholders, shall facili-  
3 tate in the development of an efficiency metric that meas-  
4 ures the energy efficiency of a data center (including  
5 equipment and facilities).

6           “(j) PROTECTION OF PROPRIETARY INFORMATION.—  
7 The Secretary and the Administrator shall not disclose  
8 any proprietary information or trade secrets provided by  
9 any individual or company for the purposes of carrying  
10 out this section or the programs and initiatives established  
11 under this section.”.

12 **SEC. 1004. ENERGY-EFFICIENT AND ENERGY-SAVING IN-**  
13 **FORMATION TECHNOLOGIES.**

14           Section 543 of the National Energy Conservation  
15 Policy Act (42 U.S.C. 8253) is amended by adding at the  
16 end the following:

17           “(h) FEDERAL IMPLEMENTATION STRATEGY FOR  
18 ENERGY-EFFICIENT AND ENERGY-SAVING INFORMATION  
19 TECHNOLOGIES.—

20                   “(1) DEFINITIONS.—In this subsection:

21                           “(A) DIRECTOR.—The term ‘Director’  
22 means the Director of the Office of Manage-  
23 ment and Budget.

24                           “(B) INFORMATION TECHNOLOGY.—The  
25 term ‘information technology’ has the meaning

1           given that term in section 11101 of title 40,  
2           United States Code.

3           “(2) DEVELOPMENT OF IMPLEMENTATION  
4 STRATEGY.—Not later than 1 year after the date of  
5 enactment of the Energy Act of 2020, each Federal  
6 agency shall coordinate with the Director, the Sec-  
7 retary, and the Administrator of the Environmental  
8 Protection Agency to develop an implementation  
9 strategy (including best-practices and measurement  
10 and verification techniques) for the maintenance,  
11 purchase, and use by the Federal agency of energy-  
12 efficient and energy-saving information technologies  
13 at or for facilities owned and operated by the Fed-  
14 eral agency, taking into consideration the perform-  
15 ance goals established under paragraph (4).

16           “(3) ADMINISTRATION.—In developing an im-  
17 plementation strategy under paragraph (2), each  
18 Federal agency shall consider—

19                   “(A) advanced metering infrastructure;

20                   “(B) energy efficient data center strategies  
21 and methods of increasing asset and infrastruc-  
22 ture utilization;

23                   “(C) advanced power management tools;

24                   “(D) building information modeling, in-  
25 cluding building energy management;

1           “(E) secure telework and travel substi-  
2           tution tools; and

3           “(F) mechanisms to ensure that the agen-  
4           cy realizes the energy cost savings of increased  
5           efficiency and utilization.

6           “(4) PERFORMANCE GOALS.—

7           “(A) IN GENERAL.—Not later than 180  
8           days after the date of enactment of the Energy  
9           Act of 2020, the Director, in consultation with  
10          the Secretary, shall establish performance goals  
11          for evaluating the efforts of Federal agencies in  
12          improving the maintenance, purchase, and use  
13          of energy-efficient and energy-saving informa-  
14          tion technology at or for facilities owned and  
15          operated by the Federal agencies.

16          “(B) BEST PRACTICES.—The Chief Infor-  
17          mation Officers Council established under sec-  
18          tion 3603 of title 44, United States Code, shall  
19          recommend best practices for the attainment of  
20          the performance goals established under sub-  
21          paragraph (A), which shall include, to the ex-  
22          tent applicable by law, consideration by a Fed-  
23          eral agency of the use of—

24                  “(i) energy savings performance con-  
25                  tracting; and

1                   “(ii) utility energy services con-  
2                   tracting.

3                   “(5) REPORTS.—

4                   “(A) AGENCY REPORTS.—Each Federal  
5                   agency shall include in the report of the agency  
6                   under section 527 of the Energy Independence  
7                   and Security Act of 2007 (42 U.S.C. 17143) a  
8                   description of the efforts and results of the  
9                   agency under this subsection.

10                  “(B) OMB GOVERNMENT EFFICIENCY RE-  
11                  PORTS AND SCORECARDS.—Effective beginning  
12                  not later than October 1, 2022, the Director  
13                  shall include in the annual report and scorecard  
14                  of the Director required under section 528 of  
15                  the Energy Independence and Security Act of  
16                  2007 (42 U.S.C. 17144) a description of the ef-  
17                  forts and results of Federal agencies under this  
18                  subsection.

19                  “(C) USE OF EXISTING REPORTING STRUC-  
20                  TURES.—The Director may require Federal  
21                  agencies to submit any information required to  
22                  be submitted under this subsection though re-  
23                  porting structures in use as of the date of en-  
24                  actment of the Energy Act of 2020.”.

1 **SEC. 1005. EXTENDED PRODUCT SYSTEM REBATE PRO-**  
2 **GRAM.**

3 (a) DEFINITIONS.—In this section:

4 (1) ELECTRIC MOTOR.—The term “electric  
5 motor” has the meaning given the term in section  
6 431.12 of title 10, Code of Federal Regulations (as  
7 in effect on the date of enactment of this Act).

8 (2) ELECTRONIC CONTROL.—The term “elec-  
9 tronic control” means—

10 (A) a power converter; or

11 (B) a combination of a power circuit and  
12 control circuit included on 1 chassis.

13 (3) EXTENDED PRODUCT SYSTEM.—The term  
14 “extended product system” means an electric motor  
15 and any required associated electronic control and  
16 driven load that—

17 (A) offers variable speed or multispeed op-  
18 eration;

19 (B) offers partial load control that reduces  
20 input energy requirements (as measured in kilo-  
21 watt-hours) as compared to identified base lev-  
22 els set by the Secretary of Energy (in this sec-  
23 tion referred to as the “Secretary”); and

24 (C)(i) has greater than 1 horsepower; and

25 (ii) uses an extended product system tech-  
26 nology, as determined by the Secretary.

1           (4) QUALIFIED EXTENDED PRODUCT SYS-  
2           TEM.—

3           (A) IN GENERAL.—The term “qualified ex-  
4           tended product system” means an extended  
5           product system that—

6                   (i) includes an electric motor and an  
7                   electronic control; and

8                   (ii) reduces the input energy (as  
9                   measured in kilowatt-hours) required to  
10                  operate the extended product system by  
11                  not less than 5 percent, as compared to  
12                  identified base levels set by the Secretary.

13          (B) INCLUSIONS.—The term “qualified ex-  
14          tended product system” includes commercial or  
15          industrial machinery or equipment that—

16                   (i)(I) did not previously make use of  
17                   the extended product system prior to the  
18                   redesign described in subclause (II); and

19                   (II) incorporates an extended product  
20                   system that has greater than 1 horsepower  
21                   into redesigned machinery or equipment;  
22                   and

23                   (ii) was previously used prior to, and  
24                   was placed back into service during, cal-  
25                   endar year 2021 or 2022.

1           (b) ESTABLISHMENT.—Not later than 180 days after  
2 the date of enactment of this Act, the Secretary shall es-  
3 tablish a program to provide rebates for expenditures  
4 made by qualified entities for the purchase or installation  
5 of a qualified extended product system.

6           (c) QUALIFIED ENTITIES.—

7           (1) ELIGIBILITY REQUIREMENTS.—A qualified  
8 entity under this section shall be—

9           (A) in the case of a qualified extended  
10 product system described in subsection  
11 (a)(4)(A), the purchaser of the qualified ex-  
12 tended product that is installed; and

13           (B) in the case of a qualified extended  
14 product system described in subsection  
15 (a)(4)(B), the manufacturer of the commercial  
16 or industrial machinery or equipment that in-  
17 corporated the extended product system into  
18 that machinery or equipment.

19           (2) APPLICATION.—To be eligible to receive a  
20 rebate under this section, a qualified entity shall  
21 submit to the Secretary—

22           (A) an application in such form, at such  
23 time, and containing such information as the  
24 Secretary may require; and



1 (B) a certification that includes dem-  
2 onstrated evidence—

3 (i) that the entity is a qualified entity;

4 and

5 (ii)(I) in the case of a qualified entity  
6 described in paragraph (1)(A)—

7 (aa) that the qualified entity in-  
8 stalled the qualified extended product  
9 system during the 2 fiscal years fol-  
10 lowing the date of enactment of this  
11 Act;

12 (bb) that the qualified extended  
13 product system meets the require-  
14 ments of subsection (a)(4)(A); and

15 (cc) showing the serial number,  
16 manufacturer, and model number  
17 from the nameplate of the installed  
18 motor of the qualified entity on which  
19 the qualified extended product system  
20 was installed; or

21 (II) in the case of a qualified entity  
22 described in paragraph (1)(B), dem-  
23 onstrated evidence—

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1 (aa) that the qualified extended  
2 product system meets the require-  
3 ments of subsection (a)(4)(B); and

4 (bb) showing the serial number,  
5 manufacturer, and model number  
6 from the nameplate of the installed  
7 motor of the qualified entity with  
8 which the extended product system is  
9 integrated.

10 (d) AUTHORIZED AMOUNT OF REBATE.—

11 (1) IN GENERAL.—The Secretary may provide  
12 to a qualified entity a rebate in an amount equal to  
13 the product obtained by multiplying—

14 (A) an amount equal to the sum of the  
15 nameplate rated horsepower of—

16 (i) the electric motor to which the  
17 qualified extended product system is at-  
18 tached; and

19 (ii) the electronic control; and

20 (B) \$25.

21 (2) MAXIMUM AGGREGATE AMOUNT.—A quali-  
22 fied entity shall not be entitled to aggregate rebates  
23 under this section in excess of \$25,000 per calendar  
24 year.

1 (e) AUTHORIZATION OF APPROPRIATIONS.—There is  
2 authorized to be appropriated to carry out this section  
3 \$5,000,000 for each of fiscal years 2022 and 2023.

4 **SEC. 1006. ENERGY EFFICIENT TRANSFORMER REBATE**  
5 **PROGRAM.**

6 (a) DEFINITIONS.—In this section:

7 (1) QUALIFIED ENERGY EFFICIENT TRANS-  
8 FORMER.—The term “qualified energy efficient  
9 transformer” means a transformer that meets or ex-  
10 ceeds the applicable energy conservation standards  
11 described in the tables in subsection (b)(2) and  
12 paragraphs (1) and (2) of subsection (c) of section  
13 431.196 of title 10, Code of Federal Regulations (as  
14 in effect on the date of enactment of this Act).

15 (2) QUALIFIED ENERGY INEFFICIENT TRANS-  
16 FORMER.—The term “qualified energy inefficient  
17 transformer” means a transformer with an equal  
18 number of phases and capacity to a transformer de-  
19 scribed in any of the tables in subsection (b)(2) and  
20 paragraphs (1) and (2) of subsection (c) of section  
21 431.196 of title 10, Code of Federal Regulations (as  
22 in effect on the date of enactment of this Act)  
23 that—

1 (A) does not meet or exceed the applicable  
2 energy conservation standards described in  
3 paragraph (1); and

4 (B)(i) was manufactured between January  
5 1, 1987, and December 31, 2008, for a trans-  
6 former with an equal number of phases and ca-  
7 pacity as a transformer described in the table  
8 in subsection (b)(2) of section 431.196 of title  
9 10, Code of Federal Regulations (as in effect on  
10 the date of enactment of this Act); or

11 (ii) was manufactured between January 1,  
12 1992, and December 31, 2011, for a trans-  
13 former with an equal number of phases and ca-  
14 pacity as a transformer described in the table  
15 in paragraph (1) or (2) of subsection (c) of that  
16 section (as in effect on the date of enactment  
17 of this Act).

18 (3) QUALIFIED ENTITY.—The term “qualified  
19 entity” means an owner of industrial or manufac-  
20 turing facilities, commercial buildings, or multifamily  
21 residential buildings, a utility, or an energy service  
22 company that fulfills the requirements of subsection  
23 (c).

24 (b) ESTABLISHMENT.—Not later than 90 days after  
25 the date of enactment of this Act, the Secretary of Energy

1 (in this section referred to as the “Secretary”) shall estab-  
2 lish a program to provide rebates to qualified entities for  
3 expenditures made by the qualified entity for the replace-  
4 ment of a qualified energy inefficient transformer with a  
5 qualified energy efficient transformer.

6 (c) REQUIREMENTS.—To be eligible to receive a re-  
7 bate under this section, an entity shall submit to the Sec-  
8 retary an application in such form, at such time, and con-  
9 taining such information as the Secretary may require, in-  
10 cluding demonstrated evidence—

11 (1) that the entity purchased a qualified energy  
12 efficient transformer;

13 (2) of the core loss value of the qualified energy  
14 efficient transformer;

15 (3) of the age of the qualified energy inefficient  
16 transformer being replaced;

17 (4) of the core loss value of the qualified energy  
18 inefficient transformer being replaced—

19 (A) as measured by a qualified professional  
20 or verified by the equipment manufacturer, as  
21 applicable; or

22 (B) for transformers described in sub-  
23 section (a)(2)(B)(i), as selected from a table of  
24 default values as determined by the Secretary  
25 in consultation with applicable industry; and

1           (5) that the qualified energy inefficient trans-  
2 former has been permanently decommissioned and  
3 scrapped.

4           (d) AUTHORIZED AMOUNT OF REBATE.—The  
5 amount of a rebate provided under this section shall be—

6           (1) for a 3-phase or single-phase transformer  
7 with a capacity of not less than 10 and not greater  
8 than 2,500 kilovolt-amperes, twice the amount equal  
9 to the difference in Watts between the core loss  
10 value (as measured in accordance with paragraphs  
11 (2) and (4) of subsection (c)) of—

12                   (A) the qualified energy inefficient trans-  
13 former; and

14                   (B) the qualified energy efficient trans-  
15 former; or

16           (2) for a transformer described in subsection  
17 (a)(2)(B)(i), the amount determined using a table of  
18 default rebate values by rated transformer output,  
19 as measured in kilovolt-amperes, as determined by  
20 the Secretary in consultation with applicable indus-  
21 try.

22           (e) AUTHORIZATION OF APPROPRIATIONS.—There is  
23 authorized to be appropriated to carry out this section  
24 \$5,000,000 for each of fiscal years 2022 and 2023.

1 (f) TERMINATION OF EFFECTIVENESS.—The author-  
2 ity provided by this section terminates on December 31,  
3 2023.

4 **SEC. 1007. SMART BUILDING ACCELERATION.**

5 (a) DEFINITIONS.—In this section:

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

8 (2) PROGRAM.—The term “program” means  
9 the Federal Smart Building Program established  
10 under subsection (b)(1).

11 (3) SECRETARY.—The term “Secretary” means  
12 the Secretary of Energy.

13 (4) SMART BUILDING.—The term “smart build-  
14 ing” means a building, or collection of buildings,  
15 with an energy system that—

16 (A) is flexible and automated;

17 (B) has extensive operational monitoring  
18 and communication connectivity, allowing re-  
19 mote monitoring and analysis of all building  
20 functions;

21 (C) takes a systems-based approach in in-  
22 tegrating the overall building operations for  
23 control of energy generation, consumption, and  
24 storage;

1 (D) communicates with utilities and other  
2 third-party commercial entities, if appropriate;

3 (E) protects the health and safety of occu-  
4 pants and workers; and

5 (F) incorporates cybersecurity best prac-  
6 tices.

7 (5) SMART BUILDING ACCELERATOR.—The  
8 term “smart building accelerator” means an initia-  
9 tive that is designed to demonstrate specific innova-  
10 tive policies and approaches—

11 (A) with clear goals and a clear timeline;  
12 and

13 (B) that, on successful demonstration,  
14 would accelerate investment in energy effi-  
15 ciency.

16 (b) FEDERAL SMART BUILDING PROGRAM.—

17 (1) ESTABLISHMENT.—Not later than 1 year  
18 after the date of enactment of this Act, the Sec-  
19 retary shall, in consultation with the Administrator  
20 of General Services, establish a program to be  
21 known as the “Federal Smart Building Program”—

22 (A) to implement smart building tech-  
23 nology; and

24 (B) to demonstrate the costs and benefits  
25 of smart buildings.



1 (2) SELECTION.—

2 (A) IN GENERAL.—The Secretary shall co-  
3 ordinate the selection of not fewer than 1 build-  
4 ing from among each of several key Federal  
5 agencies, as described in paragraph (4), to com-  
6 pose an appropriately diverse set of smart  
7 buildings based on size, type, and geographic lo-  
8 cation.

9 (B) INCLUSION OF COMMERCIALY OPER-  
10 ATED BUILDINGS.—In making selections under  
11 subparagraph (A), the Secretary may include  
12 buildings that are owned by the Federal Gov-  
13 ernment but are commercially operated.

14 (3) TARGETS.—Not later than 18 months after  
15 the date of enactment of this Act, the Secretary  
16 shall establish targets for the number of smart  
17 buildings to be commissioned and evaluated by key  
18 Federal agencies by 3 years and 6 years after the  
19 date of enactment of this Act.

20 (4) FEDERAL AGENCY DESCRIBED.—The key  
21 Federal agencies referred to paragraph (2)(A) shall  
22 include buildings operated by—

23 (A) the Department of the Army;

24 (B) the Department of the Navy;

25 (C) the Department of the Air Force;

- 1 (D) the Department;
- 2 (E) the Department of the Interior;
- 3 (F) the Department of Veterans Affairs;
- 4 and
- 5 (G) the General Services Administration.

6 (5) REQUIREMENT.—In implementing the pro-

7 gram, the Secretary shall leverage existing financing

8 mechanisms including energy savings performance

9 contracts, utility energy service contracts, and an-

10 nual appropriations.

11 (6) EVALUATION.—Using the guidelines of the

12 Federal Energy Management Program relating to

13 whole-building evaluation, measurement, and

14 verification, the Secretary shall evaluate the costs

15 and benefits of the buildings selected under para-

16 graph (2), including an identification of—

17 (A) which advanced building tech-

18 nologies—

19 (i) are most cost-effective; and

20 (ii) show the most promise for—

21 (I) increasing building energy

22 savings;

23 (II) increasing service perform-

24 ance to building occupants;

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1 (III) reducing environmental im-  
2 pacts; and

3 (IV) establishing cybersecurity;  
4 and

5 (B) any other information the Secretary  
6 determines to be appropriate.

7 (7) AWARDS.—The Secretary may expand  
8 awards made under the Federal Energy Manage-  
9 ment Program and the Better Building Challenge to  
10 recognize specific agency achievements in accel-  
11 erating the adoption of smart building technologies.

12 (c) SURVEY OF PRIVATE SECTOR SMART BUILD-  
13 INGS.—

14 (1) SURVEY.—The Secretary shall conduct a  
15 survey of privately owned smart buildings through-  
16 out the United States, including commercial build-  
17 ings, laboratory facilities, hospitals, multifamily resi-  
18 dential buildings, and buildings owned by nonprofit  
19 organizations and institutions of higher education.

20 (2) SELECTION.—From among the smart build-  
21 ings surveyed under paragraph (1), the Secretary  
22 shall select not fewer than 1 building each from an  
23 appropriate range of building sizes, types, and geo-  
24 graphic locations.

1           (3) EVALUATION.—Using the guidelines of the  
2       Federal Energy Management Program relating to  
3       whole-building evaluation, measurement, and  
4       verification, the Secretary shall evaluate the costs  
5       and benefits of the buildings selected under para-  
6       graph (2), including an identification of—

7           (A) which advanced building technologies  
8       and systems—

9           (i) are most cost-effective; and

10          (ii) show the most promise for—

11           (I) increasing building energy  
12       savings;

13           (II) increasing service perform-  
14       ance to building occupants;

15           (III) reducing environmental im-  
16       pacts; and

17           (IV) establishing cybersecurity;

18       and

19           (B) any other information the Secretary  
20       determines to be appropriate.

21       (d) BETTER BUILDING CHALLENGE.—As part of the  
22       Better Building Challenge of the Department, the Sec-  
23       retary, in consultation with major private sector property  
24       owners, shall develop smart building accelerators to dem-  
25       onstrate innovative policies and approaches that will accel-

1 erate the transition to smart buildings in the public, insti-  
2 tutional, and commercial buildings sectors.

3 (e) RESEARCH AND DEVELOPMENT ON INTEGRATING  
4 BUILDINGS ONTO THE ELECTRIC GRID.—

5 (1) IN GENERAL.—Subtitle B of title IV of the  
6 Energy Independence and Security Act of 2007 (42  
7 U.S.C. 17081 et seq.) is amended by adding at the  
8 end the following:

9 **“SEC. 426. ADVANCED INTEGRATION OF BUILDINGS ONTO**  
10 **THE ELECTRIC GRID.**

11 “(a) IN GENERAL.—The Secretary shall establish a  
12 program of research, development, and demonstration to  
13 enable components of commercial and residential buildings  
14 to serve as dynamic energy loads on and resources for the  
15 electric grid. The program shall focus on—

16 “(1) developing low-cost, low power, wireless  
17 sensors to—

18 “(A) monitor building energy load;

19 “(B) forecast building energy need; and

20 “(C) enable building-level energy control;

21 “(2) developing data management capabilities  
22 and standard communication protocols to further  
23 interoperability at the building and grid-level;

24 “(3) developing advanced building-level energy  
25 management of components through integration of

1 smart technologies, control systems, and data pro-  
2 cessing, to enable energy efficiency and savings;

3 “(4) optimizing energy consumption at the  
4 building level to enable grid stability and resilience;

5 “(5) improving visualization of behind the  
6 meter equipment and technologies to provide better  
7 insight into the energy needs and energy forecasts of  
8 individual buildings;

9 “(6) reducing the cost of key components to ac-  
10 celerate the adoption of smart building technologies;

11 “(7) protecting against cybersecurity threats  
12 and addressing security vulnerabilities of building  
13 systems or equipment; and

14 “(8) other areas determined appropriate by the  
15 Secretary.

16 “(b) CONSIDERATIONS.—In carrying out the pro-  
17 gram under subsection (a), the Secretary shall—

18 “(1) work with utility partners, building own-  
19 ers, technology vendors, and building developers to  
20 test and validate technologies and encourage the  
21 commercial application of these technologies by  
22 building owners; and

23 “(2) consider the specific challenges of enabling  
24 greater interaction between components of—

1           “(A) small- and medium-sized buildings  
2           and the electric grid; and

3           “(B) residential and commercial buildings  
4           and the electric grid.

5           “(c) BUILDINGS-TO-GRID INTEGRATION REPORT.—  
6 Not later than 1 year after the enactment of this section,  
7 the Secretary shall submit to the Committee on Science,  
8 Space, and Technology and the Committee on Energy and  
9 Commerce of the House of Representatives and the Com-  
10 mittee on Energy and Natural Resources of the Senate  
11 a report on the results of a study that examines the re-  
12 search, development, and demonstration opportunities,  
13 challenges, and standards needed to enable components of  
14 commercial and residential buildings to serve as dynamic  
15 energy loads on and resources for the electric grid.

16           “(1) REPORT REQUIREMENTS.—The report  
17 shall include—

18           “(A) an assessment of the technologies  
19 needed to enable building components as dy-  
20 namic loads on and resources for the electric  
21 grid, including how such technologies can be—

22                   “(i) incorporated into new commercial  
23                   and residential buildings; and

24                   “(ii) retrofitted in older buildings;

1           “(B) guidelines for the design of new  
2 buildings and building components to enable  
3 modern grid interactivity and improve energy  
4 efficiency;

5           “(C) an assessment of barriers to the  
6 adoption by building owners of advanced tech-  
7 nologies enabling greater integration of building  
8 components onto the electric grid; and

9           “(D) an assessment of the feasibility of  
10 adopting technologies developed under sub-  
11 section (a) at Department facilities.

12           “(2) RECOMMENDATIONS.—As part of the re-  
13 port, the Secretary shall develop a 10-year roadmap  
14 to guide the research, development, and demonstra-  
15 tion program to enable components of commercial  
16 and residential buildings to serve as dynamic energy  
17 loads on and resources for the electric grid.

18           “(3) UPDATES.—The Secretary shall update  
19 the report required under this section every 3 years  
20 for the duration of the program under subsection (a)  
21 and shall submit the updated report to the Com-  
22 mittee on Science, Space, and Technology and the  
23 Committee on Energy and Commerce of the House  
24 of Representatives and the Committee on Energy  
25 and Natural Resources of the Senate.



1           “(d) PROGRAM IMPLEMENTATION.—In carrying out  
2 this section, the Secretary shall—

3           “(1) implement the recommendations from the  
4 report in subsection (e); and

5           “(2) coordinate across all relevant program of-  
6 fices at the Department to achieve the goals estab-  
7 lished in this section, including the Office of Elec-  
8 tricity.”.

9           (2) CONFORMING AMENDMENT.—The table of  
10 contents for the Energy Independence and Security  
11 Act of 2007 is amended by adding after the item re-  
12 lating to section 425 the following:

“Sec. 426. Advanced integration of buildings onto the electric grid.”.

13           (f) REPORT.—Not later than 2 years after the date  
14 of enactment of this Act, and every 2 years thereafter until  
15 a total of 3 reports have been made, the Secretary shall  
16 submit to the Committee on Energy and Natural Re-  
17 sources of the Senate and the Committee on Energy and  
18 Commerce and the Committee on Science, Space, and  
19 Technology of the House of Representatives a report on—

20           (1) the establishment of the Federal Smart  
21 Building Program and the evaluation of Federal  
22 smart buildings under subsection (b);

23           (2) the survey and evaluation of private sector  
24 smart buildings under subsection (c); and

1           (3) any recommendations of the Secretary to  
2           further accelerate the transition to smart buildings.

3 **SEC. 1008. MODIFICATIONS TO THE CEILING FAN ENERGY**  
4 **CONSERVATION STANDARD.**

5           (a) IN GENERAL.—Section 325(ff)(6) of the Energy  
6 Policy and Conservation Act (42 U.S.C. 6295(ff)(6)) is  
7 amended by adding at the end the following:

8           “(C)(i) Large-diameter ceiling fans manufactured on  
9 or after January 21, 2020, shall—

10           “(I) not be required to meet minimum ceiling  
11 fan efficiency in terms of ratio of the total airflow  
12 to the total power consumption as described in the  
13 final rule titled ‘Energy Conservation Program: En-  
14 ergy Conservation Standards for Ceiling Fans’ (82  
15 Fed. Reg. 6826 (January 19, 2017)); and

16           “(II) have a CFEI greater than or equal to—

17                   “(aa) 1.00 at high speed; and

18                   “(bb) 1.31 at 40 percent speed or the  
19 nearest speed that is not less than 40 percent  
20 speed.

21           “(ii) For purposes of this subparagraph, the term  
22 ‘CFEI’ means the Fan Energy Index for large-diameter  
23 ceiling fans, calculated in accordance with ANSI/AMCA  
24 Standard 208–18 titled ‘Calculation of the Fan Energy  
25 Index’, with the following modifications:

1           “(I) Using an Airflow Constant ( $Q_0$ ) of 26,500  
2           cubic feet per minute.

3           “(II) Using a Pressure Constant ( $P_0$ ) of 0.0027  
4           inches water gauge.

5           “(III) Using a Fan Efficiency Constant ( $\eta_0$ ) of  
6           42 percent.”.

7           (b) REVISION.—For purposes of section 325(m) of  
8           the Energy Policy and Conservation Act (42 U.S.C.  
9           6295(m)), the standard established in section  
10          325(ff)(6)(C) of such Act (as added by subsection (a) of  
11          this section) shall be treated as if such standard was  
12          issued on January 19, 2017.

13          **SEC. 1009. REPORT ON ELECTROCHROMIC GLASS.**

14          (a) DEFINITION OF ELECTROCHROMIC GLASS.—In  
15          this section, the term “electrochromic glass” means glass  
16          that uses electricity to change the light transmittance  
17          properties of the glass to heat or cool a structure.

18          (b) REPORT.—Not later than 1 year after the date  
19          of enactment of this Act, the Secretary of Energy, in col-  
20          laboration with the heads of other relevant agencies, shall  
21          submit to the Committee on Energy and Natural Re-  
22          sources of the Senate and the Committee on Energy and  
23          Commerce of the House of Representatives a report that  
24          addresses the benefits of electrochromic glass, including  
25          the following:

1           (1) Reductions in energy consumption in com-  
2           mercial buildings, especially peak cooling load reduc-  
3           tion and annual energy bill savings.

4           (2) Benefits in the workplace, especially visual  
5           comfort and employee health.

6           (3) Benefits of natural light in hospitals for pa-  
7           tients and staff, especially accelerated patient heal-  
8           ing and recovery time.

9   **SEC. 1010. ENERGY AND WATER FOR SUSTAINABILITY.**

10          (a) NEXUS OF ENERGY AND WATER FOR SUSTAIN-  
11          ABILITY.—

12           (1) DEFINITIONS.—In this section:

13           (A) DEPARTMENT.—The term “Depart-  
14           ment” means the Department of Energy.

15           (B) ENERGY-WATER NEXUS.—The term  
16           “energy-water nexus” means the links be-  
17           tween—

18           (i) the water needed to produce fuels,  
19           electricity, and other forms of energy; and

20           (ii) the energy needed to transport,  
21           reclaim, and treat water and wastewater.

22           (C) INTERAGENCY RD&D COORDINATION  
23           COMMITTEE.—The term “Interagency RD&D  
24           Coordination Committee” means the Inter-  
25           agency RD&D Coordination Committee on the

1 Nexus of Energy and Water for Sustainability  
2 (or the “NEWS RD&D Committee”) estab-  
3 lished under paragraph (3)(A).

4 (D) NEXUS OF ENERGY AND WATER SUS-  
5 TAINABILITY RD&D OFFICE; NEWS RD&D OF-  
6 FICE.—The term “Nexus of Energy and Water  
7 Sustainability RD&D Office” or the “NEWS  
8 RD&D Office” means an office located at the  
9 Department and managed in cooperation with  
10 the Department of the Interior pursuant to an  
11 agreement between the 2 agencies to carry out  
12 leadership and administrative functions for the  
13 Interagency RD&D Coordination Committee.

14 (E) RD&D.—The term “RD&D” means  
15 research, development, and demonstration.

16 (F) SECRETARY.—The term “Secretary”  
17 means the Secretary of Energy.

18 (2) STATEMENT OF POLICY.—Recognizing  
19 States’ primacy over allocation and administration of  
20 water resources (except in specific instances where  
21 preempted under Federal law) and the siting of en-  
22 ergy infrastructure within State boundaries on non-  
23 Federal lands, it is the national policy that the Fed-  
24 eral government, in all energy-water nexus manage-  
25 ment activities, shall maximize coordination and con-

1 sultation among Federal agencies and with State  
2 and local governments, and disseminate information  
3 to the public in the most effective manner.

4 (3) INTERAGENCY RD&D COORDINATION COM-  
5 MITTEE.—

6 (A) ESTABLISHMENT.—Not later than 180  
7 days after the date of enactment of this Act,  
8 the Secretary and the Secretary of the Interior  
9 shall establish the joint NEWS RD&D Office  
10 and Interagency RD&D Coordination Com-  
11 mittee on the Nexus of Energy and Water for  
12 Sustainability (or the “NEWS RD&D Com-  
13 mittee”) to carry out the duties described in  
14 subparagraph (C).

15 (B) ADMINISTRATION.—

16 (i) CHAIRS.—The Secretary and the  
17 Secretary of the Interior shall jointly man-  
18 age the NEWS RD&D Office and serve as  
19 co-chairs of the Interagency RD&D Co-  
20 ordination Committee.

21 (ii) MEMBERSHIP; STAFFING.—Mem-  
22 bership and staffing shall be determined by  
23 the co-chairs.

24 (C) DUTIES.—The Interagency RD&D Co-  
25 ordination Committee shall—

1           (i) serve as a forum for developing  
2           common Federal goals and plans on en-  
3           ergy-water nexus RD&D activities, in co-  
4           ordination with the National Science and  
5           Technology Council;

6           (ii) not later than 1 year after the  
7           date of enactment of this Act, and bienni-  
8           ally thereafter, issue a strategic plan on  
9           energy-water nexus RD&D activities, prior-  
10          ities, and objectives pursuant to subpara-  
11          graph (D), which shall be developed in con-  
12          sultation with relevant State and local gov-  
13          ernments;

14          (iii) convene and promote coordination  
15          of RD&D activities of relevant Federal de-  
16          partments and agencies on energy-water  
17          nexus;

18          (iv)(I) coordinate and develop capa-  
19          bilities and methodologies related to  
20          RD&D activities for data collection, data  
21          communication protocols (including models  
22          and modeling results), data management,  
23          and dissemination of validated data and  
24          results related to energy-water nexus

1 RD&D activities to requesting Federal de-  
2 partments and agencies; and

3 (II) promote information exchange be-  
4 tween Federal departments and agencies—

5 (aa) to identify and document  
6 Federal and non-Federal RD&D pro-  
7 grams and funding opportunities that  
8 support basic and applied RD&D pro-  
9 posals to advance energy-water nexus  
10 related science and technologies;

11 (bb) to leverage existing RD&D  
12 programs by encouraging joint solici-  
13 tations, block grants, and matching  
14 programs with non-Federal entities;  
15 and

16 (cc) to identify opportunities for  
17 domestic and international public-pri-  
18 vate partnerships, innovative financ-  
19 ing mechanisms, and information and  
20 data exchange with respect to RD&D  
21 activities;

22 (v) identify ways to leverage existing  
23 RD&D programs, including programs at  
24 the State and local level;



1 (vi) make publicly available the results  
2 of RD&D activities on the energy water  
3 nexus;

4 (vii) with regard to RD&D programs,  
5 recommend improvements and best prac-  
6 tices for the collection and dissemination of  
7 federal water use data and the use of mon-  
8 itoring networks; and

9 (viii) promote coordination on RD&D  
10 with non-Federal interests by—

11 (I) consulting with representa-  
12 tives of research and academic institu-  
13 tions, State, local, and Tribal govern-  
14 ments, public utility commissions, and  
15 industry, who have expertise in tech-  
16 nologies, technological innovations, or  
17 practices relating to the energy-water  
18 nexus; and

19 (II) considering conducting tech-  
20 nical workshops.

21 (D) STRATEGIC PLAN.—In developing the  
22 strategic plan pursuant to (C)(ii), the Inter-  
23 agency RD&D Coordination Committee shall—

24 (i) to the maximum extent possible,  
25 avoid duplication with other Federal

1 RD&D programs, and projects, including  
2 with those of the National Laboratories;

3 (ii) consider inclusion of specific re-  
4 search, development and demonstration  
5 needs, including—

6 (I) innovative practices, tech-  
7 nologies and other advancements im-  
8 proving water efficiency, treatment,  
9 recovery, or reuse associated with en-  
10 ergy generation, including cooling,  
11 and fuel production;

12 (II) innovative practices, tech-  
13 nologies and other advancements asso-  
14 ciated with energy use in water collec-  
15 tion, supply, delivery, distribution,  
16 treatment, or reuse;

17 (III) innovative practices, tech-  
18 nologies and other advancements asso-  
19 ciated with generation or production  
20 of energy from water or wastewater  
21 systems; and

22 (IV) modeling and systems anal-  
23 ysis related to energy-water nexus;  
24 and

1 (iii) submit the plan to the Committee  
2 on Energy and Natural Resources of the  
3 Senate and the Committees on Science,  
4 Space, and Technology, Energy and Com-  
5 merce, and Natural Resources of the  
6 House of Representatives.

7 (E) RULES OF CONSTRUCTION.—

8 (i) Nothing in this section grants to  
9 the Interagency RD&D Coordination Com-  
10 mittee the authority to promulgate regula-  
11 tions or set standards.

12 (ii) Notwithstanding any other provi-  
13 sion of law, nothing in this section shall be  
14 construed to require State, Tribal, or local  
15 governments to take any action that may  
16 result in an increased financial burden to  
17 such governments.

18 (F) ADDITIONAL PARTICIPATION.—In de-  
19 veloping the strategic plan described in sub-  
20 paragraph (C)(ii), the Secretary shall consult  
21 and coordinate with a diverse group of rep-  
22 resentatives from research and academic insti-  
23 tutions, industry, public utility commissions,  
24 and State and local governments who have ex-

1           pertise in technologies and practices relating to  
2           the energy-water nexus.

3           (G) REVIEW; REPORT.—At the end of the  
4           5-year period beginning on the date on which  
5           the Interagency RD&D Coordination Committee  
6           and NEWS RD&D Office are established, the  
7           NEWS RD&D Office shall—

8                   (i) review the activities, relevance, and  
9                   effectiveness of the Interagency RD&D Co-  
10                  ordination Committee; and

11                   (ii) submit to the Committee on En-  
12                   ergy and Natural Resources of the Senate  
13                   and the Committees on Science, Space,  
14                   and Technology, Energy and Commerce,  
15                   and Natural Resources of the House of  
16                   Representatives a report that—

17                           (I) describes the results of the re-  
18                           view conducted under clause (i); and

19                           (II) includes a recommendation  
20                           on whether the Interagency RD&D  
21                           Coordination Committee should con-  
22                           tinue.

23           (4) CROSSCUT BUDGET.—Not later than 30  
24           days after the President submits the budget of the  
25           United States Government under section 1105 of

1 title 31, United States Code, the co-chairs of the  
2 Interagency RD&D Coordination Committee (acting  
3 through the NEWS RD&D Office) shall submit to  
4 the Committee on Energy and Natural Resources of  
5 the Senate and the Committees on Science, Space,  
6 and Technology, Energy and Commerce, and Nat-  
7 ural Resources of the House of Representatives, an  
8 interagency budget crosscut report that displays at  
9 the program-, project-, and activity-level for each of  
10 the Federal agencies that carry out or support (in-  
11 cluding through grants, contracts, interagency and  
12 intraagency transfers, and multiyear and no-year  
13 funds) basic and applied RD&D activities to advance  
14 the energy-water nexus related science and tech-  
15 nologies, including—

16 (A) the budget proposed in the budget re-  
17 quest of the President for the upcoming fiscal  
18 year;

19 (B) expenditures and obligations for the  
20 prior fiscal year; and

21 (C) estimated expenditures and obligations  
22 for the current fiscal year.

23 (5) TERMINATION.—

24 (A) IN GENERAL.—The authority provided  
25 to the NEWS RD&D Office and NEWS RD&D

1           Committee under this subsection shall termi-  
2           nate on the date that is 7 years after the date  
3           of enactment of this Act.

4                   (B) EFFECT.—The termination of author-  
5           ity under subparagraph (A) shall not affect on-  
6           going interagency planning, coordination, or  
7           other RD&D activities relating to the energy-  
8           water nexus.

9           (b) INTEGRATING ENERGY AND WATER RE-  
10          SEARCH.—The Secretary shall integrate the following con-  
11          siderations into energy RD&D programs and projects of  
12          the Department by—

13                   (1) advancing RD&D for energy and energy ef-  
14          ficiency technologies and practices that meet the ob-  
15          jectives of—

16                           (A) minimizing freshwater withdrawal and  
17          consumption;

18                           (B) increasing water use efficiency; and

19                           (C) utilizing nontraditional water sources;

20                   (2) considering the effects climate variability  
21          may have on water supplies and quality for energy  
22          generation and fuel production; and

23                   (3) improving understanding of the energy-  
24          water nexus (as defined in subsection (a)(1)).

1 (c) ADDITIONAL ACTIVITIES.—The Secretary may  
2 provide for such additional RD&D activities as appro-  
3 priate to integrate the considerations described in sub-  
4 section (b) into the RD&D activities of the Department.

5 **SEC. 1011. WEATHERIZATION ASSISTANCE PROGRAM.**

6 (a) REAUTHORIZATION OF WEATHERIZATION AS-  
7 SISTANCE PROGRAM.—Section 422 of the Energy Con-  
8 servation and Production Act (42 U.S.C. 6872) is amend-  
9 ed by striking paragraphs (1) through (5) and inserting  
10 the following:

11 “(1) \$330,000,000 for fiscal year 2021; and

12 “(2) \$350,000,000 for each of fiscal years 2022  
13 through 2025.”.

14 (b) MODERNIZING THE DEFINITION OF WEATHER-  
15 IZATION MATERIALS.—Section 412(9)(J) of the Energy  
16 Conservation and Production Act (42 U.S.C. 6862(9)(J))  
17 is amended—

18 (1) by inserting “, including renewable energy  
19 technologies and other advanced technologies,” after  
20 “devices or technologies”; and

21 (2) by striking “, the Secretary of Agriculture,  
22 and the Director of the Community Services Admin-  
23 istration”.

1           (c) CONSIDERATION OF HEALTH BENEFITS.—Sec-  
2 tion 413(b) of the Energy Conservation and Production  
3 Act (42 U.S.C. 6863(b)) is amended—

4           (1) in paragraph (3)—

5                 (A) by striking “and with the Director of  
6 the Community Services Administration”;

7                 (B) by inserting “and by” after “in car-  
8 rying out this part,”; and

9                 (C) by striking “, and the Director of the  
10 Community Services Administration in carrying  
11 out weatherization programs under section  
12 222(a)(12) of the Economic Opportunity Act of  
13 1964”;

14           (2) by redesignating paragraphs (4) through  
15 (6) as paragraphs (5) through (7), respectively; and

16           (3) by inserting after paragraph (3), the fol-  
17 lowing:

18           “(4) The Secretary may amend the regulations pre-  
19 scribed under paragraph (1) to provide that the standards  
20 described in paragraph (2)(A) take into consideration im-  
21 provements in the health and safety of occupants of dwell-  
22 ing units, and other non-energy benefits, from weatheriza-  
23 tion.”.

24           (d) CONTRACTOR OPTIMIZATION.—



1           (1) IN GENERAL.—The Energy Conservation  
2           and Production Act is amended by inserting after  
3           section 414B (42 U.S.C. 6864b) the following:

4   **“SEC. 414C. CONTRACTOR OPTIMIZATION.**

5           “(a) IN GENERAL.—The Secretary may request that  
6           entities receiving funding from the Federal Government  
7           or from a State through a weatherization assistance pro-  
8           gram under section 413 or section 414 perform periodic  
9           reviews of the use of private contractors in the provision  
10          of weatherization assistance, and encourage expanded use  
11          of contractors as appropriate.

12          “(b) USE OF TRAINING FUNDS.—Entities described  
13          in subsection (a) may use funding described in such sub-  
14          section to train private, non-Federal entities that are con-  
15          tracted to provide weatherization assistance under a  
16          weatherization program, in accordance with rules deter-  
17          mined by the Secretary.”.

18          (2) TABLE OF CONTENTS AMENDMENT.—The  
19          table of contents for the Energy Conservation and  
20          Production Act is amended by inserting after the  
21          item relating to section 414B the following:

          “Sec. 414C. Contractor optimization.”.

22          (e) FINANCIAL ASSISTANCE FOR WAP ENHANCE-  
23          MENT AND INNOVATION.—

24          (1) IN GENERAL.—The Energy Conservation  
25          and Production Act is amended by inserting after

1 section 414C (as added by subsection (d) of this sec-  
2 tion) the following:

3 **“SEC. 414D. FINANCIAL ASSISTANCE FOR WAP ENHANCE-**  
4 **MENT AND INNOVATION.**

5 “(a) PURPOSES.—The purposes of this section are—

6 “(1) to expand the number of dwelling units  
7 that are occupied by low-income persons that receive  
8 weatherization assistance by making such dwelling  
9 units weatherization-ready;

10 “(2) to promote the deployment of renewable  
11 energy in dwelling units that are occupied by low-in-  
12 come persons;

13 “(3) to ensure healthy indoor environments by  
14 enhancing or expanding health and safety measures  
15 and resources available to dwellings that are occu-  
16 pied by low-income persons;

17 “(4) to disseminate new methods and best prac-  
18 tices among entities providing weatherization assist-  
19 ance; and

20 “(5) to encourage entities providing weatheriza-  
21 tion assistance to hire and retain employees who are  
22 individuals—

23 “(A) from the community in which the as-  
24 sistance is provided; and

1           “(B) from communities or groups that are  
2           underrepresented in the home energy perform-  
3           ance workforce, including religious and ethnic  
4           minorities, women, veterans, individuals with  
5           disabilities, and individuals who are  
6           socioeconomically disadvantaged.

7           “(b) FINANCIAL ASSISTANCE.—The Secretary shall,  
8           to the extent funds are made available, award financial  
9           assistance, on an annual basis, through a competitive  
10          process to entities receiving funding from the Federal Gov-  
11          ernment or from a State, tribal organization, or unit of  
12          general purpose local government through a weatheriza-  
13          tion program under section 413 or section 414, or to non-  
14          profit entities, to be used by such an entity—

15                 “(1) with respect to dwelling units that are oc-  
16                 cupied by low-income persons, to—

17                         “(A) implement measures to make such  
18                         dwelling units weatherization-ready by address-  
19                         ing structural, plumbing, roofing, and electrical  
20                         issues, environmental hazards, or other meas-  
21                         ures that the Secretary determines to be appro-  
22                         priate;

23                         “(B) install energy efficiency technologies,  
24                         including home energy management systems,

1 smart devices, and other technologies the Sec-  
2 retary determines to be appropriate;

3 “(C) install renewable energy systems (as  
4 defined in section 415(c)(6)(A)); and

5 “(D) implement measures to ensure  
6 healthy indoor environments by improving in-  
7 door air quality, accessibility, and other healthy  
8 homes measures as determined by the Sec-  
9 retary;

10 “(2) to improve the capability of the entity—

11 “(A) to significantly increase the number  
12 of energy retrofits performed by such entity;

13 “(B) to replicate best practices for work  
14 performed pursuant to this section on a larger  
15 scale;

16 “(C) to leverage additional funds to sus-  
17 tain the provision of weatherization assistance  
18 and other work performed pursuant to this sec-  
19 tion after financial assistance awarded under  
20 this section is expended; and

21 “(D) to hire and retain employees who are  
22 individuals described subsection (a)(5);

23 “(3) for innovative outreach and education re-  
24 garding the benefits and availability of weatheriza-

1           tion assistance and other assistance available pursu-  
2           ant to this section;

3           “(4) for quality control of work performed pur-  
4           suant to this section;

5           “(5) for data collection, measurement, and  
6           verification with respect to such work;

7           “(6) for program monitoring, oversight, evalua-  
8           tion, and reporting regarding such work;

9           “(7) for labor, training, and technical assist-  
10          ance relating to such work;

11          “(8) for planning, management, and adminis-  
12          tration (up to a maximum of 15 percent of the as-  
13          sistance provided); and

14          “(9) for such other activities as the Secretary  
15          determines to be appropriate.

16          “(c) AWARD FACTORS.—In awarding financial assist-  
17          ance under this section, the Secretary shall consider—

18               “(1) the applicant’s record of constructing, ren-  
19               ovating, repairing, or making energy efficient single-  
20               family, multifamily, or manufactured homes that are  
21               occupied by low-income persons, either directly or  
22               through affiliates, chapters, or other partners (using  
23               the most recent year for which data are available);

24               “(2) the number of dwelling units occupied by  
25               low-income persons that the applicant has built, ren-

1 ovated, repaired, weatherized, or made more energy  
2 efficient in the 5 years preceding the date of the ap-  
3 plication;

4 “(3) the qualifications, experience, and past  
5 performance of the applicant, including experience  
6 successfully managing and administering Federal  
7 funds;

8 “(4) the strength of an applicant’s proposal to  
9 achieve one or more of the purposes under sub-  
10 section (a);

11 “(5) the extent to which such applicant will uti-  
12 lize partnerships and regional coordination to  
13 achieve one or more of the purposes under sub-  
14 section (a);

15 “(6) regional and climate zone diversity;

16 “(7) urban, suburban, and rural localities; and

17 “(8) such other factors as the Secretary deter-  
18 mines to be appropriate.

19 “(d) APPLICATIONS.—

20 “(1) ADMINISTRATION.—To be eligible for an  
21 award of financial assistance under this section, an  
22 applicant shall submit to the Secretary an applica-  
23 tion in such manner and containing such informa-  
24 tion as the Secretary may require.

1           “(2) AWARDS.—Subject to the availability of  
2           appropriations, not later than 270 days after the  
3           date of enactment of this section, the Secretary shall  
4           make a first award of financial assistance under this  
5           section.

6           “(e) MAXIMUM AMOUNT AND TERM.—

7           “(1) IN GENERAL.—The total amount of finan-  
8           cial assistance awarded to an entity under this sec-  
9           tion shall not exceed \$2,000,000.

10          “(2) TECHNICAL AND TRAINING ASSISTANCE.—

11          The total amount of financial assistance awarded to  
12          an entity under this section shall be reduced by the  
13          cost of any technical and training assistance pro-  
14          vided by the Secretary that relates to such financial  
15          assistance.

16          “(3) TERM.—The term of an award of financial

17          assistance under this section shall not exceed 3  
18          years.

19          “(4) RELATIONSHIP TO FORMULA GRANTS.—An

20          entity may use financial assistance awarded to such  
21          entity under this section in conjunction with other  
22          financial assistance provided to such entity under  
23          this part.

24          “(f) REQUIREMENTS.—Not later than 90 days after

25          the date of enactment of this section, the Secretary shall

1 issue requirements to implement this section, including,  
2 for entities receiving financial assistance under this sec-  
3 tion—

4 “(1) standards for allowable expenditures;

5 “(2) a minimum saving-to-investment ratio; and

6 “(3) standards for—

7 “(A) training programs;

8 “(B) energy audits;

9 “(C) the provision of technical assistance;

10 “(D) monitoring activities carried out  
11 using such financial assistance;

12 “(E) verification of energy and cost sav-  
13 ings;

14 “(F) liability insurance requirements; and

15 “(G) recordkeeping and reporting require-  
16 ments, which shall include reporting to the Of-  
17 fice of Weatherization and Intergovernmental  
18 Programs of the Department of Energy applica-  
19 ble data on each dwelling unit retrofitted or  
20 otherwise assisted pursuant to this section.

21 “(g) COMPLIANCE WITH STATE AND LOCAL LAW.—

22 Nothing in this section supersedes or otherwise affects any  
23 State or local law, to the extent that the State or local  
24 law contains a requirement that is more stringent than  
25 the applicable requirement of this section.



1       “(h) REVIEW AND EVALUATION.—The Secretary  
2 shall review and evaluate the performance of each entity  
3 that receives an award of financial assistance under this  
4 section (which may include an audit).

5       “(i) ANNUAL REPORT.—The Secretary shall submit  
6 to Congress an annual report that provides a description  
7 of—

8               “(1) actions taken under this section to achieve  
9 the purposes of this section; and

10              “(2) accomplishments as a result of such ac-  
11 tions, including energy and cost savings achieved.

12       “(j) FUNDING.—

13              “(1) AMOUNTS.—

14                      “(A) IN GENERAL.—For each of fiscal  
15 years 2021 through 2025, of the amount made  
16 available under section 422 for such fiscal year  
17 to carry out the weatherization program under  
18 this part (not including any of such amount  
19 made available for Department of Energy head-  
20 quarters training or technical assistance), not  
21 more than—

22                              “(i) 2 percent of such amount (if such  
23 amount is \$225,000,000 or more but less  
24 than \$260,000,000) may be used to carry  
25 out this section;

1                   “(ii) 4 percent of such amount (if  
2                   such amount is \$260,000,000 or more but  
3                   less than \$300,000,000) may be used to  
4                   carry out this section; and

5                   “(iii) 6 percent of such amount (if  
6                   such amount is \$300,000,000 or more)  
7                   may be used to carry out this section.

8                   “(B) MINIMUM.—For each of fiscal years  
9                   2021 through 2025, if the amount made avail-  
10                  able under section 422 (not including any of  
11                  such amount made available for Department of  
12                  Energy headquarters training or technical as-  
13                  sistance) for such fiscal year is less than  
14                  \$225,000,000, no funds shall be made available  
15                  to carry out this section.

16                  “(2) LIMITATION.—For any fiscal year, the  
17                  Secretary may not use more than \$25,000,000 of  
18                  the amount made available under section 422 to  
19                  carry out this section.

20                  “(k) TERMINATION.—The Secretary may not award  
21                  financial assistance under this section after September 30,  
22                  2025.”.

23                  (2) TABLE OF CONTENTS.—The table of con-  
24                  tents for the Energy Conservation and Production

1 Act is amended by inserting after the item relating  
2 to section 414C the following:

“Sec. 414D. Financial assistance for WAP enhancement and innovation.”.

3 (f) **HIRING.**—

4 (1) **IN GENERAL.**—The Energy Conservation  
5 and Production Act is amended by inserting after  
6 section 414D (as added by subsection (e) of this sec-  
7 tion) the following:

8 **“SEC. 414E. HIRING.**

9 “The Secretary may, as the Secretary determines ap-  
10 propriate, encourage entities receiving funding from the  
11 Federal Government or from a State through a weather-  
12 ization program under section 413 or section 414, to  
13 prioritize the hiring and retention of employees who are  
14 individuals described in section 414D(a)(5).”.

15 (2) **TABLE OF CONTENTS.**—The table of con-  
16 tents for the Energy Conservation and Production  
17 Act is amended by inserting after the item relating  
18 to section 414D the following:

“Sec. 414E. Hiring.”.

19 (g) **INCREASE IN ADMINISTRATIVE FUNDS.**—Section  
20 415(a)(1) of the Energy Conservation and Production Act  
21 (42 U.S.C. 6865(a)(1)) is amended by striking “10 per-  
22 cent” and inserting “15 percent”.

23 (h) **AMENDING RE-WEATHERIZATION DATE.**—Para-  
24 graph (2) of section 415(c) of the Energy Conservation

1 and Production Act (42 U.S.C. 6865(c)) is amended to  
2 read as follows:

3       “(2) Dwelling units weatherized (including dwelling  
4 units partially weatherized) under this part, or under  
5 other Federal programs (in this paragraph referred to as  
6 ‘previous weatherization’), may not receive further finan-  
7 cial assistance for weatherization under this part until the  
8 date that is 15 years after the date such previous weather-  
9 ization was completed. This paragraph does not preclude  
10 dwelling units that have received previous weatherization  
11 from receiving assistance and services (including the provi-  
12 sion of information and education to assist with energy  
13 management and evaluation of the effectiveness of in-  
14 stalled weatherization materials) other than weatheriza-  
15 tion under this part or under other Federal programs, or  
16 from receiving non-Federal assistance for weatheriza-  
17 tion.”.

18       (i) ANNUAL REPORT.—Section 421 of the Energy  
19 Conservation and Production Act (42 U.S.C. 6871) is  
20 amended by inserting “the number of multifamily build-  
21 ings in which individual dwelling units were weatherized  
22 during the previous year, the number of individual dwell-  
23 ing units in multifamily buildings weatherized during the  
24 previous year,” after “the average size of the dwellings  
25 being weatherized,”.

1           (j) REPORT ON WAIVERS.—Not later than 180 days  
2 after the date of enactment of this Act, the Secretary of  
3 Energy shall submit to Congress a report on the status  
4 of any request made after September 30, 2010, for a waiv-  
5 er of any requirement under section 200.313 of title 2,  
6 Code of Federal Regulations, as such requirement applies  
7 with respect to the weatherization assistance program  
8 under part A of title IV of the Energy Conservation and  
9 Production Act (42 U.S.C. 6861 et seq.), including a de-  
10 scription of any such waiver that has been granted and  
11 any such request for a waiver that has been considered  
12 but not granted.

13 **SEC. 1012. FEDERAL ENERGY MANAGEMENT PROGRAM.**

14           Section 543 of the National Energy Conservation  
15 Policy Act (42 U.S.C. 8253) is further amended by adding  
16 at the end the following:

17           “(i) FEDERAL ENERGY MANAGEMENT PROGRAM.—

18                   “(1) IN GENERAL.—The Secretary shall carry  
19 out a program, to be known as the ‘Federal Energy  
20 Management Program’ (referred to in this sub-  
21 section as the ‘Program’), to facilitate the implemen-  
22 tation by the Federal Government of cost-effective  
23 energy and water management and energy-related  
24 investment practices—

1           “(A) to coordinate and strengthen Federal  
2 energy and water resilience; and

3           “(B) to promote environmental steward-  
4 ship.

5           “(2) FEDERAL DIRECTOR.—The Secretary shall  
6 appoint an individual to serve as the director of the  
7 Program (referred to in this subsection as the ‘Fed-  
8 eral Director’), which shall be a career position in  
9 the Senior Executive service, to administer the Pro-  
10 gram.

11           “(3) PROGRAM ACTIVITIES.—

12           “(A) STRATEGIC PLANNING AND TECH-  
13 NICAL ASSISTANCE.—In administering the Pro-  
14 gram, the Federal Director shall—

15           “(i) provide technical assistance and  
16 project implementation support and guid-  
17 ance to agencies to identify, implement,  
18 procure, and track energy and water con-  
19 servation measures required under this Act  
20 and under other provisions of law;

21           “(ii) in coordination with the Admin-  
22 istrator of the General Services Adminis-  
23 tration, establish appropriate procedures,  
24 methods, and best practices for use by  
25 agencies to select, monitor, and terminate

1 contracts entered into pursuant to a utility  
2 incentive program under section 546(c)  
3 with utilities;

4 “(iii) carry out the responsibilities of  
5 the Secretary under section 801, as deter-  
6 mined appropriate by the Secretary;

7 “(iv) establish and maintain internet-  
8 based information resources and project  
9 tracking systems and tools for energy and  
10 water management;

11 “(v) coordinate comprehensive and  
12 strategic approaches to energy and water  
13 resilience planning for agencies; and

14 “(vi) establish a recognition program  
15 for Federal achievement in energy and  
16 water management, energy-related invest-  
17 ment practices, environmental stewardship,  
18 and other relevant areas, through events  
19 such as individual recognition award cere-  
20 monies and public announcements.

21 “(B) ENERGY AND WATER MANAGEMENT  
22 AND REPORTING.—In administering the Pro-  
23 gram, the Federal Director shall—

1                   “(i) track and report on the progress  
2                   of agencies in meeting the requirements of  
3                   the agency under this section;

4                   “(ii) make publicly available agency  
5                   performance data required under—

6                                 “(I) this section and sections  
7                                 544, 546, 547, and 548; and

8                                 “(II) section 203 of the Energy  
9                                 Policy Act of 2005 (42 U.S.C.  
10                                 15852);

11                               “(iii)(I) collect energy and water use  
12                               and consumption data from each agency;  
13                               and

14                               “(II) based on that data, submit to  
15                               each agency a report that will facilitate the  
16                               energy and water management, energy-re-  
17                               lated investment practices, and environ-  
18                               mental stewardship of the agency in sup-  
19                               port of Federal goals under this Act and  
20                               under other provisions of law;

21                               “(iv) carry out the responsibilities of  
22                               the Secretary under section 305 of the En-  
23                               ergy Conservation and Production Act (42  
24                               U.S.C. 6834);



1 “(v) in consultation with the Adminis-  
2 trator of the General Services Administra-  
3 tion, acting through the head of the Office  
4 of High-Performance Green Buildings, es-  
5 tablish and implement sustainable design  
6 principles for Federal facilities; and

7 “(vi) designate products that meet the  
8 highest energy conservation standards for  
9 categories not covered under the Energy  
10 Star program established under section  
11 324A of the Energy Policy and Conserva-  
12 tion Act (42 U.S.C. 6294a).

13 “(C) FEDERAL INTERAGENCY COORDINA-  
14 TION.—In administering the Program, the Fed-  
15 eral Director shall—

16 “(i) develop and implement accredited  
17 training consistent with existing Federal  
18 programs and activities—

19 “(I) relating to energy and water  
20 use, management, and resilience in  
21 Federal facilities, energy-related in-  
22 vestment practices, and environmental  
23 stewardship; and

24 “(II) that includes in-person  
25 training, internet-based programs,

1                   and national in-person training  
2                   events;

3                   “(ii) carry out the functions of the  
4                   Secretary with respect to the Interagency  
5                   Energy Management Task Force under  
6                   section 547; and

7                   “(iii) report on the implementation of  
8                   the priorities of the President, including  
9                   Executive orders, relating to energy and  
10                  water use in Federal facilities, in coordina-  
11                  tion with—

12                   “(I) the Office of Management  
13                   and Budget;

14                   “(II) the Council on Environ-  
15                   mental Quality; and

16                   “(III) any other entity, as consid-  
17                   ered necessary by the Federal Direc-  
18                   tor.

19                   “(D) FACILITY AND FLEET OPTIMIZA-  
20                   TION.—In administering the Program, the Fed-  
21                   eral Director shall develop guidance, supply as-  
22                   sistance to, and track the progress of agen-  
23                   cies—

1 “(i) in conducting portfolio-wide facil-  
2 ity energy and water resilience planning  
3 and project integration;

4 “(ii) in building new construction and  
5 major renovations to meet the sustainable  
6 design and energy and water performance  
7 standards required under this section;

8 “(iii) in developing guidelines for—

9 “(I) facility commissioning; and

10 “(II) facility operations and  
11 maintenance; and

12 “(iv) in coordination with the Admin-  
13 istrator of the General Services Adminis-  
14 tration, in meeting statutory and agency  
15 goals for Federal fleet vehicles.

16 “(4) MANAGEMENT COUNCIL.—The Federal Di-  
17 rector shall establish a management council to ad-  
18 vise the Federal Director that shall—

19 “(A) convene not less frequently than once  
20 every quarter; and

21 “(B) consist of representatives from—

22 “(i) the Council on Environmental  
23 Quality;

24 “(ii) the Office of Management and  
25 Budget; and

1                   “(iii) the Office of Federal High-Per-  
2                   formance Green Buildings in the General  
3                   Services Administration.

4                   “(5) AUTHORIZATION OF APPROPRIATIONS.—  
5                   There is authorized to be appropriated to the Sec-  
6                   retary to carry out this subsection \$36,000,000 for  
7                   each of fiscal years 2021 through 2025.”.

8 **SEC. 1013. CHP TECHNICAL ASSISTANCE PARTNERSHIP**  
9                   **PROGRAM.**

10                  (a) IN GENERAL.—Section 375 of the Energy Policy  
11                  and Conservation Act (42 U.S.C. 6345) is amended to  
12                  read as follows:

13 **“SEC. 375. CHP TECHNICAL ASSISTANCE PARTNERSHIP**  
14                  **PROGRAM.**

15                  “(a) RENAMING.—

16                         “(1) IN GENERAL.—The Clean Energy Applica-  
17                         tion Centers of the Department of Energy are reded-  
18                         ignated as the CHP Technical Assistance Partner-  
19                         ship Program (referred to in this section as the  
20                         ‘Program’).

21                         “(2) PROGRAM DESCRIPTION.—The Program  
22                         shall consist of—

23                                 “(A) the 10 regional CHP Technical As-  
24                                 sistance Partnerships in existence on the date  
25                                 of enactment of the Energy Act of 2020;

1           “(B) such other regional CHP Technical  
2 Assistance Partnerships as the Secretary may  
3 establish with consideration given to estab-  
4 lishing such partnerships in rural communities;  
5 and

6           “(C) any supporting technical activities  
7 under the Technical Partnership Program of  
8 the Advanced Manufacturing Office.

9           “(3) REFERENCES.—Any reference in any law,  
10 rule, regulation, or publication to a Combined Heat  
11 and Power Application Center or a Clean Energy  
12 Application Center shall be deemed to be a reference  
13 to the Program.

14           “(b) CHP TECHNICAL ASSISTANCE PARTNERSHIP  
15 PROGRAM.—

16           “(1) IN GENERAL.—The Program shall—

17           “(A) operate programs to encourage de-  
18 ployment of combined heat and power, waste  
19 heat to power, and efficient district energy (col-  
20 lectively referred to in this subsection as ‘CHP’)  
21 technologies by providing education and out-  
22 reach to—

23           “(i) building, industrial, and electric  
24 and natural gas utility professionals;

1                   “(ii) State and local policymakers;  
2                   and

3                   “(iii) other individuals and organiza-  
4                   tions with an interest in efficient energy  
5                   use, local or opportunity fuel use, resil-  
6                   iency, or energy security, microgrids, and  
7                   district energy; and

8                   “(B) provide project specific support to  
9                   building and industrial professionals through  
10                  economic and engineering assessments and ad-  
11                  visory activities.

12                  “(2) FUNDING FOR CERTAIN ACTIVITIES.—

13                  “(A) IN GENERAL.—The Program shall  
14                  make funds available to institutions of higher  
15                  education, research centers, and other appro-  
16                  priate institutions to ensure the continued oper-  
17                  ations and effectiveness of the regional CHP  
18                  Technical Assistance Partnerships.

19                  “(B) USE OF FUNDS.—Funds made avail-  
20                  able under subparagraph (A) may be used—

21                  “(i) to collect and distribute informa-  
22                  tional materials relevant to manufacturers,  
23                  commercial buildings, institutional facili-  
24                  ties, and Federal sites, including continued  
25                  support of the mission goals of the Depart-

1                   ment of Defense, on CHP and microgrid  
2                   technologies, including continuation and  
3                   updating of—

4                   “(I) the CHP installation data-  
5                   base;

6                   “(II) CHP technology potential  
7                   analyses;

8                   “(III) State CHP resource pages;  
9                   and

10                  “(IV) CHP Technical Assistance  
11                  Partnerships websites;

12                  “(ii) to produce and conduct work-  
13                  shops, reports, seminars, internet pro-  
14                  grams, CHP resiliency resources, and  
15                  other activities to provide education to end  
16                  users, regulators, and stakeholders in a  
17                  manner that leads to the deployment of  
18                  CHP technologies;

19                  “(iii) to provide or coordinate onsite  
20                  assessments for sites and enterprises that  
21                  may consider deployment of CHP tech-  
22                  nology, including the potential use of bio-  
23                  mass CHP systems;

24                  “(iv) to identify candidates for deploy-  
25                  ment of CHP technologies, hybrid renew-

1           able-CHP technologies, biomass CHP,  
2           microgrids, and clean energy;

3           “(v) to provide nonbiased engineering  
4           support to sites considering deployment of  
5           CHP technologies;

6           “(vi) to assist organizations and com-  
7           munities, including rural communities, de-  
8           veloping clean energy technologies and  
9           policies in overcoming barriers to deploy-  
10          ment; and

11          “(vii) to assist companies, commu-  
12          nities (including rural communities), and  
13          organizations with field validation and per-  
14          formance evaluations of CHP and other  
15          clean energy technologies implemented.

16          “(C) DURATION.—The Program shall  
17          make funds available under subparagraph (A)  
18          for a period of 5 years.

19          “(c) AUTHORIZATION OF APPROPRIATIONS.—There  
20          are authorized to be appropriated to carry out this section  
21          \$12,000,000 for each of fiscal years 2021 through 2025.”.

22          (b) CONFORMING AMENDMENT.—The table of con-  
23          tents of the Energy Policy and Conservation Act is amend-  
24          ed by striking the item relating to section 375 and insert-  
25          ing the following:

“375. CHP Technical Assistance Partnership Program.”.



1 **SEC. 1014. SMART ENERGY WATER EFFICIENCY PILOT PRO-**  
2 **GRAM.**

3 (a) SMART ENERGY AND WATER EFFICIENCY PILOT  
4 PROGRAM.—Subtitle A of title IX of the Energy Policy  
5 Act of 2005 (42 U.S.C. 16191 et seq.) is amended by add-  
6 ing at the end the following:

7 **“SEC. 918. SMART ENERGY AND WATER EFFICIENCY PILOT**  
8 **PROGRAM.**

9 “(a) DEFINITIONS.—In this section:

10 “(1) ELIGIBLE ENTITY.—The term ‘eligible en-  
11 tity’ means—

12 “(A) a utility;

13 “(B) a municipality;

14 “(C) a water district;

15 “(D) an Indian Tribe or Alaska Native vil-  
16 lage; and

17 “(E) any other authority that provides  
18 water, wastewater, or water reuse services.

19 “(2) SMART ENERGY AND WATER EFFICIENCY  
20 PILOT PROGRAM.—The term ‘smart energy and  
21 water efficiency pilot program’ or ‘pilot program’  
22 means the pilot program established under sub-  
23 section (b).

24 “(b) SMART ENERGY AND WATER EFFICIENCY  
25 PILOT PROGRAM.—

1           “(1) IN GENERAL.—The Secretary shall estab-  
2           lish and carry out a smart energy and water effi-  
3           ciency pilot program in accordance with this section.

4           “(2) PURPOSE.—The purpose of the smart en-  
5           ergy and water efficiency pilot program is to award  
6           grants to eligible entities to demonstrate unique, ad-  
7           vanced, or innovative technology-based solutions that  
8           will—

9                   “(A) improve the net energy balance of  
10                  water, wastewater, and water reuse systems;

11                  “(B) improve the net energy balance of  
12                  water, wastewater, and water reuse systems to  
13                  help communities across the United States  
14                  make measurable progress in conserving water,  
15                  saving energy, and reducing costs;

16                  “(C) support the implementation of inno-  
17                  vative and unique processes and the installation  
18                  of established advanced automated systems that  
19                  provide real-time data on energy and water; and

20                  “(D) improve energy-water conservation  
21                  and quality and predictive maintenance through  
22                  technologies that utilize internet connected  
23                  technologies, including sensors, intelligent gate-  
24                  ways, and security embedded in hardware.

25           “(3) PROJECT SELECTION.—

1           “(A) IN GENERAL.—The Secretary shall  
2           make competitive, merit-reviewed grants under  
3           the pilot program to not less than 3, but not  
4           more than 5, eligible entities.

5           “(B) SELECTION CRITERIA.—In selecting  
6           an eligible entity to receive a grant under the  
7           pilot program, the Secretary shall consider—

8                   “(i) energy and cost savings;

9                   “(ii) the uniqueness, commercial via-  
10                  bility, and reliability of the technology to  
11                  be used;

12                  “(iii) the degree to which the project  
13                  integrates next-generation sensors soft-  
14                  ware, analytics, and management tools;

15                  “(iv) the anticipated cost-effectiveness  
16                  of the pilot project through measurable en-  
17                  ergy savings, water savings or reuse, and  
18                  infrastructure costs averted;

19                  “(v) whether the technology can be  
20                  deployed in a variety of geographic regions  
21                  and the degree to which the technology can  
22                  be implemented in a wide range of applica-  
23                  tions ranging in scale from small towns to  
24                  large cities, including Tribal communities;

1 “(vi) whether the technology has been  
2 successfully deployed elsewhere;

3 “(vii) whether the technology was  
4 sourced from a manufacturer based in the  
5 United States; and

6 “(viii) whether the project will be  
7 completed in 5 years or less.

8 “(C) APPLICATIONS.—

9 “(i) IN GENERAL.—Subject to clause  
10 (ii), an eligible entity seeking a grant  
11 under the pilot program shall submit to  
12 the Secretary an application at such time,  
13 in such manner, and containing such infor-  
14 mation as the Secretary determines to be  
15 necessary.

16 “(ii) CONTENTS.—An application  
17 under clause (i) shall, at a minimum, in-  
18 clude—

19 “(I) a description of the project;

20 “(II) a description of the tech-  
21 nology to be used in the project;

22 “(III) the anticipated results, in-  
23 cluding energy and water savings, of  
24 the project;

1                   “(IV) a comprehensive budget for  
2                   the project;

3                   “(V) the names of the project  
4                   lead organization and any partners;

5                   “(VI) the number of users to be  
6                   served by the project;

7                   “(VII) a description of the ways  
8                   in which the proposal would meet per-  
9                   formance measures established by the  
10                  Secretary; and

11                  “(VIII) any other information  
12                  that the Secretary determines to be  
13                  necessary to complete the review and  
14                  selection of a grant recipient.

15                  “(4) ADMINISTRATION.—

16                         “(A) IN GENERAL.—Not later than 1 year  
17                         after the date of enactment of this section, the  
18                         Secretary shall select grant recipients under  
19                         this section.

20                         “(B) EVALUATIONS.—

21                                 “(i) ANNUAL EVALUATIONS.—The  
22                                 Secretary shall annually carry out an eval-  
23                                 uation of each project for which a grant is  
24                                 provided under this section that meets per-  
25                                 formance measures and benchmarks devel-

1           oped by the Secretary, consistent with the  
2           purposes of this section.

3           “(ii)     REQUIREMENTS.—Consistent  
4           with the performance measures and bench-  
5           marks developed under clause (i), in car-  
6           rying out an evaluation under that clause,  
7           the Secretary shall—

8                     “(I) evaluate the progress and  
9                     impact of the project; and

10                    “(II) assess the degree to which  
11                    the project is meeting the goals of the  
12                    pilot program.

13           “(C)   TECHNICAL AND POLICY ASSIST-  
14           ANCE.—On the request of a grant recipient, the  
15           Secretary shall provide technical and policy as-  
16           sistance.

17           “(D)   BEST PRACTICES.—The Secretary  
18           shall make available to the public through the  
19           Internet and other means the Secretary con-  
20           siders to be appropriate—

21                    “(i) a copy of each evaluation carried  
22                    out under subparagraph (B); and

23                    “(ii) a description of any best prac-  
24                    tices identified by the Secretary as a result  
25                    of those evaluations.

1                   “(E) REPORT TO CONGRESS.—The Sec-  
2                   retary shall submit to Congress a report con-  
3                   taining the results of each evaluation carried  
4                   out under subparagraph (B).

5                   “(c) AUTHORIZATION OF APPROPRIATIONS.—There  
6                   is authorized to be appropriated to the Secretary to carry  
7                   out this section \$15,000,000, to remain available until ex-  
8                   pended.”.

9                   (b) CONFORMING AMENDMENT.—The table of con-  
10                  tents of the Energy Policy Act of 2005 (Public Law 109–  
11                  58; 119 Stat. 594) is amended by inserting after the item  
12                  relating to section 917 the following:

                  “Sec. 918. Smart energy and water efficiency pilot program.”.

## 13                   **TITLE II—NUCLEAR**

### 14                  **SEC. 2001. ADVANCED NUCLEAR FUEL AVAILABILITY.**

15                  (a) PROGRAM.—

16                   (1) ESTABLISHMENT.—The Secretary shall es-  
17                   tablish and carry out, through the Office of Nuclear  
18                   Energy, a program to support the availability of  
19                   HA–LEU for civilian domestic research, develop-  
20                   ment, demonstration, and commercial use.

21                   (2) PROGRAM ELEMENTS.—In carrying out the  
22                   program under paragraph (1), the Secretary—

23                           (A) shall develop, in consultation with the  
24                           Commission, criticality benchmark data to as-  
25                           sist the Commission in—

1 (i) the licensing and regulation of spe-  
2 cial nuclear material fuel fabrication and  
3 enrichment facilities under part 70 of title  
4 10, Code of Federal Regulations; and

5 (ii) certification of transportation  
6 packages under part 71 of title 10, Code of  
7 Federal Regulations;

8 (B) shall conduct research and develop-  
9 ment, and provide financial assistance to assist  
10 commercial entities, to design and license trans-  
11 portation packages for HA-LEU, including  
12 canisters for metal, gas, and other HA-LEU  
13 compositions;

14 (C) shall, to the extent practicable—

15 (i) by January 1, 2024, support com-  
16 mercial entity submission of such transpor-  
17 tation package designs to the Commission  
18 for certification by the Commission under  
19 part 71 of title 10, Code of Federal Regu-  
20 lations; and

21 (ii) encourage the Commission to have  
22 such transportation package designs so  
23 certified by the Commission within 24  
24 months after receipt of an application;



1           (D) shall consider options for acquiring or  
2 providing HA–LEU from a stockpile of ura-  
3 nium owned by the Department, or using en-  
4 richment technology, to make available to mem-  
5 bers of the consortium established pursuant to  
6 subparagraph (F) for commercial use or dem-  
7 onstration projects, taking into account cost  
8 and amount of time required, and prioritizing  
9 methods that would produce usable HA–LEU  
10 the quickest, including options for acquiring or  
11 providing HA–LEU—

12           (i) that—

13                   (I) directly meets the needs of an  
14 end user; and

15                   (II) has been previously used or  
16 fabricated for another purpose;

17           (ii) that meets the needs of an end  
18 user after having radioactive or other con-  
19 taminants that resulted from a previous  
20 use or fabrication of the fuel for research,  
21 development, demonstration, or deployment  
22 activities of the Department removed;

23           (iii) that is produced from high-en-  
24 riched uranium that is blended with lower

1 assay uranium to become HA-LEU to  
2 meet the needs of an end user;

3 (iv) that is produced by Department  
4 research, development, and demonstration  
5 activities;

6 (v) that is produced in the United  
7 States by—

8 (I) a United States-owned com-  
9 mercial entity operating United  
10 States-origin technology;

11 (II) a United States-owned com-  
12 mercial entity operating a foreign-ori-  
13 gin technology; or

14 (III) a foreign-owned entity oper-  
15 ating a foreign-origin technology;

16 (vi) that does not require extraction of  
17 uranium or development of uranium from  
18 lands managed by the Federal Govern-  
19 ment, cause harm to the natural or cul-  
20 tural resources of Tribal communities or  
21 sovereign Native Nations, or result in de-  
22 graded ground or surface water quality on  
23 publicly managed or privately owned lands;  
24 or

1 (vii) that does not negatively impact  
2 the availability of HA–LEU by the Depart-  
3 ment to support the production of medical  
4 isotopes, including the medical isotopes de-  
5 fined under the American Medical Isotopes  
6 Production Act of 2012 (Public Law 112–  
7 239; 126 Stat. 2211);

8 (E) not later than 1 year after the date of  
9 enactment of this Act, and biennially thereafter,  
10 shall conduct a survey of stakeholders to esti-  
11 mate the quantity of HA–LEU necessary for  
12 domestic commercial use for each of the 5 sub-  
13 sequent years;

14 (F) shall establish, and from time to time  
15 update, a consortium, which may include enti-  
16 ties involved in any stage of the nuclear fuel  
17 cycle, to partner with the Department to sup-  
18 port the availability of HA–LEU for civilian do-  
19 mestic demonstration and commercial use, in-  
20 cluding by—

21 (i) providing information to the Sec-  
22 retary for purposes of surveys conducted  
23 under subparagraph (E);

24 (ii) purchasing HA–LEU made avail-  
25 able by the Secretary to members of the

1 consortium for commercial use under the  
2 program; and

3 (iii) carrying out demonstration  
4 projects using HA–LEU provided by the  
5 Secretary under the program;

6 (G) if applicable, shall, prior to acquiring  
7 or providing HA–LEU under subparagraph  
8 (H), in coordination with the consortium estab-  
9 lished pursuant to subparagraph (F), develop a  
10 schedule for cost recovery of HA–LEU made  
11 available to members of the consortium using  
12 HA–LEU for commercial use pursuant to sub-  
13 paragraph (H);

14 (H) shall, beginning not later than 3 years  
15 after the establishment of a consortium under  
16 subparagraph (F), have the capability to ac-  
17 quire or provide HA–LEU, in order to make  
18 such HA–LEU available to members of the con-  
19 sortium beginning not later than January 1,  
20 2026, in amounts that are consistent, to the ex-  
21 tent practicable, with—

22 (i) the quantities estimated under the  
23 surveys conducted under subparagraph  
24 (E); plus

1                   (ii) the quantities necessary for dem-  
2                   onstration projects carried out under the  
3                   program, as determined by the Secretary;

4                   (I) shall, for advanced reactor demonstra-  
5                   tion projects, prioritize the provision of HA-  
6                   LEU made available under this section through  
7                   a merit-based, competitive selection process;  
8                   and

9                   (J) shall seek to ensure that the activities  
10                  carried out under this section do not cause any  
11                  delay in the progress of any HA-LEU project  
12                  between private industry and the Department  
13                  that is underway as of the date of the enact-  
14                  ment of this section.

15                  (3) APPLICABILITY OF USEC PRIVATIZATION  
16                  ACT.—

17                  (A) SALE OR TRANSFER TO CONSOR-  
18                  TIUM.—The requirements of section 3112 of  
19                  the USEC Privatization Act (42 U.S.C. 2297h-  
20                  10), except for the requirements of subpara-  
21                  graph (A) of section 3112(d)(2), shall not apply  
22                  to the provision of enrichment services, or the  
23                  sale or transfer of HA-LEU for commercial use  
24                  by the Secretary to a member of the consortium  
25                  under this subsection.

1           (B) DEMONSTRATION.—HA—LEU made  
2 available to members of the consortium estab-  
3 lished pursuant to paragraph (2)(F) for dem-  
4 onstration projects shall remain the property of  
5 and title will remain with the Department,  
6 which shall be responsible for the storage, use,  
7 and disposition of all radioactive waste and  
8 spent nuclear fuel created by the irradiation,  
9 processing, or purification of such uranium, and  
10 shall not be subject to the requirements of a  
11 sale or transfer of uranium under sections  
12 3112, except for the requirements of subpara-  
13 graph (A) of section 3112(d)(2), and 3113 of  
14 the USEC Privatization Act (42 U.S.C. 2297h–  
15 10; 42 U.S.C. 2297h–11).

16           (4) NATIONAL SECURITY NEEDS.—The Sec-  
17 retary shall only make available to a member of the  
18 consortium under this section for commercial or  
19 demonstration project use material that the Presi-  
20 dent has determined is not necessary for national se-  
21 curity needs, provided that this available material  
22 shall not include any material that the Secretary  
23 may determine to be necessary for the National Nu-  
24 clear Security Administration or other critical De-  
25 partmental missions.

1           (5) DOE ACQUISITION OF HA-LEU.—The Sec-  
2           retary may not make commitments under this sec-  
3           tion (including cooperative agreements (used in ac-  
4           cordance with section 6305 of title 31, United States  
5           Code), purchase agreements, guarantees, leases,  
6           service contracts, or any other type of commitment)  
7           for the purchase or other acquisition of HA-LEU  
8           unless—

9                   (A) funds are specifically provided for such  
10                  purposes in advance in subsequent appropria-  
11                  tions Acts, and only to the extent that the full  
12                  extent of anticipated costs stemming from such  
13                  commitments is recorded as an obligation up  
14                  front and in full at the time it is made; or

15                   (B) such committing agreement includes a  
16                  clause conditioning the Federal Government's  
17                  obligation on the availability of future year ap-  
18                  propriations.

19           (6) SUNSET.—The authority of the Secretary to  
20           carry out the program under this subsection shall  
21           expire on the earlier of—

22                   (A) September 30, 2034; or

23                   (B) 90 days after the date on which HA-  
24           LEU is available to provide a reliable and ade-

1           quate supply for civilian domestic advanced nu-  
2           clear reactors in the commercial market.

3           (7) LIMITATION.—The Secretary shall not bar-  
4           ter or otherwise sell or transfer uranium in any form  
5           in exchange for services relating to the final disposi-  
6           tion of radioactive waste from uranium that is made  
7           available under this subsection.

8           (b) REPORTS TO CONGRESS.—

9           (1) COMMISSION REPORT ON NECESSARY REGU-  
10          LATORY UPDATES.—Not later than 12 months after  
11          the date of enactment of this Act, the Commission  
12          shall submit to Congress a report that includes—

13                 (A) identification of updates to regulations,  
14                 certifications, and other regulatory policies that  
15                 the Commission determines are necessary in  
16                 order for HA–LEU to be commercially avail-  
17                 able, including—

18                         (i) guidance for material control and  
19                         accountability of special nuclear material;

20                         (ii) certifications relating to transpor-  
21                         tation packaging for HA–LEU; and

22                         (iii) licensing of enrichment, conver-  
23                         sion, and fuel fabrication facilities for HA–  
24                         LEU, and associated physical security  
25                         plans for such facilities;



1 (B) a description of such updates; and

2 (C) a timeline to complete such updates.

3 (2) DOE REPORT ON PROGRAM TO SUPPORT  
4 THE AVAILABILITY OF HA-LEU FOR CIVILIAN DO-  
5 MESTIC DEMONSTRATION AND COMMERCIAL USE.—

6 (A) IN GENERAL.—Not later than 180  
7 days after the date of enactment of this Act,  
8 the Secretary shall submit to Congress a report  
9 that describes actions proposed to be carried  
10 out by the Secretary under the program de-  
11 scribed in subsection (a)(1).

12 (B) COORDINATION AND STAKEHOLDER  
13 INPUT.—In developing the report under this  
14 paragraph, the Secretary shall consult with—

15 (i) the Commission;

16 (ii) suppliers of medical isotopes that  
17 have converted their operations to use  
18 HA-LEU;

19 (iii) the National Laboratories;

20 (iv) institutions of higher education;

21 (v) a diverse group of entities from  
22 the nuclear energy industry;

23 (vi) a diverse group of technology de-  
24 velopers;

1 (vii) experts in nuclear nonprolifera-  
2 tion, environmental safety, safeguards and  
3 security, and public health and safety; and

4 (viii) members of the consortium cre-  
5 ated under subsection (a)(2)(F).

6 (C) COST AND SCHEDULE ESTIMATES.—

7 The report under this paragraph shall include  
8 estimated costs, budgets, and timeframes for all  
9 activities carried out under this section.

10 (D) REQUIRED EVALUATIONS.—The report  
11 under this paragraph shall evaluate—

12 (i) the actions required to establish  
13 and carry out the program under sub-  
14 section (a)(1) and the cost of such actions,  
15 including with respect to—

16 (I) proposed preliminary terms  
17 for contracting between the Depart-  
18 ment and recipients of HA–LEU  
19 under the program (including guide-  
20 lines defining the roles and respon-  
21 sibilities between the Department and  
22 the recipient); and

23 (II) the potential to coordinate  
24 with recipients of HA–LEU under the  
25 program regarding—

- 1 (aa) fuel fabrication; and
- 2 (bb) fuel transport;
- 3 (ii) the potential sources and fuel
- 4 forms available to provide uranium for the
- 5 program under subsection (a)(1);
- 6 (iii) options to coordinate the program
- 7 under subsection (a)(1) with the operation
- 8 of the versatile, reactor-based fast neutron
- 9 source under section 959A of the Energy
- 10 Policy Act of 2005 (as added by section
- 11 2003);
- 12 (iv) the ability of uranium producers
- 13 to provide materials for advanced nuclear
- 14 reactor fuel;
- 15 (v) any associated legal, regulatory,
- 16 and policy issues that should be addressed
- 17 to enable—
- 18 (I) implementation of the pro-
- 19 gram under subsection (a)(1); and
- 20 (II) the establishment of an in-
- 21 dustry capable of providing HA-LEU;
- 22 and
- 23 (vi) any research and development
- 24 plans to develop criticality benchmark data
- 25 under subsection (a)(2)(A), if needed.

1           (3) ALTERNATE FUELS REPORT.—Not later  
2 than 180 days after the date of enactment of this  
3 Act, the Secretary shall, after consulting with rel-  
4 evant entities, including National Laboratories, insti-  
5 tutions of higher education, and technology devel-  
6 opers, submit to Congress a report identifying any  
7 and all options for providing nuclear material, con-  
8 taining isotopes other than the uranium-235 isotope,  
9 such as uranium-233 and thorium-232 to be used as  
10 fuel for advanced nuclear reactor research, develop-  
11 ment, demonstration, or commercial application pur-  
12 poses.

13       (c) AUTHORIZATION OF APPROPRIATIONS.—There  
14 are authorized to be appropriated to carry out research,  
15 development, demonstration, and transportation activities  
16 in this section—

- 17           (1) \$31,500,000 for fiscal year 2021;  
18           (2) \$33,075,000 for fiscal year 2022;  
19           (3) \$34,728,750 for fiscal year 2023;  
20           (4) \$36,465,188 for fiscal year 2024; and  
21           (5) \$38,288,447 for fiscal year 2025.

22       (d) DEFINITIONS.—In this section:

- 23           (1) COMMISSION.—The term “Commission”  
24 means the Nuclear Regulatory Commission.

1           (2) DEMONSTRATION PROJECT.—The term  
2           “demonstration project” has the meaning given such  
3           term in section 959A of the Energy Policy Act of  
4           2005.

5           (3) HA-LEU.—The term “HA-LEU” means  
6           high-assay low-enriched uranium.

7           (4) HIGH-ASSAY LOW-ENRICHED URANIUM.—  
8           The term “high-assay low-enriched uranium” means  
9           uranium having an assay greater than 5.0 weight  
10          percent and less than 20.0 weight percent of the  
11          uranium-235 isotope.

12          (5) HIGH-ENRICHED URANIUM.—The term  
13          “high-enriched uranium” means uranium with an  
14          assay of 20.0 weight percent or more of the ura-  
15          nium-235 isotope.

16          (6) SECRETARY.—The term “Secretary” means  
17          the Secretary of Energy.

18 **SEC. 2002. AMENDMENTS TO DEFINITIONS IN ENERGY POL-**

19 **ICY ACT OF 2005.**

20          Section 951(b)(1) of the Energy Policy Act of 2005  
21 (42 U.S.C. 16271(b)(1)) is amended to read as follows:

22           “(1) ADVANCED NUCLEAR REACTOR.—The  
23           term ‘advanced nuclear reactor’ means—

24                   “(A) a nuclear fission reactor, including a  
25                   prototype plant (as defined in sections 50.2 and

1           52.1 of title 10, Code of Federal Regulations  
2           (or successor regulations)), with significant im-  
3           provements compared to reactors operating on  
4           the date of enactment of the Energy Act of  
5           2020, including improvements such as—

6                   “(i) additional inherent safety fea-  
7                   tures;

8                   “(ii) lower waste yields;

9                   “(iii) improved fuel and material per-  
10                  formance;

11                  “(iv) increased tolerance to loss of  
12                  fuel cooling;

13                  “(v) enhanced reliability or improved  
14                  resilience;

15                  “(vi) increased proliferation resist-  
16                  ance;

17                  “(vii) increased thermal efficiency;

18                  “(viii) reduced consumption of cooling  
19                  water and other environmental impacts;

20                  “(ix) the ability to integrate into elec-  
21                  tric applications and nonelectric applica-  
22                  tions;

23                  “(x) modular sizes to allow for deploy-  
24                  ment that corresponds with the demand  
25                  for electricity or process heat; and

1                   “(xi) operational flexibility to respond  
2                   to changes in demand for electricity or  
3                   process heat and to complement integra-  
4                   tion with intermittent renewable energy or  
5                   energy storage; and  
6                   “(B) a fusion reactor.”.

7 **SEC. 2003. NUCLEAR ENERGY RESEARCH, DEVELOPMENT,**  
8 **DEMONSTRATION, AND COMMERCIAL APPLI-**  
9 **CATION PROGRAMS.**

10           (a) REACTOR CONCEPTS RESEARCH, DEVELOPMENT,  
11 AND DEMONSTRATION.—Section 952 of the Energy Policy  
12 Act of 2005 (42 U.S.C. 16272) is amended to read as  
13 follows:

14 **“SEC. 952. REACTOR CONCEPTS RESEARCH, DEVELOP-**  
15 **MENT, DEMONSTRATION, AND COMMERCIAL**  
16 **APPLICATION.**

17           “(a) SUSTAINABILITY PROGRAM FOR LIGHT WATER  
18 REACTORS.—

19                   “(1) IN GENERAL.—The Secretary shall carry  
20                   out a program of research, development, demonstra-  
21                   tion, and commercial application, including through  
22                   the use of modeling and simulation, to support exist-  
23                   ing operating nuclear power plants which shall ad-  
24                   dress technologies to modernize and improve, with  
25                   respect to such plants—

1 “(A) reliability;

2 “(B) capacity;

3 “(C) component aging;

4 “(D) safety;

5 “(E) physical security and security costs;

6 “(F) plant lifetime;

7 “(G) operations and maintenance costs, in-  
8 cluding by utilizing risk-informed systems anal-  
9 ysis;

10 “(H) the ability for plants to operate flexi-  
11 bly;

12 “(I) nuclear integrated energy system ap-  
13 plications described in subsection (c);

14 “(J) efficiency;

15 “(K) environmental impacts; and

16 “(L) resilience.

17 “(2) AUTHORIZATION OF APPROPRIATIONS.—

18 There are authorized to be appropriated to the Sec-  
19 retary to carry out the program under this sub-  
20 section \$55,000,000 for each of fiscal years 2021  
21 through 2025.

22 “(3) REPORT.—The Secretary shall submit an-  
23 nually a public report to the Committee on Science,  
24 Space, and Technology of the House of Representa-  
25 tives and the Committee on Energy and Natural Re-



1 sources of the Senate documenting funds spent  
2 under the program that describes program activities,  
3 objectives, and outcomes, including those that could  
4 benefit the entirety of the existing reactor fleet, such  
5 as with respect to aging management and related  
6 sustainability concerns, and identifying funds award-  
7 ed to private entities.

8 “(b) ADVANCED REACTOR TECHNOLOGIES.—

9 “(1) IN GENERAL.—The Secretary shall carry  
10 out a program of research, development, demonstra-  
11 tion, and commercial application to support ad-  
12 vanced reactor technologies.

13 “(2) REQUIREMENTS.—In carrying out the pro-  
14 gram under this subsection, the Secretary shall—

15 “(A) prioritize designs for advanced nu-  
16 clear reactors that are proliferation resistant  
17 and passively safe, including designs that, com-  
18 pared to reactors operating on the date of en-  
19 actment of the Energy Act of 2020—

20 “(i) are economically competitive with  
21 other electric power generation plants;

22 “(ii) have higher efficiency, lower cost,  
23 less environmental impacts, increased resil-  
24 ience, and improved safety;

1                   “(iii) use fuels that are proliferation  
2                   resistant and have reduced production of  
3                   high-level waste per unit of output; and

4                   “(iv) use advanced instrumentation  
5                   and monitoring systems;

6                   “(B) consult with the Nuclear Regulatory  
7                   Commission on appropriate metrics to consider  
8                   for the criteria specified in subparagraph (A);

9                   “(C) support research and development to  
10                  resolve materials challenges relating to extreme  
11                  environments, including environments that con-  
12                  tain high levels of—

13                   “(i) radiation fluence;

14                   “(ii) temperature;

15                   “(iii) pressure; and

16                   “(iv) corrosion;

17                  “(D) support research and development to  
18                  aid in the qualification of advanced fuels, in-  
19                  cluding fabrication techniques;

20                  “(E) support activities that address near-  
21                  term challenges in modeling and simulation to  
22                  enable accelerated design of and licensing of ad-  
23                  vanced nuclear reactors, including the identi-  
24                  fication of tools and methodologies for vali-  
25                  dating such modeling and simulation efforts;

1           “(F) develop technologies, including tech-  
2           nologies to manage, reduce, or reuse nuclear  
3           waste;

4           “(G) ensure that nuclear research infra-  
5           structure is maintained or constructed, includ-  
6           ing—

7                   “(i) currently operational research re-  
8                   actors at the National Laboratories and in-  
9                   stitutions of higher education;

10                   “(ii) hot cell research facilities;

11                   “(iii) a versatile fast neutron source;

12                   and

13                   “(iv) advanced coolant testing facili-  
14                   ties, including coolants such as lead, so-  
15                   dium, gas, and molten salt;

16           “(H) improve scientific understanding of  
17           nonlight water coolant physics and chemistry;

18           “(I) develop advanced sensors and control  
19           systems, including the identification of tools  
20           and methodologies for validating such sensors  
21           and systems;

22           “(J) investigate advanced manufacturing  
23           and advanced construction techniques and ma-  
24           terials to reduce the cost of advanced nuclear  
25           reactors, including the use of digital twins and

1 of strategies to implement project and construc-  
2 tion management best practices, and study the  
3 effects of radiation and corrosion on materials  
4 created with these techniques;

5 “(K) consult with the Administrator of the  
6 National Nuclear Security Administration to in-  
7 tegrate reactor safeguards and security into de-  
8 sign;

9 “(L) support efforts to reduce any tech-  
10 nical barriers that would prevent commercial  
11 application of advanced nuclear energy systems;  
12 and

13 “(M) develop various safety analyses and  
14 emergency preparedness and response meth-  
15 odologies.

16 “(3) COORDINATION.—The Secretary shall co-  
17 ordinate with individuals engaged in the private sec-  
18 tor and individuals who are experts in nuclear non-  
19 proliferation, environmental and public health and  
20 safety, and economics to advance the development of  
21 various designs of advanced nuclear reactors. In car-  
22 rying out this paragraph, the Secretary shall con-  
23 vene an advisory committee of such individuals and  
24 such committee shall submit annually a report to the

1 relevant committees of Congress with respect to the  
2 progress of the program.

3 “(4) AUTHORIZATION OF APPROPRIATIONS.—

4 There are authorized to be appropriated to the Sec-  
5 retary to carry out the program under this sub-  
6 section \$55,000,000 for each of fiscal years 2021  
7 through 2025.

8 “(c) NUCLEAR INTEGRATED ENERGY SYSTEMS RE-  
9 SEARCH, DEVELOPMENT, DEMONSTRATION, AND COM-  
10 Mercial APPLICATION PROGRAM.—

11 “(1) IN GENERAL.—The Secretary shall carry  
12 out a program of research, development, demonstra-  
13 tion, and commercial application to develop nuclear  
14 integrated energy systems, composed of 2 or more  
15 co-located or jointly operated subsystems of energy  
16 generation, energy storage, or other technologies and  
17 in which not less than 1 such subsystem is a nuclear  
18 energy system, to—

19 “(A) reduce greenhouse gas emissions in  
20 both the power and nonpower sectors; and

21 “(B) maximize energy production and effi-  
22 ciency.

23 “(2) COORDINATION.—In carrying out the pro-  
24 gram under paragraph (1), the Secretary shall co-  
25 ordinate with—

1           “(A) relevant program offices within the  
2           Department of Energy;

3           “(B) National Laboratories;

4           “(C) institutions of higher education; and

5           “(D) the private sector.

6           “(3) FOCUS AREAS.—The program under para-  
7           graph (1) may include research, development, dem-  
8           onstration, or commercial application of nuclear in-  
9           tegrated energy systems with respect to—

10           “(A) desalination technologies and proc-  
11           esses;

12           “(B) hydrogen or other liquid and gaseous  
13           fuel or chemical production;

14           “(C) heat for industrial processes;

15           “(D) district heating;

16           “(E) heat or electricity generation and  
17           storage;

18           “(F) carbon capture, use, utilization, and  
19           storage;

20           “(G) microgrid or island applications;

21           “(H) integrated systems modeling, anal-  
22           ysis, and optimization, inclusive of different  
23           configurations of integrated energy systems;  
24           and

1           “(I) integrated design, planning, building,  
2           and operation of systems with existing infra-  
3           structure, including interconnection require-  
4           ments with the electric grid, as appropriate.

5           “(4) AUTHORIZATION OF APPROPRIATIONS.—  
6           There are authorized to be appropriated to the Sec-  
7           retary to carry out the program under this sub-  
8           section—

9                   “(A) \$20,000,000 for fiscal year 2021;

10                   “(B) \$30,000,000 for fiscal year 2022;

11                   “(C) \$30,000,000 for fiscal year 2023;

12                   “(D) \$40,000,000 for fiscal year 2024;

13                   and

14                   “(E) \$40,000,000 for fiscal year 2025.”.

15           (b) FUEL CYCLE RESEARCH AND DEVELOPMENT.—  
16           Section 953 of the Energy Policy Act of 2005 (42 U.S.C.  
17           16273) is amended to read as follows:

18           **“SEC. 953. FUEL CYCLE RESEARCH, DEVELOPMENT, DEM-**  
19                   **ONSTRATION, AND COMMERCIAL APPLICA-**  
20                   **TION.**

21           “(a) USED NUCLEAR FUEL RESEARCH, DEVELOP-  
22           MENT, DEMONSTRATION, AND COMMERCIAL APPLICA-  
23           TION.—

24                   “(1) IN GENERAL.—The Secretary shall con-  
25           duct an advanced fuel cycle research, development,

1 demonstration, and commercial application program  
2 to improve fuel cycle performance, minimize environ-  
3 mental and public health and safety impacts, and  
4 support a variety of options for used nuclear fuel  
5 storage, use, and disposal, including advanced nu-  
6 clear reactor and non-reactor concepts (such as radi-  
7 oisotope power systems), which may include—

8 “(A) dry cask storage;

9 “(B) consolidated interim storage;

10 “(C) deep geological storage and disposal,  
11 including mined repository, and other tech-  
12 nologies;

13 “(D) used nuclear fuel transportation;

14 “(E) integrated waste management sys-  
15 tems;

16 “(F) vitrification;

17 “(G) fuel recycling and transmutation  
18 technologies, including advanced reprocessing  
19 technologies such as electrochemical and molten  
20 salt technologies, and advanced redox extraction  
21 technologies;

22 “(H) advanced materials to be used in sub-  
23 paragraphs (A) through (G); and

24 “(I) other areas as determined by the Sec-  
25 retary.



1           “(2) REQUIREMENTS.—In carrying out the pro-  
2           gram under this subsection, the Secretary shall—

3                   “(A) ensure all activities and designs in-  
4                   corporate state of the art safeguards tech-  
5                   nologies and techniques to reduce risk of pro-  
6                   liferation;

7                   “(B) consult with the Administrator of the  
8                   National Nuclear Security Administration to in-  
9                   tegrate safeguards and security by design;

10                   “(C) consider the potential benefits and  
11                   other impacts of those activities for civilian nu-  
12                   clear applications, environmental health and  
13                   safety, and national security, including consid-  
14                   eration of public consent; and

15                   “(D) consider the economic viability of all  
16                   activities and designs.

17           “(3) AUTHORIZATION OF APPROPRIATIONS.—  
18           There are authorized to be appropriated to the Sec-  
19           retary to carry out the program under this sub-  
20           section \$60,000,000 for each of fiscal years 2021  
21           through 2025.

22           “(b) ADVANCED FUELS.—

23                   “(1) IN GENERAL.—The Secretary shall con-  
24                   duct an advanced fuels research, development, dem-  
25                   onstration, and commercial application program on

1 next-generation light water reactor and advanced re-  
2 actor fuels that demonstrate the potential for im-  
3 proved—

4 “(A) performance;

5 “(B) accident tolerance;

6 “(C) proliferation resistance;

7 “(D) use of resources;

8 “(E) environmental impact; and

9 “(F) economics.

10 “(2) REQUIREMENTS.—In carrying out the pro-  
11 gram under this subsection, the Secretary shall focus  
12 on the development of advanced technology fuels, in-  
13 cluding fabrication techniques, that offer improved  
14 accident-tolerance and economic performance with  
15 the goal of initial commercial application by Decem-  
16 ber 31, 2025.

17 “(3) REPORT.—Not later than 180 days after  
18 the date of enactment of this section, the Secretary  
19 shall submit to the Committee on Science, Space,  
20 and Technology of the House of Representatives and  
21 the Committee on Energy and Natural Resources of  
22 the Senate a report that describes how the tech-  
23 nologies and concepts studied under this program  
24 would impact reactor economics, the fuel cycle, oper-  
25 ations, safety, proliferation, and the environment.

1           “(4) AUTHORIZATION OF APPROPRIATIONS.—  
2           There are authorized to be appropriated to the Sec-  
3           retary to carry out the program under this sub-  
4           section \$125,000,000 for each of fiscal years 2021  
5           through 2025.”.

6           (c) NUCLEAR SCIENCE AND ENGINEERING SUP-  
7           PORT.—Section 954 of the Energy Policy Act of 2005 (42  
8           U.S.C. 16274) is amended—

9           (1) in the section heading, by striking “**UNI-**  
10           **VERSITY NUCLEAR**” and inserting “**NUCLEAR**”;

11           (2) in subsection (b)—

12           (A) in the matter preceding paragraph (1),  
13           by striking “this section” and inserting “this  
14           subsection”; and

15           (B) by redesignating paragraphs (1)  
16           through (5) as subparagraphs (A) through (E),  
17           respectively, and indenting appropriately;

18           (3) in subsection (c), by redesignating para-  
19           graphs (1) and (2) as subparagraphs (A) and (B),  
20           respectively, and indenting appropriately;

21           (4) in subsection (d)—

22           (A) in the matter preceding paragraph (1),  
23           by striking “this section” and inserting “this  
24           subsection”; and

1 (B) by redesignating paragraphs (1)  
2 through (4) as subparagraphs (A) through (D),  
3 respectively, and indenting appropriately;

4 (5) in subsection (e), by striking “this section”  
5 and inserting “this subsection”;

6 (6) in subsection (f)—

7 (A) by striking “this section” and inserting  
8 “this subsection”; and

9 (B) by striking “subsection (b)(2)” and in-  
10 serting “paragraph (2)(B)”;

11 (7) by redesignating subsections (a) through (d)  
12 as paragraphs (1) through (4), respectively, and in-  
13 denting appropriately;

14 (8) by redesignating subsections (e) and (f) as  
15 paragraphs (7) and (8), respectively;

16 (9) by inserting after paragraph (4) (as so re-  
17 designated) the following:

18 “(5) RADIOLOGICAL FACILITIES MANAGE-  
19 MENT.—

20 “(A) IN GENERAL.—The Secretary shall  
21 carry out a program under which the Secretary  
22 shall provide project management, technical  
23 support, quality engineering and inspection, and  
24 nuclear material handling support to research  
25 reactors located at universities.

1           “(B) AUTHORIZATION OF APPROPRIA-  
2           TIONS.—Of any amounts appropriated to carry  
3           out the program under this subsection, there  
4           are authorized to be appropriated to the Sec-  
5           retary to carry out the program under this  
6           paragraph \$20,000,000 for each of fiscal years  
7           2021 through 2025.

8           “(6) NUCLEAR ENERGY UNIVERSITY PRO-  
9           GRAM.—In carrying out the programs under this  
10          section, the Department shall, to the maximum ex-  
11          tent practicable, allocate 20 percent of funds appro-  
12          priated to nuclear energy research and development  
13          programs annually to fund university-led research  
14          and university infrastructure projects through an  
15          open, competitive solicitation process.”;

16          (10) by inserting before paragraph (1) (as so  
17          redesignated) the following:

18          “(a) UNIVERSITY NUCLEAR SCIENCE AND ENGI-  
19          NEERING SUPPORT.—”; and

20          (11) by adding at the end the following:

21          “(b) NUCLEAR ENERGY GRADUATE TRAINEESHIP  
22          SUBPROGRAM.—

23          “(1) ESTABLISHMENT.—In carrying out the  
24          program under subsection (a), the Secretary shall  
25          establish a nuclear energy graduate traineeship sub-

1 program under which the Secretary shall competi-  
2 tively award graduate traineeships in coordination  
3 with universities to provide focused, advanced train-  
4 ing to meet critical mission needs of the Depart-  
5 ment, including in industries that are represented by  
6 skilled labor unions.

7 “(2) REQUIREMENTS.—In carrying out the sub-  
8 program under this subsection, the Secretary shall—

9 “(A) encourage appropriate partnerships  
10 among National Laboratories, affected univer-  
11 sities, and industry; and

12 “(B) on an annual basis, evaluate the  
13 needs of the nuclear energy community to im-  
14 plement graduate traineeships for focused top-  
15 ical areas addressing mission-specific workforce  
16 needs.

17 “(3) AUTHORIZATION OF APPROPRIATIONS.—  
18 There are authorized to be appropriated to the Sec-  
19 retary to carry out the subprogram under this sub-  
20 section \$5,000,000 for each of fiscal years 2021  
21 through 2025.”.

22 (d) CONFORMING AMENDMENT.—The table of con-  
23 tents of the Energy Policy Act of 2005 (Public Law 109–  
24 58; 119 Stat. 600) is amended by striking the items relat-

1 ing to sections 952 through 954 and inserting the fol-  
2 lowing:

“Sec. 952. Reactor concepts research, development, demonstration, and commercial application.

“Sec. 953. Fuel cycle research, development, demonstration, and commercial application.

“Sec. 954. Nuclear science and engineering support.”.

3 (e) UNIVERSITY NUCLEAR LEADERSHIP PRO-  
4 GRAM.—Section 313 of the Omnibus Appropriations Act,  
5 2009 (42 U.S.C. 16274a), is amended to read as follows:

6 **“SEC. 313. UNIVERSITY NUCLEAR LEADERSHIP PROGRAM.**

7 “(a) IN GENERAL.—The Secretary of Energy, the  
8 Administrator of the National Nuclear Security Adminis-  
9 tration, and the Chairman of the Nuclear Regulatory  
10 Commission shall jointly establish a program, to be known  
11 as the ‘University Nuclear Leadership Program’.

12 “(b) USE OF FUNDS.—

13 “(1) IN GENERAL.—Except as provided in para-  
14 graph (2), amounts made available to carry out the  
15 Program shall be used to provide financial assistance  
16 for scholarships, fellowships, and research and devel-  
17 opment projects at institutions of higher education  
18 in areas relevant to the programmatic mission of the  
19 applicable Federal agency, with an emphasis on pro-  
20 viding the financial assistance with respect to re-  
21 search, development, demonstration, and commercial  
22 application activities relevant to civilian advanced  
23 nuclear reactors including, but not limited to—

1                   “(A) relevant fuel cycle technologies;

2                   “(B) project management; and

3                   “(C) advanced construction, manufac-  
4                   turing, and fabrication methods.

5                   “(2) EXCEPTION.—Notwithstanding paragraph  
6                   (1), amounts made available to carry out the Pro-  
7                   gram may be used to provide financial assistance for  
8                   a scholarship, fellowship, or multiyear research and  
9                   development project that does not align directly with  
10                  a programmatic mission of the Department of En-  
11                  ergy, if the activity for which assistance is provided  
12                  would facilitate the maintenance of the discipline of  
13                  nuclear science or engineering.

14                  “(c) DEFINITIONS.—In this section:

15                  “(1) ADVANCED NUCLEAR REACTOR; INSTITU-  
16                  TION OF HIGHER EDUCATION.—The terms ‘advanced  
17                  nuclear reactor’ and ‘institution of higher education’  
18                  have the meanings given those terms in section 951  
19                  of the Energy Policy Act of 2005 (42 U.S.C.  
20                  16271).

21                  “(2) PROGRAM.—The term ‘Program’ means  
22                  the University Nuclear Leadership Program estab-  
23                  lished under this section.



1       “(d) AUTHORIZATION OF APPROPRIATIONS.—There  
2 are authorized to be appropriated to carry out the Pro-  
3 gram for each of fiscal years 2021 through 2025—

4           “(1) \$30,000,000 to the Secretary of Energy,  
5 of which \$15,000,000 shall be for use by the Admin-  
6 istrator of the National Nuclear Security Adminis-  
7 tration; and

8           “(2) \$15,000,000 to the Nuclear Regulatory  
9 Commission.”.

10       (f) NUCLEAR ENERGY RESEARCH INFRASTRUC-  
11 TURE.—Section 955 of the Energy Policy Act of 2005 (42  
12 U.S.C. 16275) is amended—

13           (1) in subsection (c), paragraph (1)—

14               (A) in the paragraph heading, by striking  
15 “MISSION NEED” and inserting “AUTHORIZA-  
16 TION”; and

17               (B) in subparagraph (A), by striking “de-  
18 termine the mission need” and inserting “pro-  
19 vide”;

20           (2) by adding at the end of subsection (c) the  
21 following:

22           “(7) AUTHORIZATION OF APPROPRIATIONS.—  
23 There are authorized to be appropriated to the Sec-  
24 retary to carry out to completion the construction of  
25 the facility under this section—

1                   “(A) \$295,000,000 for fiscal year 2021;  
2                   “(B) \$348,000,000 for fiscal year 2022;  
3                   “(C) \$525,000,000 for fiscal year 2023;  
4                   “(D) \$534,000,000 for fiscal year 2024;  
5                   and  
6                   “(E) \$584,000,000 for fiscal year 2025.”.

7                   (3) in subsection (c) paragraph (4), by striking  
8                   “2025” and inserting “2026”; and  
9                   (4) by adding at the end the following:  
10                  “(d) GATEWAY FOR ACCELERATED INNOVATION IN  
11 NUCLEAR.—

12                  “(1) IN GENERAL.—In carrying out the pro-  
13 grams under this subtitle, the Secretary is author-  
14 ized to establish a new initiative to be known as the  
15 Gateway for Accelerated Innovation in Nuclear  
16 (GAIN). The initiative shall, to the maximum extent  
17 practicable and consistent with national security,  
18 provide the nuclear energy industry with access to  
19 cutting edge research and development along with  
20 the technical, regulatory, and financial support nec-  
21 essary to move innovative nuclear energy tech-  
22 nologies toward commercialization in an accelerated  
23 and cost-effective fashion. The Secretary shall make  
24 available, as a minimum—

1           “(A) experimental capabilities and testing  
2 facilities;

3           “(B) computational capabilities, modeling,  
4 and simulation tools;

5           “(C) access to existing datasets and data  
6 validation tools; and

7           “(D) technical assistance with guidance or  
8 processes as needed.

9           “(2) SELECTION.—

10           “(A) IN GENERAL.—The Secretary shall  
11 select industry partners for awards on a com-  
12 petitive merit-reviewed basis.

13           “(B) CONSIDERATIONS.—In selecting in-  
14 dustry partners under subparagraph (A), the  
15 Secretary shall consider—

16           “(i) the information disclosed by the  
17 Department as described in paragraph (1);  
18 and

19           “(ii) any existing facilities the Depart-  
20 ment will provide for public private part-  
21 nership activities.”.

22           (g) ADVANCED REACTOR DEMONSTRATION PRO-  
23 GRAM.—

1           (1) IN GENERAL.—Subtitle E of title IX of the  
2       Energy Policy Act of 2005 (42 U.S.C. 16271 et  
3       seq.) is amended by adding at the end the following:

4   **“SEC. 959A. ADVANCED REACTOR DEMONSTRATION PRO-**  
5                                   **GRAM.**

6           “(a) DEMONSTRATION PROJECT DEFINED.—For the  
7       purposes of this section, the term ‘demonstration project’  
8       means an advanced nuclear reactor operated in any man-  
9       ner, including as part of the power generation facilities  
10      of an electric utility system, for the purpose of dem-  
11      onstrating the suitability for commercial application of the  
12      advanced nuclear reactor.

13          “(b) ESTABLISHMENT.—The Secretary shall estab-  
14      lish a program to advance the research, development, dem-  
15      onstration, and commercial application of domestic ad-  
16      vanced, affordable, nuclear energy technologies by—

17                           “(1) demonstrating a variety of advanced nu-  
18      clear reactor technologies, including those that could  
19      be used to produce—

20   “(A) safer, emissions-free power at a com-  
21   petitive cost of electricity compared to other  
22   new energy generation technologies on the date  
23   of enactment of the Energy Act of 2020;

1           “(B) heat for community heating, indus-  
2           trial purposes, heat storage, or synthetic fuel  
3           production;

4           “(C) remote or off-grid energy supply; or

5           “(D) backup or mission-critical power sup-  
6           plies;

7           “(2) identifying research areas that the private  
8           sector is unable or unwilling to undertake due to the  
9           cost of, or risks associated with, the research; and

10          “(3) facilitating the access of the private sec-  
11          tor—

12                 “(A) to Federal research facilities and per-  
13                 sonnel; and

14                 “(B) to the results of research relating to  
15                 civil nuclear technology funded by the Federal  
16                 Government.

17          “(c) DEMONSTRATION PROJECTS.—In carrying out  
18          demonstration projects under the program established in  
19          subsection (b), the Secretary shall—

20                 “(1) include, as an evaluation criterion, diver-  
21                 sity in designs for the advanced nuclear reactors  
22                 demonstrated under this section, including designs  
23                 using various—

24                         “(A) primary coolants;

25                         “(B) fuel types and compositions; and

1 “(C) neutron spectra;

2 “(2) consider, as evaluation criteria—

3 “(A) the likelihood that the operating cost  
4 for future commercial units for each design im-  
5 plemented through a demonstration project  
6 under this subsection is cost-competitive in the  
7 applicable market, including those designs con-  
8 figured as integrated energy systems as de-  
9 scribed in section 952(c);

10 “(B) the technology readiness level of a  
11 proposed advanced nuclear reactor technology;

12 “(C) the technical abilities and qualifica-  
13 tions of teams desiring to demonstrate a pro-  
14 posed advanced nuclear reactor technology; and

15 “(D) the capacity to meet cost-share re-  
16 quirements of the Department;

17 “(3) ensure that each evaluation of candidate  
18 technologies for the demonstration projects is com-  
19 pleted through an external review of proposed de-  
20 signs, which review shall—

21 “(A) be conducted by a panel that includes  
22 not fewer than 1 representative that does not  
23 have a conflict of interest of each within the ap-  
24 plicable market of the design of—

25 “(i) an electric utility;

1                   “(ii) an entity that uses high-tempera-  
2                   ture process heat for manufacturing or in-  
3                   dustrial processing, such as a petro-  
4                   chemical or synthetic fuel company, a man-  
5                   ufacturer of metals or chemicals, or a man-  
6                   ufacturer of concrete;

7                   “(iii) an expert from the investment  
8                   community;

9                   “(iv) a project management practi-  
10                  tioner; and

11                  “(v) an environmental health and  
12                  safety expert; and

13                  “(B) include a review of each demonstra-  
14                  tion project under this subsection which shall  
15                  include consideration of cost-competitiveness  
16                  and other value streams, together with the tech-  
17                  nology readiness level, the technical abilities  
18                  and qualifications of teams desiring to dem-  
19                  onstrate a proposed advanced nuclear reactor  
20                  technology, the capacity to meet cost-share re-  
21                  quirements of the Department, if Federal fund-  
22                  ing is provided, and environmental impacts;

23                  “(4) for federally funded demonstration  
24                  projects, enter into cost-sharing agreements with  
25                  private sector partners in accordance with section

1 988 for the conduct of activities relating to the re-  
2 search, development, and demonstration of advanced  
3 nuclear reactor designs under the program;

4 “(5) consult with—

5 “(A) National Laboratories;

6 “(B) institutions of higher education;

7 “(C) traditional end users (such as electric  
8 utilities);

9 “(D) potential end users of new tech-  
10 nologies (such as users of high-temperature  
11 process heat for manufacturing processing, in-  
12 cluding petrochemical or synthetic fuel compa-  
13 nies, manufacturers of metals or chemicals, or  
14 manufacturers of concrete);

15 “(E) developers of advanced nuclear reac-  
16 tor technology;

17 “(F) environmental and public health and  
18 safety experts; and

19 “(G) non-proliferation experts;

20 “(6) seek to ensure that the demonstration  
21 projects carried out under this section do not cause  
22 any delay in the progress of an advanced reactor  
23 project by private industry and the Department of  
24 Energy that is underway as of the date of enactment  
25 of this section;



1           “(7) establish a streamlined approval process  
2           for expedited contracting between awardees and the  
3           Department;

4           “(8) identify technical challenges to candidate  
5           technologies;

6           “(9) support near-term research and develop-  
7           ment to address the highest risk technical challenges  
8           to the successful demonstration of a selected ad-  
9           vanced reactor technology, in accordance with—

10                   “(A) paragraph (8);

11                   “(B) the research and development activi-  
12           ties under section 952(b); and

13                   “(C) the research and development activi-  
14           ties under section 958; and

15           “(10) establish such technology advisory work-  
16           ing groups as the Secretary determines to be appro-  
17           priate to advise the Secretary regarding the tech-  
18           nical challenges identified under paragraph (8) and  
19           the scope of research and development programs to  
20           address the challenges, in accordance with para-  
21           graph (9), to be comprised of—

22                   “(A) private sector advanced nuclear reac-  
23           tor technology developers;

1           “(B) technical experts with respect to the  
2           relevant technologies at institutions of higher  
3           education;

4           “(C) technical experts at the National  
5           Laboratories;

6           “(D) environmental and public health and  
7           safety experts;

8           “(E) non-proliferation experts; and

9           “(F) any other entities the Secretary de-  
10          termines appropriate.

11          “(d)        MILESTONE-BASED        DEMONSTRATION  
12   PROJECTS.—The Secretary may carry out demonstration  
13   projects under subsection (c) as a milestone-based dem-  
14   onstration project under section 9005 of the Energy Act  
15   of 2020.

16          “(e) NONDUPLICATION.—Entities may not receive  
17   funds under this program if receiving funds from another  
18   reactor demonstration program at the Department in the  
19   same fiscal year.

20          “(f) AUTHORIZATION OF APPROPRIATIONS.—There  
21   are authorized to be appropriated to the Secretary to carry  
22   out the program under this subsection—

23               “(1) \$405,000,000 for fiscal year 2021;

24               “(2) \$405,000,000 for fiscal year 2022;

25               “(3) \$420,000,000 for fiscal year 2023;

1 “(4) \$455,000,000 for fiscal year 2024; and

2 “(5) \$455,000,000 for fiscal year 2025.”.

3 (2) TABLE OF CONTENTS.—The table of con-  
4 tents of the Energy Policy Act of 2005 (Public Law  
5 109–58; 119 Stat. 594) is amended—

6 (A) in the items relating to sections 957,  
7 958, and 959, by inserting “Sec.” before “95”  
8 each place it appears; and

9 (B) by inserting after the item relating to  
10 section 959 the following:

“Sec. 959A. Advanced reactor demonstration program.”.

11 (h) INTERNATIONAL NUCLEAR ENERGY COOPERA-  
12 TION.—

13 (1) IN GENERAL.—Subtitle E of title IX of the  
14 Energy Policy Act of 2005 (42 U.S.C. 16271 et  
15 seq.), as amended by subsection (g), is further  
16 amended by adding at the end the following:

17 **“SEC. 959B. INTERNATIONAL NUCLEAR ENERGY COOPERA-**  
18 **TION.**

19 “The Secretary shall carry out a program—

20 “(1) to collaborate in international efforts with  
21 respect to research, development, demonstration, and  
22 commercial application of nuclear technology that  
23 supports diplomatic, financing, nonproliferation, cli-  
24 mate, and international economic objectives for the

1 safe, secure, and peaceful use of such technology;  
2 and

3 “(2) to develop collaboration initiatives with re-  
4 spect to such efforts with a variety of countries  
5 through—

6 “(A) preparations for research and devel-  
7 opment agreements;

8 “(B) the development of coordinated action  
9 plans; and

10 “(C) new or existing multilateral coopera-  
11 tion commitments including—

12 “(i) the International Framework for  
13 Nuclear Energy Cooperation;

14 “(ii) the Generation IV International  
15 Forum;

16 “(iii) the International Atomic Energy  
17 Agency;

18 “(iv) the Organization for Economic  
19 Co-operation and Development Nuclear  
20 Energy Agency; and

21 “(v) any other international collabo-  
22 rative effort with respect to advanced nu-  
23 clear reactor operations and safety.”.

24 (2) TABLE OF CONTENTS.—The table of con-  
25 tents of the Energy Policy Act of 2005 (Public Law

1 109–58; 119 Stat. 594), as amended by subsection  
2 (g), is further amended by inserting after the item  
3 relating to section 959A the following:

“Sec. 959B. International nuclear energy cooperation.”.

4 **SEC. 2004. HIGH-PERFORMANCE COMPUTATION COLLABO-**  
5 **RATIVE RESEARCH PROGRAM.**

6 Section 957 of the Energy Policy Act of 2005 (42  
7 U.S.C. 16277) is amended by adding at the end the fol-  
8 lowing:

9 “(d) DUPLICATION.—The Secretary shall ensure the  
10 coordination of, and avoid unnecessary duplication of, the  
11 activities of the program under subsection (a) with the ac-  
12 tivities of—

13 “(1) other research entities of the Department,  
14 including the National Laboratories, the Advanced  
15 Research Projects Agency–Energy, and the Ad-  
16 vanced Scientific Computing Research program; and

17 “(2) industry.”.

18 **SEC. 2005. NUCLEAR ENERGY BUDGET PLAN.**

19 Section 959 of the Energy Policy Act of 2005 (42  
20 U.S.C. 16279) is amended—

21 (1) by amending subsection (b) to read as fol-  
22 lows:

23 “(b) BUDGET PLAN ALTERNATIVE 1.—One of the  
24 budget plans submitted under subsection (a) shall assume  
25 constant annual funding for 10 years at the appropriated

1 level for the current fiscal year for the civilian nuclear en-  
2 ergy research and development of the Department.”;

3 (2) in subsection (d)(2) by striking “; and” and  
4 inserting “;”;

5 (3) in subsection (d)(3) by striking the period  
6 at the end and inserting “; and”

7 (4) by inserting at the end of subsection (d) the  
8 following:

9 “(4) a description of the progress made under  
10 the programs described in section 959A.”; and

11 (5) by inserting after subsection (d) the fol-  
12 lowing:

13 “(e) UPDATES.—Not less frequently than once every  
14 2 years, the Secretary shall submit to the Committee on  
15 Science, Space, and Technology of the House of Rep-  
16 resentatives and the Committee on Energy and Natural  
17 Resources of the Senate updated 10-year budget plans  
18 which shall identify, and provide a justification for, any  
19 major deviation from a previous budget plan submitted  
20 under this section.”.

21 **SEC. 2006. ORGANIZATION AND ADMINISTRATION OF PRO-**  
22 **GRAMS.**

23 (a) IN GENERAL.—Subtitle E of title IX of the En-  
24 ergy Policy Act of 2005 (42 U.S.C. 16271 et seq.), as

1 amended by this Act, is further amended by adding at the  
2 end of the following:

3 **“SEC. 959C. ORGANIZATION AND ADMINISTRATION OF PRO-**  
4 **GRAMS.**

5 “(a) COORDINATION.—In carrying out this subtitle,  
6 the Secretary shall coordinate activities, and effectively  
7 manage crosscutting research priorities across programs  
8 of the Department and other relevant Federal agencies,  
9 including the National Laboratories.

10 “(b) COLLABORATION.—

11 “(1) IN GENERAL.—In carrying out this sub-  
12 title, the Secretary shall collaborate with industry,  
13 National Laboratories, other relevant Federal agen-  
14 cies, institutions of higher education, including mi-  
15 nority-serving institutions and research reactors,  
16 Tribal entities, including Alaska Native Corpora-  
17 tions, and international bodies with relevant sci-  
18 entific and technical expertise.

19 “(2) PARTICIPATION.—To the extent prac-  
20 ticable, the Secretary shall encourage research  
21 projects that promote collaboration between entities  
22 specified in paragraph (1).

23 “(c) DISSEMINATION OF RESULTS AND PUBLIC  
24 AVAILABILITY.—The Secretary shall, except to the extent  
25 protected from disclosure under section 552(b) of title 5,

1 United States Code, publish the results of projects sup-  
2 ported under this subtitle through Department websites,  
3 reports, databases, training materials, and industry con-  
4 ferences, including information discovered after the com-  
5 pletion of such projects.

6 “(d) EDUCATION AND OUTREACH.—In carrying out  
7 the activities described in this subtitle, the Secretary shall  
8 support education and outreach activities to disseminate  
9 information and promote public understanding of nuclear  
10 energy.

11 “(e) TECHNICAL ASSISTANCE.—In carrying out this  
12 subtitle, for the purposes of supporting technical, non-  
13 hardware, and information-based advances in nuclear en-  
14 ergy development and operations, the Secretary shall also  
15 conduct technical assistance and analysis activities, includ-  
16 ing activities that support commercial application of nu-  
17 clear energy in rural, Tribal, and low-income communities.

18 “(f) PROGRAM REVIEW.—At least annually, all pro-  
19 grams in this subtitle shall be subject to an annual review  
20 by the Nuclear Energy Advisory Committee of the Depart-  
21 ment or other independent entity, as appropriate.

22 “(g) SENSITIVE INFORMATION.—The Secretary shall  
23 not publish any information generated under this subtitle  
24 that is detrimental to national security, as determined by  
25 the Secretary.”



1 (b) TABLE OF CONTENTS.—The table of contents of  
2 the Energy Policy Act of 2005 (Public Law 109–58; 119  
3 Stat. 594), as amended by this Act, is further amended  
4 by inserting after the item relating to section 959B the  
5 following:

“Sec. 959C. Organization and administration of programs.”.

6 **SEC. 2007. EXTENSION AND EXPANSION OF LIMITATIONS**  
7 **ON IMPORTATION OF URANIUM FROM RUS-**  
8 **SIAN FEDERATION.**

9 (a) IN GENERAL.—Section 3112A of the USEC Pri-  
10 vatization Act (42 U.S.C. 2297h–10a) is amended—

11 (1) in subsection (a)—

12 (A) by redesignating paragraph (7) as  
13 paragraph (8); and

14 (B) by inserting after paragraph (6) the  
15 following:

16 “(7) SUSPENSION AGREEMENT.—The term  
17 ‘Suspension Agreement’ has the meaning given that  
18 term in section 3102(13).”;

19 (2) in subsection (b)—

20 (A) by striking “United States to support”  
21 and inserting the following: “United States—

22 “(1) to support”;

23 (B) by striking the period at the end and  
24 inserting a semicolon; and

25 (C) by adding at the end the following:

1           “(2) to reduce reliance on uranium imports in  
2 order to protect essential national security interests;

3           “(3) to revive and strengthen the supply chain  
4 for nuclear fuel produced and used in the United  
5 States; and

6           “(4) to expand production of nuclear fuel in the  
7 United States.”; and

8           (3) in subsection (c)—

9           (A) in paragraph (2)—

10           (i) in subparagraph (A)—

11           (I) in clause (vi), by striking “;  
12 and” and inserting a semicolon;

13           (II) in clause (vii), by striking  
14 the period at the end and inserting a  
15 semicolon; and

16           (III) by adding at the end the  
17 following:

18           “(viii) in calendar year 2021, 596,682  
19 kilograms;

20           “(ix) in calendar year 2022, 489,617  
21 kilograms;

22           “(x) in calendar year 2023, 578,877  
23 kilograms;

24           “(xi) in calendar year 2024, 476,536  
25 kilograms;

1                   “(xii) in calendar year 2025, 470,376  
2 kilograms;  
3                   “(xiii) in calendar year 2026, 464,183  
4 kilograms;  
5                   “(xiv) in calendar year 2027, 459,083  
6 kilograms;  
7                   “(xv) in calendar year 2028, 344,312  
8 kilograms;  
9                   “(xvi) in calendar year 2029, 340,114  
10 kilograms;  
11                  “(xvii) in calendar year 2030,  
12 332,141 kilograms;  
13                  “(xviii) in calendar year 2031,  
14 328,862 kilograms;  
15                  “(xix) in calendar year 2032, 322,255  
16 kilograms;  
17                  “(xx) in calendar year 2033, 317,536  
18 kilograms;  
19                  “(xxi) in calendar year 2034, 298,088  
20 kilograms;  
21                  “(xxii) in calendar year 2035,  
22 294,511 kilograms;  
23                  “(xxiii) in calendar year 2036,  
24 286,066 kilograms;

1                   “(xxiv) in calendar year 2037,  
2                   281,272 kilograms;

3                   “(xxv) in calendar year 2038, 277,124  
4                   kilograms;

5                   “(xxvi) in calendar year 2039,  
6                   277,124 kilograms; and

7                   “(xxvii) in calendar year 2040,  
8                   267,685 kilograms.”;

9                   (ii) by redesignating subparagraph  
10                  (B) as subparagraph (C); and

11                  (iii) by inserting after subparagraph  
12                  (A) the following:

13                  “(B) ADMINISTRATION.—

14                   “(i) IN GENERAL.—The Secretary of  
15                   Commerce shall administer the import lim-  
16                   itations described in subparagraph (A) in  
17                   accordance with the provisions of the Sus-  
18                   pension Agreement, including—

19                   “(I) the limitations on sales of  
20                   enriched uranium product and separa-  
21                   tive work units plus conversion, in  
22                   amounts determined in accordance  
23                   with Section IV.B.1 of the Suspension  
24                   Agreement (as amended by the  
25                   amendment published in the Federal

1 Register on October 9, 2020 (85 Fed.  
2 Reg. 64112));

3 “(II) the export limit allocations  
4 set forth in Appendix 5 of the Suspen-  
5 sion Agreement (as so amended);

6 “(III) the requirements for nat-  
7 ural uranium returned feed associated  
8 with imports of low-enriched uranium,  
9 including pursuant to sales of enrich-  
10 ment, with or without conversion,  
11 from the Russian Federation, as set  
12 forth in Section IV.B.1 of the Suspen-  
13 sion Agreement (as so amended);

14 “(IV) any other provisions of the  
15 Suspension Agreement (as so amend-  
16 ed); and

17 “(V) any related administrative  
18 guidance issued by the Department of  
19 Commerce.

20 “(ii) EFFECT OF TERMINATION OF  
21 SUSPENSION AGREEMENT.—Clause (i)  
22 shall remain in effect if the Suspension  
23 Agreement is terminated.”;

24 (B) in paragraph (3)—

1 (i) in subparagraph (A), by striking  
2 the semicolon and inserting “; or”;

3 (ii) in subparagraph (B), by striking  
4 “; or” and inserting a period; and

5 (iii) by striking subparagraph (C);  
6 (C) in paragraph (5)—

7 (i) in subparagraph (A), by striking  
8 “reference data” and all that follows  
9 through “2019” and inserting the fol-  
10 lowing: “lower scenario data in the report  
11 of the World Nuclear Association entitled  
12 ‘The Nuclear Fuel Report: Global Sce-  
13 narios for Demand and Supply Availability  
14 2019–2040’. In each of calendar years  
15 2023, 2029, and 2035”; and

16 (ii) by redesignating subparagraphs  
17 (B) and (C) as subparagraphs (C) and  
18 (D), respectively;

19 (iii) by inserting after subparagraph  
20 (A) the following:

21 “(B) REPORT REQUIRED.—Not later than  
22 one year after the date of the enactment of the  
23 Energy Act of 2020, and every 3 years there-  
24 after, the Secretary shall submit to Congress a  
25 report that includes—

1                   “(i) a recommendation on the use of  
2                   all publicly available data to ensure accu-  
3                   rate forecasting by scenario data to com-  
4                   port to actual demand for low-enriched  
5                   uranium for nuclear reactors in the United  
6                   States; and

7                   “(ii) an identification of the steps to  
8                   be taken to adjust the import limitations  
9                   described in paragraph (2)(A) based on the  
10                  most accurate scenario data.”; and

11                  (iv) in subparagraph (D), as redesign-  
12                  ated by clause (ii), by striking “subpara-  
13                  graph (B)” and inserting “subparagraph  
14                  (C)”;

15                  (D) in paragraph (9), by striking “2020”  
16                  and inserting “2040”;

17                  (E) in paragraph (12)(B), by inserting “or  
18                  the Suspension Agreement” after “the Russian  
19                  HEU Agreement”; and

20                  (F) by striking “(2)(B)” each place it ap-  
21                  pears and inserting “(2)(C)”.

22                  (b) **APPLICABILITY.**—The amendments made by sub-  
23                  section (a) apply with respect to uranium imported from  
24                  the Russian Federation on or after January 1, 2021.

1 **SEC. 2008. FUSION ENERGY RESEARCH.**

2 (a) PROGRAM.—Section 307 of the Department of  
3 Energy Research and Innovation Act (42 U.S.C. 18645)  
4 is amended—

5 (1) by redesignating subsections (a) through (g)  
6 as subsections (b) through (h), respectively;

7 (2) by inserting before subsection (b), as so re-  
8 designated, the following:

9 “(a) PROGRAM.—As part of the activities authorized  
10 under section 209 of the Department of Energy Organiza-  
11 tion Act (42 U.S.C. 7139) and section 972 of the Energy  
12 Policy Act of 2005 (42 U.S.C. 16312), the Director shall  
13 carry out a fusion energy sciences research and enabling  
14 technology development program to effectively address the  
15 scientific and engineering challenges to building a cost  
16 competitive fusion power plant and to support the develop-  
17 ment of a competitive fusion power industry in the United  
18 States. As part of this program, the Director shall carry  
19 out research activities to expand the fundamental under-  
20 standings of plasma and matter at very high temperatures  
21 and densities for fusion applications and for other engi-  
22 neering and plasma science applications.”;

23 (3) by amending subsection (d) to read as fol-  
24 lows:

25 “(d) INERTIAL FUSION RESEARCH AND DEVELOP-  
26 MENT.—



1           “(1) IN GENERAL.—The Director shall carry  
2           out a program of research and technology develop-  
3           ment in inertial fusion for energy applications, in-  
4           cluding ion beam, laser, and pulsed power fusion  
5           systems.

6           “(2) ACTIVITIES.—As part of the program de-  
7           scribed in paragraph (1), the Director shall support  
8           activities at and partnerships with universities and  
9           the National Laboratories to—

10                   “(A) develop novel target designs;

11                   “(B) support modeling of various inertial  
12           fusion energy concepts and systems;

13                   “(C) develop diagnostic tools; and

14                   “(D) improve inertial fusion energy driver  
15           technologies.

16           “(3) AUTHORIZATION OF APPROPRIATIONS.—  
17           Out of funds authorized to be appropriated under  
18           subsection (o), there are authorized to be appro-  
19           priated to the Secretary to carry out the activities  
20           described in subsection (d) \$25,000,000 for each of  
21           fiscal years 2021 through 2025.”;

22           (4) by amending subsection (e) to read as fol-  
23           lows:

24           “(e) ALTERNATIVE AND ENABLING CONCEPTS.—

1           “(1) IN GENERAL.—The Director shall support  
2           research and development activities and facility oper-  
3           ations at institutions of higher education, National  
4           Laboratories, and private facilities in the United  
5           States for a portfolio of alternative and enabling fu-  
6           sion energy concepts that may provide solutions to  
7           significant challenges to the establishment of a com-  
8           mercial magnetic fusion power plant, prioritized  
9           based on the ability of the United States to play a  
10          leadership role in the international fusion research  
11          community.

12          “(2) ACTIVITIES.—Fusion energy concepts and  
13          activities explored under paragraph (1) may in-  
14          clude—

15                 “(A) alternative fusion energy concepts, in-  
16                 cluding—

17                         “(i) advanced stellarator concepts;

18                         “(ii) non-tokamak confinement con-  
19                         figurations operating at low magnetic  
20                         fields;

21                         “(iii) magnetized target fusion energy  
22                         concepts; or

23                         “(iv) other promising fusion energy  
24                         concepts identified by the Director;

1           “(B) enabling fusion technology develop-  
2           ment activities, including—

3                   “(i) high magnetic field approaches  
4                   facilitated by high temperature super-  
5                   conductors;

6                   “(ii) liquid metals to address issues  
7                   associated with fusion plasma interactions  
8                   with the inner wall of the encasing device;  
9                   and

10                   “(iii) advanced blankets for heat man-  
11                   agement and fuel breeding; and

12                   “(C) advanced scientific computing activi-  
13           ties.

14           “(3) INNOVATION NETWORK FOR FUSION EN-  
15           ERGY.—

16                   “(A) IN GENERAL.—The Secretary, acting  
17                   through the Office of Science, shall support a  
18                   program to provide fusion energy researchers  
19                   with access to scientific and technical resources  
20                   and expertise at facilities supported by the De-  
21                   partment, including such facilities at National  
22                   Laboratories and universities, to advance inno-  
23                   vative fusion energy technologies toward com-  
24                   mercial application.

1           “(B) AWARDS.—Financial assistance  
2           under the program established in subsection  
3           (a)—

4                   “(i) shall be awarded on a competi-  
5                   tive, merit-reviewed basis; and

6                   “(ii) may be in the form of grants,  
7                   vouchers, equipment loans, or contracts to  
8                   private entities.

9           “(4) AUTHORIZATION OF APPROPRIATIONS.—  
10           Out of funds authorized to be appropriated under  
11           subsection (o), there are authorized to be appro-  
12           priated to the Secretary to carry out the activities  
13           described in subsection (e) \$50,000,000 for each of  
14           fiscal years 2021 through 2025.”; and

15           (5) by adding at the end the following:

16           “(i) MILESTONE-BASED DEVELOPMENT PROGRAM.—

17                   “(1) IN GENERAL.—Using the authority of the  
18                   Secretary under section 646(g) of the Department of  
19                   Energy Organization Act (42 U.S.C. 7256(g)), not-  
20                   withstanding paragraph (10) of such section, the  
21                   Secretary shall establish, not later than 6 months  
22                   after the date of enactment of this section, a mile-  
23                   stone-based fusion energy development program that  
24                   requires projects to meet particular technical mile-

1 stones before a participant is awarded funds by the  
2 Department.

3 “(2) PURPOSE.—The purpose of the program  
4 established by paragraph (1) shall be to support the  
5 development of a U.S.-based fusion power industry  
6 through the research and development of tech-  
7 nologies that will enable the construction of new full-  
8 scale fusion systems capable of demonstrating sig-  
9 nificant improvements in the performance of such  
10 systems, as defined by the Secretary, within 10  
11 years of the enactment of this section.

12 “(3) ELIGIBILITY.—Any entity is eligible to  
13 participate in the program provided that the Sec-  
14 retary has deemed it as having the necessary re-  
15 sources and expertise.

16 “(4) REQUIREMENTS.—In carrying out the  
17 milestone-based program under paragraph (1), the  
18 Secretary shall, for each relevant project—

19 “(A) request proposals from eligible enti-  
20 ties, as determined by the Secretary, that in-  
21 clude proposed technical milestones, including  
22 estimated project timelines and total costs;

23 “(B) set milestones based on a rigorous  
24 technical review process;

1           “(C) award funding of a predetermined  
2 amount to projects that successfully meet pro-  
3 posed milestones under paragraph (1), or for  
4 expenses deemed reimbursable by the Secretary,  
5 in accordance with terms negotiated for an indi-  
6 vidual award; and

7           “(D) communicate regularly with selected  
8 eligible entities and, if the Secretary deems ap-  
9 propriate, exercise small amounts of flexibility  
10 for technical milestones as projects mature.

11           “(5) AWARDS.—For the program established  
12 under paragraph (1)—

13           “(A) an award recipient shall be respon-  
14 sible for all costs until milestones are achieved,  
15 or reimbursable expenses are reviewed and  
16 verified by the Department;

17           “(B) should an awardee not meet the mile-  
18 stones described in paragraph (4), the Sec-  
19 retary may end the partnership with an award  
20 recipient and use the remaining funds in the  
21 ended agreement for new or existing projects  
22 carried out under this section; and

23           “(C) consistent with the existing authori-  
24 ties of the Department, the Secretary may end

1           the partnership with an award recipient for  
2           cause during the performance period.

3           “(6) APPLICATIONS.—Any project proposal sub-  
4           mitted to the program under paragraph (1) shall be  
5           evaluated based upon its scientific, technical, and  
6           business merits through a peer-review process, which  
7           shall include reviewers with appropriate expertise  
8           from the private sector, the investment community,  
9           and experts in the science and engineering of fusion  
10          and plasma physics.

11          “(7) PROJECT MANAGEMENT.—In carrying out  
12          projects under this program and assessing the com-  
13          pletion of their milestones in accordance with para-  
14          graph (4), the Secretary shall consult with experts  
15          that represent diverse perspectives and professional  
16          experiences, including those from the private sector,  
17          to ensure a complete and thorough review.

18          “(8) PROGRAMMATIC REVIEW.—Not later than  
19          4 years after the Secretary has established 3 mile-  
20          stones under this program, the Secretary shall enter  
21          into a contractual arrangement with the National  
22          Academy of Sciences to review and provide a report  
23          describing the findings of this review to the House  
24          Committee on Science, Space, and Technology and  
25          the Senate Committee on Energy and Natural Re-

1 sources on the program established under this para-  
2 graph (1) that assesses—

3 “(A) the benefits and drawbacks of a mile-  
4 stone-based fusion program as compared to tra-  
5 ditional program structure funding models at  
6 the Department;

7 “(B) lessons-learned from program oper-  
8 ations; and

9 “(C) any other matters the Secretary de-  
10 termines regarding the program.

11 “(9) ANNUAL REPORT.—As part of the annual  
12 budget request submitted for each fiscal year, the  
13 Secretary shall provide the House Committee on  
14 Science, Space, and Technology and the Senate  
15 Committee on Energy and Natural Resources a re-  
16 port describing partnerships supported by the pro-  
17 gram established under paragraph (1) during the  
18 previous fiscal year.

19 “(10) AUTHORIZATION OF APPROPRIATIONS.—  
20 Out of funds authorized to be appropriated under  
21 subsection (o), there are authorized to be appro-  
22 priated to the Secretary to carry out the activities  
23 described in subsection (i), to remain available until  
24 expended—

25 “(A) \$45,000,000 for fiscal year 2021;



1 “(B) \$65,000,000 for fiscal year 2022;

2 “(C) \$105,000,000 for fiscal year 2023;

3 “(D) \$65,000,000 for fiscal year 2024;

4 and

5 “(E) \$45,000,000 for fiscal year 2025.

6 “(j) FUSION REACTOR SYSTEM DESIGN.—The Direc-  
7 tor shall support research and development activities to  
8 design future fusion reactor systems and examine and ad-  
9 dress the technical drivers for the cost of these systems.

10 “(k) GENERAL PLASMA SCIENCE AND APPLICA-  
11 TIONS.—The Director shall support research in general  
12 plasma science and high energy density physics that ad-  
13 vance the understanding of the scientific community of  
14 fundamental properties and complex behavior of matter to  
15 control and manipulate plasmas for a broad range of ap-  
16 plications, including support for research relevant to ad-  
17 vancements in chip manufacturing and microelectronics.

18 “(l) SENSE OF CONGRESS.—It is the sense of Con-  
19 gress that the United States should support a robust, di-  
20 verse program in addition to providing sufficient support  
21 to, at a minimum, meet its commitments to ITER and  
22 maintain the schedule of the project as determined by the  
23 Secretary in coordination with the ITER Organization at  
24 the time of the enactment of this section. It is further  
25 the sense of Congress that developing the scientific basis

1 for fusion, providing research results key to the success  
2 of ITER, and training the next generation of fusion sci-  
3 entists are of critical importance to the United States and  
4 should in no way be diminished by participation of the  
5 United States in the ITER project.

6 “(m) INTERNATIONAL COLLABORATION.—The Direc-  
7 tor shall—

8 “(1) as practicable and in coordination with  
9 other appropriate Federal agencies as necessary, en-  
10 sure the access of United States researchers to the  
11 most advanced fusion research facilities and research  
12 capabilities in the world, including ITER;

13 “(2) to the maximum extent practicable, con-  
14 tinue to leverage United States participation ITER,  
15 and prioritize expanding international partnerships  
16 and investments in current and future fusion re-  
17 search facilities within the United States; and

18 “(3) to the maximum extent practicable,  
19 prioritize engagement in collaborative efforts in sup-  
20 port of future international facilities that would pro-  
21 vide access to the most advanced fusion research fa-  
22 cilities in the world to United States researchers.

23 “(n) FISSION AND FUSION RESEARCH COORDINA-  
24 TION REPORT.—

1           “(1) IN GENERAL.—Not later than 6 months  
2 after the date of enactment of this section, the Sec-  
3 retary shall transmit to Congress a report address-  
4 ing opportunities for coordinating fusion energy re-  
5 search and development activities between the Office  
6 of Nuclear Energy, the Office of Science, and the  
7 Advanced Research Projects Agency—Energy.

8           “(2) COMPONENTS.—The report shall assess  
9 opportunities for collaboration on research and de-  
10 velopment of—

11           “(A) liquid metals to address issues associ-  
12 ated with fusion plasma interactions with the  
13 inner wall of the encasing device and other com-  
14 ponents within the reactor;

15           “(B) immersion blankets for heat manage-  
16 ment and fuel breeding;

17           “(C) technologies and methods for instru-  
18 mentation and control;

19           “(D) computational methods and codes for  
20 system operation and maintenance;

21           “(E) codes and standard development;

22           “(F) radioactive waste handling;

23           “(G) radiological safety;

24           “(H) potential for non-electricity genera-  
25 tion applications; and

1           “(I) any other overlapping priority as iden-  
2           tified by the Director of the Office of Science  
3           or the Assistant Secretary of Energy for Nu-  
4           clear Energy.

5           “(o) AUTHORIZATION OF APPROPRIATIONS.—There  
6           are authorized to be appropriated to the Secretary to carry  
7           out the activities described in this section—

8           “(1) \$996,000,000 for fiscal year 2021;

9           “(2) \$921,000,000 for fiscal year 2022;

10          “(3) \$961,000,000 for fiscal year 2023;

11          “(4) \$921,000,000 for fiscal year 2024; and

12          “(5) \$901,000,000 for fiscal year 2025.”.

13          (b) ITER.—Section 972(c) of the Energy Policy Act  
14          of 2005 (42 U.S.C. 16312) is amended to read as follows:

15          “(c) UNITED STATES PARTICIPATION IN ITER.—

16                 “(1) IN GENERAL.—There is authorized United  
17                 States participation in the construction and oper-  
18                 ations of the ITER project, as agreed to under the  
19                 April 25, 2007 ‘Agreement on the Establishment of  
20                 the ITER International Fusion Energy Organization  
21                 for the Joint Implementation of the ITER Project’.  
22                 The Director shall coordinate and carry out the re-  
23                 sponsibilities of the United States with respect to  
24                 this Agreement.

1           “(2) REPORT.—Not later than 1 year after the  
2           date of enactment of this section, the Secretary shall  
3           submit to Congress a report providing an assessment  
4           of the most recent schedule for ITER that has been  
5           approved by the ITER Council.

6           “(3) AUTHORIZATION OF APPROPRIATIONS.—  
7           Out of funds authorized to be appropriated under  
8           section 307(o) of the Department of Energy Re-  
9           search and Innovation Act (42 U.S.C. 18645), there  
10          shall be made available to the Secretary to carry out  
11          the construction of ITER—

12                   “(A) \$374,000,000 for fiscal year 2021;

13                   and

14                   “(B) \$281,000,000 for each of fiscal years  
15                   2022 through 2025.”.

16       **TITLE III—RENEWABLE ENERGY**  
17                   **AND STORAGE**

18           **Subtitle A—Renewable Energy**  
19                   **Research and Development**

20       **SEC. 3001. WATER POWER RESEARCH AND DEVELOPMENT.**

21           (a) IN GENERAL.—Subtitle C of title VI of the En-  
22       ergy Independence and Security Act of 2007 (42 U.S.C.  
23       17211 et seq.) is amended to read as follows:

1                   **“Subtitle C—Water Power**  
2                   **Research and Development**

3   **“SEC. 632. DEFINITIONS.**

4           “In this subtitle:

5                   “(1) ELIGIBLE ENTITY.—The term ‘eligible en-  
6           tity’ means any of the following entities:

7                           “(A) An institution of higher education.

8                           “(B) A National Laboratory.

9                           “(C) A Federal research agency.

10                          “(D) A State research agency.

11                          “(E) A nonprofit research organization.

12                          “(F) An industrial entity or a multi-insti-  
13           tutional consortium thereof.

14                   “(2) INSTITUTION OF HIGHER EDUCATION.—  
15           The term ‘institution of higher education’ means—

16                           “(A) an institution of higher education (as  
17           defined in section 101(a) of the Higher Edu-  
18           cation Act of 1965 (20 U.S.C. 1001(a))); or

19                           “(B) a postsecondary vocational institution  
20           (as defined in section 102(c) of the Higher  
21           Education Act of 1965 (20 U.S.C. 1002(c))).

22                   “(3) MARINE ENERGY.—The term ‘marine en-  
23           ergy’ means energy from—

24                           “(A) waves, tides, and currents in oceans,  
25           estuaries, and tidal areas;

1           “(B) free flowing water in rivers, lakes,  
2           streams, and man-made channels;

3           “(C) differentials in salinity and pressure  
4           gradients; and

5           “(D) differentials in water temperature, in-  
6           cluding ocean thermal energy conversion.

7           “(4) NATIONAL LABORATORY.—The term ‘Na-  
8           tional Laboratory’ has the meaning given such term  
9           in section 2(3) of the Energy Policy Act of 2005 (42  
10          U.S.C. 15801(3)).

11          “(5) WATER POWER.—The term ‘water power’  
12          refers to hydropower, including conduit power,  
13          pumped storage, and marine energy technologies.

14          “(6) MICROGRID.—The term ‘microgrid’ has  
15          the meaning given such term in section 641 of the  
16          Energy Independence and Security Act of 2007 (42  
17          U.S.C. 17231).

18   **“SEC. 633. WATER POWER TECHNOLOGY RESEARCH, DE-**  
19                           **VELOPMENT, AND DEMONSTRATION.**

20          “The Secretary shall carry out a program to conduct  
21          research, development, demonstration, and commercial ap-  
22          plication of water power technologies in support of each  
23          of the following purposes:

24                 “(1) To promote research, development, dem-  
25                 onstration, and commercial application of water

1 power generation technologies in order to increase  
2 capacity and reduce the cost of those technologies.

3 “(2) To promote research and development to  
4 improve the environmental impact of water power  
5 technologies.

6 “(3) To provide grid reliability and resilience,  
7 including through technologies that facilitate new  
8 market opportunities, such as ancillary services, for  
9 water power.

10 “(4) To promote the development of water  
11 power technologies to improve economic growth and  
12 enhance cross-institutional foundational workforce  
13 development in the water power sector, including in  
14 coastal communities.

15 **“SEC. 634. HYDROPOWER RESEARCH, DEVELOPMENT, AND**  
16 **DEMONSTRATION.**

17 “The Secretary shall conduct a program of research,  
18 development, demonstration, and commercial application  
19 for technologies that improve the capacity, efficiency, resil-  
20 ience, security, reliability, affordability, and environmental  
21 impact, including potential cumulative environmental im-  
22 pacts, of hydropower systems. In carrying out such pro-  
23 gram, the Secretary shall prioritize activities designed  
24 to—

25 “(1) develop technology for—



1           “(A) non-powered dams, including aging  
2           and potentially hazardous dams;

3           “(B) pumped storage;

4           “(C) constructed waterways;

5           “(D) new stream-reach development;

6           “(E) modular and small dams;

7           “(F) increased operational flexibility; and

8           “(G) enhancement of relevant existing fa-  
9           cilities;

10          “(2) develop new strategies and technologies,  
11          including analytical methods, physical and numerical  
12          tools, and advanced computing, as well as methods  
13          to validate such methods and tools, in order to—

14               “(A) extend the operational lifetime of hy-  
15               dropower systems and their physical structures,  
16               while improving environmental impact, includ-  
17               ing potential cumulative environmental impacts;

18               “(B) assist in device and system design,  
19               installation, operation, and maintenance; and

20               “(C) reduce costs, limit outages, and in-  
21               crease unit and plant efficiencies, including by  
22               examining the impact of changing water and  
23               electricity demand on hydropower generation,  
24               flexibility, and provision of grid services;

1           “(3) study, in conjunction with other relevant  
2           Federal agencies as appropriate, methods to improve  
3           the hydropower licensing process, including by com-  
4           piling current and accepted best practices, public  
5           comments, and methodologies to assess the full  
6           range of potential environmental and economic im-  
7           pacts;

8           “(4) identify opportunities for joint research,  
9           development, and demonstration programs between  
10          hydropower systems, which may include—

11                   “(A) pumped storage systems and other  
12                   renewable energy systems;

13                   “(B) small hydro facilities and other en-  
14                   ergy storage systems;

15                   “(C) other hybrid energy systems;

16                   “(D) small hydro facilities and critical in-  
17                   frastructure, including water infrastructure;  
18                   and

19                   “(E) hydro facilities and responsive load  
20                   technologies, which may include smart buildings  
21                   and city systems;

22           “(5) improve the reliability of hydropower tech-  
23           nologies, including during extreme weather events;

24           “(6) develop methods and technologies to im-  
25           prove environmental impact, including potential cu-

1 cumulative environmental impacts, of hydropower and  
2 pumped storage technologies, including potential im-  
3 pacts on wildlife, such as—

4 “(A) fisheries;

5 “(B) aquatic life and resources;

6 “(C) navigation of waterways; and

7 “(D) upstream and downstream environ-  
8 mental conditions, including sediment move-  
9 ment, water quality, and flow volumes;

10 “(7) identify ways to increase power generation  
11 by—

12 “(A) diversifying plant configuration op-  
13 tions;

14 “(B) improving pump-back efficiencies;

15 “(C) investigating multi-phase systems;

16 “(D) developing, testing, and monitoring  
17 advanced generators with faster cycling times,  
18 variable speeds, and improved efficiencies;

19 “(E) developing, testing, and monitoring  
20 advanced turbines capable of improving environ-  
21 mental impact, including potential cumulative  
22 environmental impacts, including small turbine  
23 designs;

24 “(F) developing standardized powertrain  
25 components;

1           “(G) developing components with advanced  
2 materials and manufacturing processes, includ-  
3 ing additive manufacturing; and

4           “(H) developing analytical tools that en-  
5 able hydropower to provide grid services that,  
6 amongst other services, improve grid integra-  
7 tion of other energy sources;

8           “(8) advance new pumped storage technologies,  
9 including—

10           “(A) systems with adjustable speed and  
11 other new pumping and generating equipment  
12 designs;

13           “(B) modular systems;

14           “(C) alternative closed-loop systems, in-  
15 cluding mines and quarries; and

16           “(D) other innovative equipment and ma-  
17 terials as determined by the Secretary;

18           “(9) reduce civil works costs and construction  
19 times for hydropower and pumped storage systems,  
20 including comprehensive data and systems analysis  
21 of hydropower and pumped storage construction  
22 technologies and processes in order to identify areas  
23 for whole-system efficiency gains;

1           “(10) advance efficient and reliable integration  
2 of hydropower and pumped storage systems with the  
3 electric grid by—

4           “(A) improving methods for operational  
5 forecasting of renewable energy systems to  
6 identify opportunities for hydropower applica-  
7 tions in pumped storage and hybrid energy sys-  
8 tems, including forecasting of seasonal and an-  
9 nual energy storage;

10           “(B) considering aggregating small distrib-  
11 uted hydropower assets; and

12           “(C) identifying barriers to grid scale im-  
13 plementation of hydropower and pumped stor-  
14 age technologies;

15           “(11) improve computational fluid dynamic  
16 modeling methods;

17           “(12) improve flow measurement methods, in-  
18 cluding maintenance of continuous flow measure-  
19 ment equipment;

20           “(13) identify best methods for compiling data  
21 on all hydropower resources and assets, including  
22 identifying potential for increased capacity; and

23           “(14) identify mechanisms to test and validate  
24 performance of hydropower and pumped storage  
25 technologies.

1 **“SEC. 635. MARINE ENERGY RESEARCH, DEVELOPMENT,**  
2 **AND DEMONSTRATION.**

3 “(a) IN GENERAL.—The Secretary, in consultation  
4 with the Secretary of Defense, Secretary of Commerce  
5 (acting through the Under Secretary of Commerce for  
6 Oceans and Atmosphere) and other relevant Federal agen-  
7 cies, shall conduct a program of research, development,  
8 demonstration, and commercial application of marine en-  
9 ergy technology, including activities to—

10 “(1) assist technology development to improve  
11 the components, processes, and systems used for  
12 power generation from marine energy resources at a  
13 variety of scales;

14 “(2) establish and expand critical testing infra-  
15 structure and facilities necessary to—

16 “(A) demonstrate and prove marine energy  
17 devices at a range of scales in a manner that  
18 is cost-effective and efficient; and

19 “(B) accelerate the technological readiness  
20 and commercial application of such devices;

21 “(3) address marine energy resource variability  
22 issues, including through the application of energy  
23 storage technologies;

24 “(4) advance efficient and reliable integration  
25 of marine energy with the electric grid, which may  
26 include smart building systems;

1           “(5) identify and study critical short-term and  
2 long-term needs to maintaining a sustainable marine  
3 energy supply chain based in the United States;

4           “(6) increase the reliability, security, and resil-  
5 ience of marine energy technologies;

6           “(7) validate the performance, reliability, main-  
7 tainability, and cost of marine energy device designs  
8 and system components in an operating environ-  
9 ment;

10          “(8) consider the protection of critical infra-  
11 structure, such as adequate separation between ma-  
12 rine energy devices and submarine telecommuni-  
13 cations cables, including through the development of  
14 voluntary, consensus-based standards for such pur-  
15 poses;

16          “(9) identify opportunities for crosscutting re-  
17 search, development, and demonstration programs  
18 between existing energy research programs;

19          “(10) identify and improve, in conjunction with  
20 the Secretary of Commerce, acting through the  
21 Under Secretary of Commerce for Oceans and At-  
22 mosphere, and other relevant Federal agencies as  
23 appropriate, the environmental impact, including po-  
24 tential cumulative environmental impacts, of marine  
25 energy technologies, including—

1           “(A) potential impacts on fisheries and  
2           other marine resources; and

3           “(B) developing technologies, including  
4           mechanisms for self-evaluation, and other  
5           means available for improving environmental  
6           impact, including potential cumulative environ-  
7           mental impacts;

8           “(11) identify, in consultation with relevant  
9           Federal agencies, potential navigational impacts of  
10          marine energy technologies and strategies to prevent  
11          possible adverse impacts, in addition to opportunities  
12          for marine energy systems to aid the United States  
13          Coast Guard, such as remote sensing for coastal bor-  
14          der security;

15          “(12) develop numerical and physical tools, in-  
16          cluding models and monitoring technologies, to as-  
17          sist industry in device and system design, installa-  
18          tion, operation, and maintenance, including methods  
19          to validate such tools;

20          “(13) support materials science as it relates to  
21          marine energy technology, such as the development  
22          of corrosive-resistant materials;

23          “(14) improve marine energy resource fore-  
24          casting and general understanding of aquatic system



1 behavior, including turbulence and extreme condi-  
2 tions;

3 “(15) develop metrics and voluntary, consensus-  
4 based standards, in coordination with the National  
5 Institute of Standards and Technology and appro-  
6 priate standard development organizations, for ma-  
7 rine energy components, systems, and projects, in-  
8 cluding—

9 “(A) measuring performance of marine en-  
10 ergy technologies; and

11 “(B) characterizing environmental condi-  
12 tions;

13 “(16) enhance integration with hybrid energy  
14 systems, including desalination;

15 “(17) identify opportunities to integrate marine  
16 energy technologies into new and existing infrastruc-  
17 ture; and

18 “(18) to develop technology necessary to sup-  
19 port the use of marine energy—

20 “(A) for the generation and storage of  
21 power at sea; and

22 “(B) for the generation and storage of  
23 power to promote the resilience of coastal com-  
24 munities, including in applications relating to—

25 “(i) desalination;

1                   “(ii) disaster recovery and resilience;  
2                   and  
3                   “(iii) community microgrids in iso-  
4                   lated power systems.

5           “(b) STUDY OF NON-POWER SECTOR APPLICATIONS  
6 FOR ADVANCED MARINE ENERGY TECHNOLOGIES.—

7           “(1) IN GENERAL.—The Secretary, in consulta-  
8           tion with the Secretary of Transportation and the  
9           Secretary of Commerce, shall conduct a study to ex-  
10          amine opportunities for research and development in  
11          advanced marine energy technologies for non-power  
12          sector applications, including applications with re-  
13          spect to—

14                   “(A) the maritime transportation sector;

15                   “(B) associated maritime energy infra-  
16                   structure, including infrastructure that serves  
17                   ports, to improve system resilience and disaster  
18                   recovery; and

19                   “(C) enabling scientific missions at sea  
20                   and in extreme environments, including the  
21                   Arctic.

22           “(2) REPORT.—Not later than 1 year after the  
23           date of enactment of this section, the Secretary shall  
24           submit to the Committee on Energy and Natural  
25           Resources of the Senate and the Committee on

1 Science, Space, and Technology of the House of  
2 Representatives a report that describes the results of  
3 the study conducted under paragraph (1).

4 **“SEC. 636. NATIONAL MARINE ENERGY CENTERS.**

5 “(a) IN GENERAL.—The Secretary shall award  
6 grants, each such grant up to \$10,000,000 per year, to  
7 institutions of higher education (or consortia thereof)  
8 for—

9 “(1) the continuation and expansion of the re-  
10 search, development, demonstration, testing, and  
11 commercial application activities at the National Ma-  
12 rine Energy Centers (referred to in this section as  
13 ‘Centers’) established as of January 1, 2020; and

14 “(2) the establishment of new National Marine  
15 Energy Centers.

16 “(b) LOCATION SELECTION.—In selecting institu-  
17 tions of higher education for new Centers, the Secretary  
18 shall consider the following criteria:

19 “(1) Whether the institution hosts an existing  
20 marine energy research and development program.

21 “(2) Whether the institution has proven tech-  
22 nical expertise to support marine energy research.

23 “(3) Whether the institution has access to ma-  
24 rine resources.

1       “(c) PURPOSES.—The Centers shall coordinate  
2 among themselves, the Department, and National Labora-  
3 tories to—

4           “(1) advance research, development, demonstra-  
5 tion, and commercial application of marine energy  
6 technologies in response to industry and commercial  
7 needs;

8           “(2) support in-water testing and demonstra-  
9 tion of marine energy technologies, including facili-  
10 ties capable of testing—

11           “(A) marine energy systems of various  
12 technology readiness levels and scales;

13           “(B) a variety of technologies in multiple  
14 test berths at a single location;

15           “(C) arrays of technology devices; and

16           “(D) interconnectivity to an electrical grid,  
17 including microgrids; and

18           “(3) collect and disseminate information on  
19 best practices in all areas relating to developing and  
20 managing marine energy resources and energy sys-  
21 tems.

22       “(d) COORDINATION.—To the extent practicable, the  
23 Centers shall coordinate their activities with the Secretary  
24 of Commerce, acting through the Undersecretary of Com-

1 merce for Oceans and Atmosphere, and other relevant  
2 Federal agencies.

3 “(e) TERMINATION.—To the extent otherwise author-  
4 ized by law, the Secretary may terminate funding for a  
5 Center described in paragraph (a) if such Center is under-  
6 performing.

7 **“SEC. 637. ORGANIZATION AND ADMINISTRATION OF PRO-**  
8 **GRAMS.**

9 “(a) COORDINATION.—In carrying out this subtitle,  
10 the Secretary shall coordinate activities, and effectively  
11 manage cross-cutting research priorities across programs  
12 of the Department and other relevant Federal agencies,  
13 including the National Laboratories and the National Ma-  
14 rine Energy Centers.

15 “(b) COLLABORATION.—

16 “(1) IN GENERAL.—In carrying out this sub-  
17 title, the Secretary shall collaborate with industry,  
18 National Laboratories, other relevant Federal agen-  
19 cies, institutions of higher education, including Mi-  
20 nority Serving Institutions, National Marine Energy  
21 Centers, Tribal entities, including Alaska Native  
22 Corporations, and international bodies with relevant  
23 scientific and technical expertise.

24 “(2) PARTICIPATION.—To the extent prac-  
25 ticable, the Secretary shall encourage research

1 projects that promote collaboration between entities  
2 specified in paragraph (1) and include entities not  
3 historically associated with National Marine Energy  
4 Centers, such as Minority Serving Institutions.

5 “(3) INTERNATIONAL COLLABORATION.—The  
6 Secretary, in coordination with other appropriate  
7 Federal and multilateral agencies (including the  
8 United States Agency for International Develop-  
9 ment) shall support collaborative efforts with inter-  
10 national partners to promote the research, develop-  
11 ment, and demonstration of water power tech-  
12 nologies used to develop hydropower, pump storage,  
13 and marine energy resources.

14 “(c) DISSEMINATION OF RESULTS AND PUBLIC  
15 AVAILABILITY.—The Secretary shall—

16 “(1) publish the results of projects supported  
17 under this subtitle through Department websites, re-  
18 ports, databases, training materials, and industry  
19 conferences, including information discovered after  
20 the completion of such projects, withholding any in-  
21 dustrial proprietary information; and

22 “(2) share results of such projects with the  
23 public except to the extent that the information is  
24 protected from disclosure under section 552(b) of  
25 title 5, United States Code.

1           “(d) AWARD FREQUENCY.—The Secretary shall so-  
2 licit applications for awards under this subtitle no less fre-  
3 quently than once per fiscal year.

4           “(e) EDUCATION AND OUTREACH.—In carrying out  
5 the activities described in this subtitle, the Secretary shall  
6 support education and outreach activities to disseminate  
7 information and promote public understanding of water  
8 power technologies and the water power workforce, includ-  
9 ing activities at the National Marine Energy Centers.

10          “(f) TECHNICAL ASSISTANCE AND WORKFORCE DE-  
11 VELOPMENT.—In carrying out this subtitle, the Secretary  
12 may also conduct, for purposes of supporting technical,  
13 non-hardware, and information-based advances in water  
14 power systems development and operations—

15               “(1) technical assistance and analysis activities  
16 with eligible entities, including activities that sup-  
17 port expanding access to advanced water power tech-  
18 nologies for rural, Tribal, and low-income commu-  
19 nities; and

20               “(2) workforce development and training activi-  
21 ties, including to support the dissemination of stand-  
22 ards and best practices for enabling water power  
23 production.

24          “(g) STRATEGIC PLAN.—In carrying out the activi-  
25 ties described in this subtitle, the Secretary shall—

1           “(1) not later than one year after the date of  
2           the enactment of the Energy Act of 2020, draft a  
3           plan, considering input from relevant stakeholders  
4           such as industry and academia, to implement the  
5           programs described in this subtitle and update the  
6           plan on an annual basis; and

7           “(2) the plan shall address near-term (up to 2  
8           years), mid-term (up to 7 years), and long-term (up  
9           to 15 years) challenges to the advancement of water  
10          power systems.

11          “(h) REPORT TO CONGRESS.—Not later than 1 year  
12          after the date of the enactment of the Energy Act of 2020,  
13          and at least once every 2 years thereafter, the Secretary  
14          shall provide, and make available to the public and the  
15          relevant authorizing and appropriations committees of  
16          Congress, a report on the findings of research conducted  
17          and activities carried out pursuant to this subtitle, includ-  
18          ing the most current strategic plan under subsection (g)  
19          and the progress made in implementing such plan.

20          **“SEC. 638. APPLICABILITY OF OTHER LAWS.**

21          “Nothing in this subtitle shall be construed as  
22          waiving, modifying, or superseding the applicability of any  
23          requirement under any environmental or other Federal or  
24          State law.



1 **“SEC. 639. AUTHORIZATION OF APPROPRIATIONS.**

2 “There are authorized to be appropriated to the Sec-  
3 retary to carry out this subtitle \$186,600,000 for each of  
4 fiscal years 2021 through 2025, including \$137,428,378  
5 for marine energy and \$49,171,622 for hydropower re-  
6 search, development, and demonstration activities.”.

7 (b) CONFORMING TABLE OF CONTENTS AMEND-  
8 MENT.—The table of contents for the Energy Independ-  
9 ence and Security Act of 2007 is amended by striking the  
10 items relating to subtitle C of title VI and inserting the  
11 following:

“Subtitle C—Water Power Research and Development

“Sec. 632. Definitions.

“Sec. 633. Water power technology research, development, and demonstration.

“Sec. 634. Hydropower research, development, and demonstration.

“Sec. 635. Marine energy research, development, and demonstration.

“Sec. 636. National Marine Energy Centers.

“Sec. 637. Organization and administration of programs.

“Sec. 638. Applicability of other laws.

“Sec. 639. Authorization of appropriations.”.

12 **SEC. 3002. ADVANCED GEOTHERMAL INNOVATION LEADER-**  
13 **SHIP.**

14 (a) DEFINITIONS.—Section 612 of the Energy Inde-  
15 pendence and Security Act of 2007 (42 U.S.C. 17191) is  
16 amended—

17 (1) by amending paragraph (1) to read as fol-  
18 lows:

19 “(1) ENGINEERED.—When referring to en-  
20 hanced geothermal systems, the term ‘engineered’  
21 means designed to access subsurface heat, including

1 stimulation and nonstimulation technologies to ad-  
2 dress one or more of the following issues:

3 “(A) Lack of effective permeability, poros-  
4 ity or open fracture connectivity within the heat  
5 reservoir.

6 “(B) Insufficient contained geofluid in the  
7 heat reservoir.

8 “(C) A low average geothermal gradient  
9 which necessitates deeper drilling, or the use of  
10 alternative heat sources or heat generation  
11 processes.”;

12 (2) by redesignating paragraphs (2) through  
13 (7) as paragraphs (3) through (8), respectively; and  
14 (3) by adding after paragraph (1) the following:

15 “(2) ELIGIBLE ENTITY.—The term ‘eligible en-  
16 tity’ means any of the following entities:

17 “(A) An institution of higher education.

18 “(B) A National laboratory.

19 “(C) A Federal research agency.

20 “(D) A State research agency.

21 “(E) A nonprofit research organization.

22 “(F) An industrial entity.

23 “(G) A consortium of 2 or more entities  
24 described in subparagraphs (A) through (F).”.

1 (b) HYDROTHERMAL RESEARCH AND DEVELOP-  
2 MENT.—Section 613 of the Energy Independence and Se-  
3 curity Act of 2007 (42 U.S.C. 17192) is amended to read  
4 as follows:

5 **“SEC. 613. HYDROTHERMAL RESEARCH AND DEVELOP-**  
6 **MENT.**

7 “(a) IN GENERAL.—The Secretary shall carry out a  
8 program of research, development, demonstration, and  
9 commercial application for geothermal energy production  
10 from hydrothermal systems.

11 “(b) PROGRAMS.—The program authorized in sub-  
12 section (a) shall include the following:

13 “(1) ADVANCED HYDROTHERMAL RESOURCE  
14 TOOLS.—The research and development of advanced  
15 geologic tools to assist in locating hydrothermal re-  
16 sources, and to increase the reliability of site charac-  
17 terization, including the development of new imaging  
18 and sensing technologies and techniques to assist in  
19 prioritization of targets for characterization;

20 “(2) EXPLORATORY DRILLING FOR GEO-  
21 THERMAL RESOURCES.—The demonstration of ad-  
22 vanced technologies and techniques of siting and ex-  
23 ploratory drilling for undiscovered resources in a va-  
24 riety of geologic settings, carried out in collaboration  
25 with industry partners that will assist in the acquisi-

1           tion of high quality data sets relevant for hydro-  
2           thermal subsurface characterization activities.”.

3           (c) GENERAL GEOTHERMAL SYSTEMS RESEARCH  
4 AND DEVELOPMENT.—Section 614 of the Energy Inde-  
5 pendence and Security Act of 2007 (42 U.S.C. 17193) is  
6 amended to read as follows:

7           **“SEC. 614. GENERAL GEOTHERMAL SYSTEMS RESEARCH**  
8   **AND DEVELOPMENT.**

9           “(a) SUBSURFACE COMPONENTS AND SYSTEMS.—  
10 The Secretary shall support a program of research, devel-  
11 opment, demonstration, and commercial application of  
12 components and systems capable of withstanding geo-  
13 thermal environments and necessary to develop, produce,  
14 and monitor geothermal reservoirs and produce geo-  
15 thermal energy.

16           “(b) ENVIRONMENTAL IMPACTS.—The Secretary  
17 shall—

18                           “(1) support a program of research, develop-  
19                           ment, demonstration, and commercial application of  
20                           technologies and practices designed to mitigate or  
21                           preclude potential adverse environmental impacts of  
22                           geothermal energy development, production or use;

23                           “(2) support a research program to identify po-  
24                           tential environmental impacts, including induced  
25                           seismicity, and environmental benefits of geothermal

1 energy development, production, and use, and ensure  
2 that the program described in paragraph (1) ad-  
3 dresses such impacts, including water use and ef-  
4 fects on groundwater and local hydrology;

5 “(3) support a program of research to compare  
6 the potential environmental impacts and environ-  
7 mental benefits identified as part of the develop-  
8 ment, production, and use of geothermal energy with  
9 the potential emission reductions of greenhouse  
10 gases gained by geothermal energy development,  
11 production, and use; and

12 “(4) in carrying out this section, the Secretary  
13 shall, to the maximum extent practicable, consult  
14 with relevant federal agencies, including the Envi-  
15 ronmental Protection Agency.

16 “(c) RESERVOIR THERMAL ENERGY STORAGE.—The  
17 Secretary shall support a program of research, develop-  
18 ment, and demonstration of reservoir thermal energy stor-  
19 age, emphasizing cost-effective improvements through  
20 deep direct use engineering, design, and systems research.

21 “(d) OIL AND GAS TECHNOLOGY TRANSFER INITIA-  
22 TIVE.—

23 “(1) IN GENERAL.—The Secretary shall sup-  
24 port an initiative among the Office of Fossil Energy,  
25 the Office of Energy Efficiency and Renewable En-

1       ergy, and the private sector to research, develop, and  
2       demonstrate relevant advanced technologies and op-  
3       eration techniques used in the oil and gas sector for  
4       use in geothermal energy development.

5           “(2) PRIORITIES.—In carrying out paragraph  
6       (1), the Secretary shall prioritize technologies with  
7       the greatest potential to significantly increase the  
8       use and lower the cost of geothermal energy in the  
9       United States, including the cost and speed of geo-  
10      thermal drilling surface technologies, large- and  
11      small-scale drilling, and well construction.

12       “(e) COPRODUCTION OF GEOTHERMAL ENERGY AND  
13      MINERALS PRODUCTION RESEARCH AND DEVELOPMENT  
14      INITIATIVE.—

15           “(1) IN GENERAL.—The Secretary shall carry  
16      out a research and development initiative under  
17      which the Secretary shall provide financial assist-  
18      ance to demonstrate the coproduction of critical min-  
19      erals from geothermal resources.

20           “(2) REQUIREMENTS.—An award made under  
21      paragraph (1) shall—

22           “(A) improve the cost effectiveness of re-  
23      moving minerals from geothermal brines as part  
24      of the coproduction process;

1           “(B) increase recovery rates of the tar-  
2           geted mineral commodity;

3           “(C) decrease water use and other environ-  
4           mental impacts, as determined by the Sec-  
5           retary; and

6           “(D) demonstrate a path to commercial vi-  
7           ability.

8           “(f) FLEXIBLE OPERATIONS.—The Secretary shall  
9           support a research initiative on flexible operation of geo-  
10          thermal power plants.

11          “(g) INTEGRATED ENERGY SYSTEMS.—The Sec-  
12          retary shall identify opportunities for joint research, devel-  
13          opment, and demonstration programs between geothermal  
14          systems and other energy generation or storage systems.

15          “(h) DRILLING DATA REPOSITORY.—

16                 “(1) IN GENERAL.—The Secretary shall, in con-  
17                 sultation with the Secretary of the Interior, establish  
18                 and operate a voluntary, industry-wide repository of  
19                 geothermal drilling information to lower the cost of  
20                 future geothermal drilling.

21                 “(2) REPOSITORY.—

22                         “(A) IN GENERAL.—In carrying out para-  
23                         graph (1), the Secretary shall collaborate with  
24                         countries utilizing a significant amount of geo-  
25                         thermal energy, as determined by the Secretary.

1           “(B) DATA SYSTEM.—The repository es-  
2           tablished under paragraph (1) shall be inte-  
3           grated with the National Geothermal Data Sys-  
4           tem.”.

5           (d) ENHANCED GEOTHERMAL SYSTEMS RESEARCH  
6   AND DEVELOPMENT.—Section 615 of the Energy Inde-  
7   pendence and Security Act of 2007 (42 U.S.C. 17194) is  
8   amended to read as follows:

9   **“SEC. 615. ENHANCED GEOTHERMAL SYSTEMS RESEARCH**  
10           **AND DEVELOPMENT.**

11         “(a) IN GENERAL.—The Secretary shall support a  
12         program of research, development, demonstration, and  
13         commercial application for enhanced geothermal systems,  
14         including the programs described in subsection (b).

15         “(b) ENHANCED GEOTHERMAL SYSTEMS TECH-  
16         NOLOGIES.—In collaboration with industry partners, insti-  
17         tutions of higher education, and the national laboratories,  
18         the Secretary shall support a program of research, devel-  
19         opment, demonstration, and commercial application of the  
20         technologies to achieve higher efficiency and lower cost en-  
21         hanced geothermal systems, including—

22                 “(1) reservoir stimulation;

23                 “(2) drilled, non-stimulated (e.g. closed-loop)  
24         reservoir technologies;



1           “(3) reservoir characterization, monitoring, and  
2           modeling and understanding of the surface area and  
3           volume of fractures;

4           “(4) stress and fracture mapping including real  
5           time monitoring and modeling;

6           “(5) tracer development;

7           “(6) three and four-dimensional seismic imag-  
8           ing and tomography;

9           “(7) well placement and orientation;

10          “(8) long-term reservoir management;

11          “(9) drilling technologies, methods, and tools;

12          “(10) improved exploration tools;

13          “(11) zonal isolation; and

14          “(12) understanding induced seismicity risks  
15          from reservoir engineering and stimulation.

16          “(c) FRONTIER OBSERVATORY FOR RESEARCH IN  
17          GEOTHERMAL ENERGY.—

18                 “(1) IN GENERAL.—The Secretary shall sup-  
19                 port the establishment and construction of up to 3  
20                 field research sites, which shall each be known as a  
21                 ‘Frontier Observatory for Research in Geothermal  
22                 Energy’ or ‘FORGE’ site to develop, test, and en-  
23                 hance techniques and tools for enhanced geothermal  
24                 energy.

25                 “(2) DUTIES.—The Secretary shall—

1           “(A) provide financial assistance in sup-  
2 port of research and development projects fo-  
3 cused on advanced monitoring technologies, new  
4 technologies and approaches for implementing  
5 multi-zone stimulations, nonstimulation tech-  
6 niques, and dynamic reservoir modeling that in-  
7 corporates all available high-fidelity character-  
8 ization data; and

9           “(B) seek opportunities to coordinate ef-  
10 forts and share information with domestic and  
11 international partners engaged in research and  
12 development of geothermal systems and related  
13 technology, including coordination between  
14 FORGE sites.

15           “(3) SITE SELECTION.—Of the FORGE sites  
16 referred to in paragraph (1), the Secretary shall—

17           “(A) consider applications through a com-  
18 petitive, merit-reviewed process, from National  
19 Laboratories, multi-institutional collaborations,  
20 institutes of higher education and other appro-  
21 priate entities best suited to provide national  
22 leadership on geothermal related issues and  
23 perform the duties enumerated under this sub-  
24 section;

1           “(B) prioritize existing field sites and fa-  
2           cilities with capabilities relevant to the duties  
3           enumerated under this subsection;

4           “(C) determine the mission need for and  
5           potential location of subsequent FORGE sites  
6           following the completion of construction and  
7           one year of operation of two FORGE sites; and

8           “(D) ensure geologic diversity among  
9           FORGE sites when developing subsequent sites,  
10          to the maximum extent practicable.

11          “(4) EXISTING FORGE SITES.—A FORGE site  
12          already in existence on the date of enactment of this  
13          Act may continue to receive support.

14          “(5) SITE OPERATION.—

15                 “(A) INITIAL DURATION.—FORGE sites  
16                 selected under paragraph (3) shall operate for  
17                 an initial term of not more than 7 years after  
18                 the date on which site operation begins.

19                 “(B) PERFORMANCE METRICS.—The Sec-  
20                 retary shall establish performance metrics for  
21                 each FORGE site supported under this para-  
22                 graph, which may be used by the Secretary to  
23                 determine whether a FORGE site should con-  
24                 tinue to receive funding.

25          “(6) ADDITIONAL TERMS.—

1           “(A) IN GENERAL.—At the end of an oper-  
2           ational term described in subparagraph (B), a  
3           FORGE site may—

4                   “(i) be transferred to other public or  
5                   private entities for further enhanced geo-  
6                   thermal testing; or

7                   “(ii) subject to appropriations and a  
8                   merit review by the Secretary, operate for  
9                   an additional term of not more than 7  
10                  years.

11           “(B) OPERATIONAL TERM DESCRIBED.—  
12           An operational term referred to in subpara-  
13           graph (A)—

14                   “(i) in the case of an existing FORGE  
15                   site, is the existing operational term; and

16                   “(ii) in the case of new FORGE sites  
17                   selected under paragraph (3), is the initial  
18                   term under paragraph (5)(A) or an addi-  
19                   tional term under subparagraph (A)(ii) of  
20                   this paragraph.

21           “(7) FUNDING.—

22                   “(A) IN GENERAL.—Out of funds author-  
23                   ized to be appropriated under section 623, there  
24                   shall be made available to the Secretary to

1 carry out the FORGE activities under this  
2 paragraph—

3 “(i) \$45,000,000 for fiscal year 2021;

4 “(ii) \$55,000,000 for fiscal year 2022;

5 “(iii) \$65,000,000 for fiscal year  
6 2023;

7 “(iv) \$70,000,000 for fiscal year  
8 2024; and

9 “(v) \$70,000,000 for fiscal year 2025.

10 “(B) CONSIDERATIONS.—In carrying out  
11 this subsection, the Secretary shall consider the  
12 balance between funds dedicated to construction  
13 and operations and research activities to reflect  
14 the state of site development.

15 “(d) ENHANCED GEOTHERMAL SYSTEMS DEM-  
16 ONSTRATIONS.—

17 “(1) IN GENERAL.—Beginning on the date of  
18 enactment of this section, the Secretary, in collabo-  
19 ration with industry partners, institutions of higher  
20 education, and the national laboratories, shall sup-  
21 port an initiative for demonstration of enhanced geo-  
22 thermal systems for power production or direct use.

23 “(2) PROJECTS.—

24 “(A) IN GENERAL.—Under the initiative  
25 described in paragraph (1), 4 demonstration

1 projects shall be carried out in locations that  
2 are potentially commercially viable for enhanced  
3 geothermal systems development, while also  
4 considering environmental impacts to the maximum extent practicable, as determined by the  
5 Secretary.  
6

7 “(B) REQUIREMENTS.—Demonstration  
8 projects under subparagraph (A) shall—

9 “(i) collectively demonstrate—

10 “(I) different geologic settings,  
11 such as hot sedimentary aquifers, layered geologic systems, supercritical  
12 systems, and basement rock systems;  
13 and  
14

15 “(II) a variety of development  
16 techniques, including open hole and  
17 cased hole completions, differing well  
18 orientations, and stimulation and non-  
19 stimulation mechanisms; and

20 “(ii) to the extent practicable, use existing sites where subsurface characteriza-  
21 tion or geothermal energy integration analysis has been conducted.  
22  
23

24 “(C) EASTERN DEMONSTRATION.—Not  
25 fewer than 1 of the demonstration projects car-

1           ried out under subparagraph (A) shall be lo-  
2           cated an area east of the Mississippi River that  
3           is suitable for enhanced geothermal demonstra-  
4           tion for power, heat, or a combination of power  
5           and heat.

6           “(D) MILESTONE-BASED DEMONSTRATION  
7           PROJECTS.—The Secretary may carry out dem-  
8           onstration projects under this subsection as a  
9           milestone-based demonstration project under  
10          section 9005 of the Energy Act of 2020.

11          “(3) FUNDING.—Out of funds authorized to be  
12          appropriated under section 623, there shall be made  
13          available to the Secretary to carry out the dem-  
14          onstration activities under this subsection  
15          \$21,000,000 for each of fiscal years 2021 through  
16          2025.”.

17          (e) GEOTHERMAL HEAT PUMPS AND DIRECT USE.—

18               (1) IN GENERAL.—Title VI of the Energy Inde-  
19               pendence and Security Act of 2007 is amended by  
20               inserting after section 616 (42 U.S.C. 17195) the  
21               following:

22          **“SEC. 616A. GEOTHERMAL HEAT PUMPS AND DIRECT USE**  
23               **RESEARCH AND DEVELOPMENT.**

24          “(a) PURPOSES.—The purposes of this section are—

1           “(1) to improve the understanding of related  
2 earth sciences, components, processes, and systems  
3 used for geothermal heat pumps and the direct use  
4 of geothermal energy; and

5           “(2) to increase the energy efficiency, lower the  
6 cost, increase the use, and improve and demonstrate  
7 the effectiveness of geothermal heat pumps and the  
8 direct use of geothermal energy.

9           “(b) DEFINITIONS.—In this section:

10           “(1) DIRECT USE OF GEOTHERMAL ENERGY.—  
11 The term ‘direct use of geothermal energy’ means  
12 geothermal systems that use water directly or  
13 through a heat exchanger to provide—

14           “(A) heating and cooling to buildings, com-  
15 mercial districts, residential communities, and  
16 large municipal, or industrial projects; or

17           “(B) heat required for industrial processes,  
18 agriculture, aquaculture, and other facilities.

19           “(2) ECONOMICALLY DISTRESSED AREA.—The  
20 term ‘economically distressed area’ means an area  
21 described in section 301(a) of the Public Works and  
22 Economic Development Act of 1965 (42 U.S.C.  
23 3161(a)).

24           “(3) GEOTHERMAL HEAT PUMP.—The term  
25 ‘geothermal heat pump’ means a system that pro-



1 vides heating and cooling by exchanging heat from  
2 shallow geology, groundwater, or surface water  
3 using—

4 “(A) a closed loop system, which transfers  
5 heat by way of buried or immersed pipes that  
6 contain a mix of water and working fluid; or

7 “(B) an open loop system, which circulates  
8 ground or surface water directly into the build-  
9 ing and returns the water to the same aquifer  
10 or surface water source.

11 “(c) PROGRAM.—

12 “(1) IN GENERAL.—The Secretary shall sup-  
13 port within the Geothermal Technologies Office a  
14 program of research, development, and demonstra-  
15 tion for geothermal heat pumps and the direct use  
16 of geothermal energy.

17 “(2) AREAS.—The program under paragraph  
18 (1) may include research, development, demonstra-  
19 tion, and commercial application of—

20 “(A) geothermal ground loop efficiency im-  
21 provements, cost reductions, and improved in-  
22 stallation and operations methods;

23 “(B) the use of geothermal energy for  
24 building-scale energy storage;

1           “(C) the use of geothermal energy as a  
2           grid management resource or seasonal energy  
3           storage;

4           “(D) geothermal heat pump efficiency im-  
5           provements;

6           “(E) the use of alternative fluids as a heat  
7           exchange medium, such as hot water found in  
8           mines and mine shafts, graywater, or other  
9           fluids that may improve the economics of geo-  
10          thermal heat pumps;

11          “(F) heating of districts, neighborhoods,  
12          communities, large commercial or public build-  
13          ings, and industrial and manufacturing facili-  
14          ties;

15          “(G) the use of low temperature ground-  
16          water for direct use; and

17          “(H) system integration of direct use with  
18          geothermal electricity production.

19          “(3) ENVIRONMENTAL IMPACTS.—In carrying  
20          out the program, the Secretary shall identify and  
21          mitigate potential environmental impacts in accord-  
22          ance with section 614(b).

23          “(d) FINANCIAL ASSISTANCE.—

24                 “(1) IN GENERAL.—The Secretary shall carry  
25          out the program established in subsection (c) by

1 making financial assistance available to State, local,  
2 and Tribal governments, institutions of higher edu-  
3 cation, nonprofit entities, National Laboratories,  
4 utilities, and for-profit companies.

5 “(2) PRIORITY.—In providing financial assist-  
6 ance under this subsection, the Secretary may give  
7 priority to proposals that apply to large buildings,  
8 commercial districts, and residential communities  
9 that are located in economically distressed areas and  
10 areas that the Secretary determines to have high  
11 economic potential for geothermal district heating  
12 based on the report, ‘Geovision: Harnessing the  
13 Heat Beneath our Feet’ published by the Depart-  
14 ment in 2019, or a successor report.”.

15 (2) CONFORMING AMENDMENT.—Section 1(b)  
16 of the Energy Independence and Security Act of  
17 2007 (42 U.S.C. 17001 note) is amended in the  
18 table of contents by inserting after the item relating  
19 to section 616 the following:

“Sec. 616A. Geothermal heat pumps and direct use research and develop-  
ment.”.

20 (f) ORGANIZATION AND ADMINISTRATION OF PRO-  
21 GRAMS.—

22 (1) IN GENERAL.—Section 617 of the Energy  
23 Independence and Security Act of 2007 (42 U.S.C.  
24 17196) is amended—

1 (A) by striking the section heading and in-  
2 serting “**ORGANIZATION AND ADMINISTRA-**  
3 **TION OF PROGRAMS**”;

4 (B) in subsection (b), by striking para-  
5 graph (2) and redesignating paragraphs (3) and  
6 (4) as paragraphs (2) and (3), respectively; and

7 (C) by adding at the end the following:

8 “(c) **EDUCATION AND OUTREACH.**—In carrying out  
9 the activities described in this subtitle, the Secretary shall  
10 support education and outreach activities to disseminate  
11 information on geothermal energy technologies and the  
12 geothermal energy workforce, including activities at the  
13 Frontier Observatory for Research in Geothermal Energy  
14 site or sites.

15 “(d) **TECHNICAL ASSISTANCE.**—In carrying out this  
16 subtitle, the Secretary shall also conduct technical assist-  
17 ance and analysis activities with eligible entities for the  
18 purpose of supporting the commercial application of ad-  
19 vances in geothermal energy systems development and op-  
20 erations, which may include activities that support ex-  
21 panding access to advanced geothermal energy tech-  
22 nologies for rural, Tribal, and low-income communities.

23 “(e) **REPORT.**—Every 5 years after the date of enact-  
24 ment of this subsection, the Secretary shall report to the  
25 Committee on Science and Technology of the House of

1 Representatives and the Committee on Energy and Nat-  
2 ural Resources of the Senate on advanced concepts and  
3 technologies to maximize the geothermal resource poten-  
4 tial of the United States.

5 “(f) PROGRESS REPORTS.—Not later than 1 year  
6 after the date of enactment of this subsection, and every  
7 2 years thereafter, the Secretary shall submit to the Com-  
8 mittee on Science and Technology of the House of Rep-  
9 resentatives and the Committee on Energy and Natural  
10 Resources of the Senate a report on the results of projects  
11 undertaken under this part and other such information  
12 the Secretary considers appropriate.”.

13 (2) CONFORMING AMENDMENT.—Section 1(b)  
14 of the Energy Independence and Security Act of  
15 2007 (42 U.S.C. 17001 note) is amended in the  
16 table of contents by amending the item related to  
17 section 617 to read as follows:

“Sec. 617. Organization and administration of programs.”.

18 (g) ADVANCED GEOTHERMAL COMPUTING AND DATA  
19 SCIENCE RESEARCH AND DEVELOPMENT.—

20 (1) IN GENERAL.—Section 618 of the Energy  
21 Independence and Security Act of 2007 (42 U.S.C.  
22 17197) is amended to read as follows:

1 **“SEC. 618. ADVANCED GEOTHERMAL COMPUTING AND**  
2 **DATA SCIENCE RESEARCH AND DEVELOP-**  
3 **MENT.**

4 “(a) IN GENERAL.—The Secretary shall carry out a  
5 program of research and development of advanced com-  
6 puting and data science tools for geothermal energy.

7 “(b) PROGRAMS.—The program authorized in sub-  
8 section (a) shall include the following:

9 “(1) ADVANCED COMPUTING FOR GEOTHERMAL  
10 SYSTEMS TECHNOLOGIES.—Research, development,  
11 and demonstration of technologies to develop ad-  
12 vanced data, machine learning, artificial intelligence,  
13 and related computing tools to assist in locating geo-  
14 thermal resources, to increase the reliability of site  
15 characterization, to increase the rate and efficiency  
16 of drilling, to improve induced seismicity mitigation,  
17 and to support enhanced geothermal systems tech-  
18 nologies.

19 “(2) GEOTHERMAL SYSTEMS RESERVOIR MOD-  
20 ELING.—Research, development, and demonstration  
21 of models of geothermal reservoir performance and  
22 enhanced geothermal systems reservoir stimulation  
23 technologies and techniques, with an emphasis on  
24 accurately modeling fluid and heat flow, permeability  
25 evolution, geomechanics, geochemistry, seismicity,

1 and operational performance over time, including  
2 collaboration with industry and field validation.

3 “(c) COORDINATION.—In carrying out these pro-  
4 grams, the Secretary shall ensure coordination and con-  
5 sultation with the Department of Energy’s Office of  
6 Science. The Secretary shall ensure, to the maximum ex-  
7 tent practicable, coordination of these activities with the  
8 Department of Energy National Laboratories, institutes  
9 of higher education, and the private sector.”.

10 (2) CONFORMING AMENDMENT.—Section 1(b)  
11 of the Energy Independence and Security Act of  
12 2007 (42 U.S.C. 17001 note) is amended in the  
13 table of contents by amending the item related to  
14 section 618 to read as follows:

“Sec. 618. Advanced geothermal computing and data science research and de-  
velopment.”.

15 (h) GEOTHERMAL WORKFORCE DEVELOPMENT.—

16 (1) IN GENERAL.—Section 619 of the Energy  
17 Independence and Security Act of 2007 (42 U.S.C.  
18 17198) is amended to read as follows:

19 **“SEC. 619. GEOTHERMAL WORKFORCE DEVELOPMENT.**

20 “The Secretary shall support the development of a  
21 geothermal energy workforce through a program that—

22 “(1) facilitates collaboration between university  
23 students and researchers at the National Labora-  
24 tories; and

1           “(2) prioritizes science in areas relevant to the  
2 mission of the Department through the application  
3 of geothermal energy tools and technologies.”.

4           (2) CONFORMING AMENDMENT.—Section 1(b)  
5 of the Energy Independence and Security Act of  
6 2007 (42 U.S.C. 17001 note) is amended in the  
7 table of contents by amending the item related to  
8 section 619 to read as follows:

“Sec. 619. Geothermal workforce development.”.

9           (i) REPEALS.—

10           (1) EISA REPEAL.—Subtitle B of title VI of  
11 the Energy Independence and Security Act of 2007  
12 (42 U.S.C. 17191 et seq.) is amended by striking  
13 sections 620 and 621.

14           (2) CONFORMING AMENDMENT.—Section 1(b)  
15 of the Energy Independence and Security Act of  
16 2007 (42 U.S.C. 17001 note) is amended in the  
17 table of contents by striking the item related to sec-  
18 tion 620 and 621.

19           (3) ADDITIONAL REPEAL.—The Geothermal  
20 Energy Research, Development, and Demonstration  
21 Act of 1974 (30 U.S.C. 1101 et seq.) is repealed.

22           (j) AUTHORIZATION OF APPROPRIATIONS.—Section  
23 623 of the Energy Independence and Security Act of 2007  
24 (42 U.S.C. 17202) is amended to read as follows:



1 **“SEC. 623. AUTHORIZATION OF APPROPRIATIONS.**

2 “There are authorized to be appropriated to the Sec-  
3 retary to carry out the programs under this subtitle  
4 \$170,000,000 for each of fiscal years 2021 through  
5 2025.”.

6 (k) INTERNATIONAL GEOTHERMAL ENERGY DEVEL-  
7 OPMENT.—Section 624 of the Energy Independence and  
8 Security Act of 2007 (42 U.S.C. 17203) is amended—

9 (1) by amending subsection (a) to read as fol-  
10 lows:

11 “(a) IN GENERAL.—The Secretary of Energy, in co-  
12 ordination with other appropriate Federal and multilateral  
13 agencies (including the United States Agency for Inter-  
14 national Development) shall support collaborative efforts  
15 with international partners to promote the research, devel-  
16 opment, and demonstration of geothermal technologies  
17 used to develop hydrothermal and enhanced geothermal  
18 system resources.”; and

19 (2) by striking subsection (c).

20 (l) REAUTHORIZATION OF HIGH COST REGION GEO-  
21 THERMAL ENERGY GRANT PROGRAM.—Section 625 of the  
22 Energy Independence and Security Act of 2007 (42  
23 U.S.C. 17204) is amended—

24 (1) in subsection (a)(2), by inserting “or heat”  
25 after “electrical power”; and

1           (2) by amending subsection (e) to read as fol-  
2       lows:

3       “(e) AUTHORIZATION OF APPROPRIATIONS.—Out of  
4 funds authorized under section 623, there is authorized  
5 to be appropriated to carry out this section \$5,000,000  
6 for each of fiscal years 2021 through 2025.”.

7       (m) UPDATE TO GEOTHERMAL RESOURCE ASSESS-  
8 MENT.—Section 2501 of the Energy Policy Act of 1992  
9 (30 U.S.C. 1028) is amended—

10           (1) by redesignating subsections (a) and (b) as  
11       subsections (b) and (d), respectively;

12           (2) by inserting before subsection (b) (as so re-  
13       designated) the following:

14       “(a) DEFINITION OF ENHANCED GEOTHERMAL SYS-  
15 TEMS.—In this section, the term ‘enhanced geothermal  
16 systems’ has the meaning given the term in section 612  
17 of the Energy Independence and Security Act of 2007 (42  
18 U.S.C. 17191).”;

19           (3) by inserting after subsection (b) (as so re-  
20       designated) the following:

21       “(c) UPDATE TO GEOTHERMAL RESOURCE ASSESS-  
22 MENT.—The Secretary of the Interior, acting through the  
23 United States Geological Survey, and in consultation with  
24 the Secretary of Energy, shall update the 2008 United

1 States geothermal resource assessment carried out by the  
2 United States Geological Survey, including—

3 “(1) with respect to areas previously identified  
4 by the Department of Energy or the United States  
5 Geological Survey as having significant potential for  
6 hydrothermal energy or enhanced geothermal sys-  
7 tems energy, by focusing on—

8 “(A) improving the resolution of resource  
9 potential at systematic temperatures and  
10 depths, including temperatures and depths ap-  
11 propriate for power generation and direct use  
12 applications;

13 “(B) quantifying the total potential to co-  
14 produce geothermal energy and minerals;

15 “(C) incorporating data relevant to under-  
16 ground thermal energy storage and exchange,  
17 such as aquifer and soil properties; and

18 “(D) producing high resolution maps, in-  
19 cluding—

20 “(i) maps that indicate key subsurface  
21 parameters for electric and direct use re-  
22 sources; and

23 “(ii) risk maps for induced seismicity  
24 based on geologic, geographic, and oper-  
25 ational parameters; and

1           “(2) to the maximum extent practicable, by co-  
2           ordinating with relevant State officials and institu-  
3           tions of higher education to expand geothermal as-  
4           sessments, including enhanced geothermal systems  
5           assessments, to include assessments for the Com-  
6           monwealth of Puerto Rico and the States of Alaska  
7           and Hawaii.”; and

8           (4) in subsection (d) (as so redesignated), by  
9           striking “necessary” and inserting “necessary”.

10          (n) MODIFYING THE DEFINITION OF RENEWABLE  
11 ENERGY TO INCLUDE THERMAL ENERGY.—

12          (o) MODIFYING THE DEFINITION OF RENEWABLE  
13 ENERGY TO INCLUDE THERMAL ENERGY.—Section 203  
14 of the Energy Policy Act of 2005 (42 U.S.C. 15852) is  
15 amended—

16           (1) in subsection (b)(2), by striking “gen-  
17           erated” and inserting “produced”; and

18           (2) in subsection (c)—

19                   (A) by redesignating paragraphs (1)  
20                   through (3) as subparagraphs (A) through (C),  
21                   respectively, and indenting appropriately;

22                   (B) in the matter preceding subparagraph  
23                   (A) (as so redesignated), by striking “For pur-  
24                   poses” and inserting the following:

25                   “(1) IN GENERAL.—For purposes”; and

1 (C) by adding at the end the following:

2 “(2) SEPARATE CALCULATION.—

3 “(A) IN GENERAL.—For purposes of deter-  
4 mining compliance with the requirement of this  
5 section, any energy consumption that is avoided  
6 through the use of geothermal energy shall be  
7 considered to be renewable energy produced.

8 “(B) EFFICIENCY ACCOUNTING.—Energy  
9 consumption that is avoided through the use of  
10 geothermal energy that is considered to be re-  
11 newable energy under this section shall not be  
12 considered energy efficiency for the purpose of  
13 compliance with Federal energy efficiency goals,  
14 targets, and incentives.”.

15 **SEC. 3003. WIND ENERGY RESEARCH AND DEVELOPMENT.**

16 (a) DEFINITIONS.—In this section:

17 (1) CRITICAL MATERIAL.—The term “critical  
18 material” has the meaning given the term in section  
19 7002 of this Act.

20 (2) ECONOMICALLY DISTRESSED AREA.—The  
21 term “economically distressed area” means an area  
22 described in section 301(a) of the Public Works and  
23 Economic Development Act of 1965 (42 U.S.C.  
24 3161(a)).

1           (3) ELIGIBLE ENTITY.—The term “eligible enti-  
2           ty” means—

3                   (A) an institution of higher education, in-  
4                   cluding a minority-serving institution;

5                   (B) a National Laboratory;

6                   (C) a Federal research agency;

7                   (D) a State research agency;

8                   (E) a research agency associated with a  
9                   territory or freely associated state;

10                  (F) a Tribal energy development organiza-  
11                  tion;

12                  (G) an Indian Tribe;

13                  (H) a Tribal organization;

14                  (I) a Native Hawaiian community-based  
15                  organization;

16                  (J) a nonprofit research organization;

17                  (K) an industrial entity;

18                  (L) any other entity, as determined by the  
19                  Secretary; and

20                  (M) a consortium of 2 or more entities de-  
21                  scribed in subparagraphs (A) through (L).

22           (4) INDIAN TRIBE.—The term “Indian Tribe”  
23           has the meaning given the term in section 4 of the  
24           Indian Self-Determination and Education Assistance  
25           Act (25 U.S.C. 5304).

1           (5) INSTITUTION OF HIGHER EDUCATION.—The  
2 term “institution of higher education” means—

3           (A) an institution of higher education (as  
4 defined in section 101(a) of the Higher Edu-  
5 cation Act of 1965 (20 U.S.C. 1001(a))); or

6           (B) a postsecondary vocational institution  
7 (as defined in section 102(c) of the Higher  
8 Education Act of 1965 (20 U.S.C. 1002(c))).

9           (6) MINORITY SERVING INSTITUTION.—The  
10 term “minority-serving institution” has the meaning  
11 given the term “eligible institution” in section  
12 371(a) of the Higher Education Act of 1965 (20  
13 U.S.C. 1067q(a)).

14           (7) NATIONAL LABORATORY.—The term “Na-  
15 tional Laboratory” has the meaning given such term  
16 in section 2(3) of the Energy Policy Act of 2005 (42  
17 U.S.C. 15801(3)).

18           (8) NATIVE HAWAIIAN COMMUNITY-BASED OR-  
19 GANIZATION.—The term “Native Hawaiian commu-  
20 nity-based organization” has the meaning given the  
21 term in section 6207 of the Elementary and Sec-  
22 ondary Education Act of 1965 (20 U.S.C. 7517).

23           (9) PROGRAM.—The term “program” means  
24 the program established under subsection (b)(1).

1           (10) SECRETARY.—The term “Secretary”  
2 means the Secretary of Energy.

3           (11) TERRITORY OR FREELY ASSOCIATED  
4 STATE.—The term “territory or freely associated  
5 state” has the meaning given the term “insular  
6 area” in section 1404 of the Food and Agriculture  
7 Act of 1977 (7 U.S.C. 3103).

8           (12) TRIBAL ENERGY DEVELOPMENT ORGANI-  
9 ZATION.—The term “Tribal energy development or-  
10 ganization” has the meaning given the term “tribal  
11 energy development organization” in section 2601 of  
12 the Energy Policy Act of 1992 (25 U.S.C. 3501).

13           (13) TRIBAL ORGANIZATION.—The term “Trib-  
14 al organization” has the meaning given the term in  
15 section 4 of the Indian Self-Determination and Edu-  
16 cation Assistance Act (25 U.S.C. 5304).

17 (b) WIND ENERGY TECHNOLOGY PROGRAM.—

18           (1) ESTABLISHMENT.—

19           (A) IN GENERAL.—The Secretary shall es-  
20 tablish a program to conduct research, develop-  
21 ment, demonstration, and commercialization of  
22 wind energy technologies in accordance with  
23 this subsection.

24           (B) PURPOSES.—The purposes of the pro-  
25 gram are the following:



1 (i) To improve the energy efficiency,  
2 cost effectiveness, reliability, resilience, se-  
3 curity, siting, integration,  
4 manufacturability, installation, decommis-  
5 sioning, and recyclability of wind energy  
6 technologies.

7 (ii) To optimize the performance and  
8 operation of wind energy components, tur-  
9 bines, and systems, including through the  
10 development of new materials, hardware,  
11 and software.

12 (iii) To optimize the design and  
13 adaptability of wind energy technologies to  
14 the broadest practical range of geographic,  
15 atmospheric, offshore, and other site condi-  
16 tions, including—

17 (I) at varying hub heights; and

18 (II) through the use of computer  
19 modeling.

20 (iv) To support the integration of  
21 wind energy technologies with the electric  
22 grid and other energy technologies and sys-  
23 tems.

24 (v) To reduce the cost, risk, and other  
25 potential negative impacts across the life-

1 span of wind energy technologies, includ-  
2 ing—

3 (I) manufacturing, siting, permit-  
4 ting, installation, operations, mainte-  
5 nance, decommissioning, and recy-  
6 cling; and

7 (II) through the development of  
8 solutions to transportation barriers to  
9 wind components.

10 (vi) To reduce and mitigate potential  
11 negative impacts of wind energy tech-  
12 nologies on human communities, the envi-  
13 ronment, or commerce.

14 (vii) To address barriers to the com-  
15 mercialization and export of wind energy  
16 technologies.

17 (viii) To support the domestic wind  
18 industry, workforce, and supply chain.

19 (C) TARGETS.—Not later than 180 days  
20 after the date of enactment of this Act, the Sec-  
21 retary shall establish targets for the program  
22 relating to near-term (up to 2 years), mid-term  
23 (up to 7 years), and long-term (up to 15 years)  
24 challenges to the advancement of wind energy

1 technologies, including onshore, offshore, dis-  
2 tributed, and off-grid technologies.

3 (2) ACTIVITIES.—

4 (A) TYPES OF ACTIVITIES.—In carrying  
5 out the program, the Secretary shall carry out  
6 research, development, demonstration, and com-  
7 mercialization activities, including—

8 (i) awarding grants and awards, on a  
9 competitive, merit-reviewed basis;

10 (ii) performing precompetitive re-  
11 search and development;

12 (iii) establishing or maintaining dem-  
13 onstration facilities and projects, including  
14 through stewardship of existing facilities  
15 such as the National Wind Test Center;

16 (iv) providing technical assistance;

17 (v) entering into contracts and cooper-  
18 ative agreements;

19 (vi) providing small business vouchers;

20 (vii) establishing prize competitions;

21 (viii) conducting education and out-  
22 reach activities;

23 (ix) conducting professional develop-  
24 ment activities; and

1                   (x) conducting analyses, studies, and  
2                   reports.

3                   (B) SUBJECT AREAS.—The Secretary shall  
4                   carry out research, development, demonstration,  
5                   and commercialization activities in the following  
6                   subject areas:

7                   (i) Wind power plant siting, perform-  
8                   ance, operations, and security.

9                   (ii) New materials and designs relat-  
10                  ing to all hardware, software, and compo-  
11                  nents of wind energy technologies, includ-  
12                  ing technologies and strategies that reduce  
13                  the use of energy, water, critical materials,  
14                  and other commodities that are determined  
15                  to be vulnerable to disruption.

16                  (iii) Advanced wind energy manufac-  
17                  turing and installation technologies and  
18                  practices, including materials, processes,  
19                  such as onsite or near site manufacturing,  
20                  and design.

21                  (iv) Offshore wind-specific projects  
22                  and plants, including—

23                         (I) fixed and floating sub-  
24                         structure systems, materials, and  
25                         components;

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1 (II) the operation of offshore fa-  
2 cilities, such as—

3 (aa) an offshore research fa-  
4 cility to conduct research for oce-  
5 anic, biological, geological, and  
6 atmospheric resource character-  
7 ization relevant to offshore wind  
8 energy development in coordina-  
9 tion with the ocean and atmos-  
10 pheric science communities; and

11 (bb) an offshore support  
12 structure testing facility to con-  
13 duct development, demonstration,  
14 and commercialization of large-  
15 scale and full-scale offshore wind  
16 energy support structure compo-  
17 nents and systems;

18 (III) the monitoring and analysis  
19 of site and environmental consider-  
20 ations unique to offshore sites, includ-  
21 ing freshwater environments.

22 (v) Integration of wind energy tech-  
23 nologies with—

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1 (I) the electric grid, including  
2 transmission, distribution, microgrids,  
3 and distributed energy systems; and

4 (II) other energy technologies, in-  
5 cluding—

6 (aa) other generation  
7 sources;

8 (bb) demand response tech-  
9 nologies; and

10 (cc) energy storage tech-  
11 nologies.

12 (vi) Methods to improve the lifetime,  
13 maintenance, decommissioning, recycling,  
14 reuse, and sustainability of wind energy  
15 components and systems, including tech-  
16 nologies and strategies to reduce the use of  
17 energy, water, critical materials, and other  
18 valuable or harmful inputs.

19 (vii) Wind power forecasting and at-  
20 mospheric measurement systems, including  
21 for turbines and plant systems of varying  
22 height.

23 (viii) Integrated wind energy systems,  
24 grid-connected and off-grid, that incor-  
25 porate diverse—

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- 1 (I) generation sources;
- 2 (II) loads; and
- 3 (III) storage technologies.
- 4 (ix) Reducing market barriers, includ-
- 5 ing non-hardware and information-based
- 6 barriers, to the adoption of wind energy
- 7 technologies, such as impacts on, or chal-
- 8 lenges relating to—
- 9 (I) distributed wind technologies,
- 10 including the development of best
- 11 practices, models, and voluntary
- 12 streamlined processes for local siting
- 13 and permitting of distributed wind en-
- 14 ergy systems to reduce costs;
- 15 (II) airspace;
- 16 (III) military operations;
- 17 (IV) radar;
- 18 (V) local communities, with spe-
- 19 cial consideration given to economi-
- 20 cally distressed areas, previously dis-
- 21 turbed lands such as landfills and
- 22 former mines, and other areas dis-
- 23 proportionately impacted by environ-
- 24 mental pollution;

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1 (VI) wildlife and wildlife habitats;

2 and

3 (VII) any other appropriate mat-  
4 ter, as determined by the Secretary.

5 (x) Technologies or strategies to  
6 avoid, minimize, and offset the potential  
7 impacts of wind energy facilities on bird  
8 species, bat species, marine wildlife, and  
9 other sensitive species and habitats.

10 (xi) Advanced physics-based and data  
11 analysis computational tools, in coordina-  
12 tion with the high-performance computing  
13 programs of the Department, to more effi-  
14 ciently design, site, permit, manufacture,  
15 install, operate, decommission, and recycle  
16 wind energy systems.

17 (xii) Technologies for distributed  
18 wind, including micro, small, and medium  
19 turbines and the components of those tur-  
20 bines and their microgrid applications.

21 (xiii) Transformational technologies  
22 for harnessing wind energy.

23 (xiv) Other research areas that ad-  
24 vance the purposes of the program, as de-  
25 termined by the Secretary.



1                   (C) PRIORITIZATION.—In carrying out ac-  
2                   tivities under the program, the Secretary shall,  
3                   to the maximum extent practicable, give special  
4                   consideration to—

5                               (i) projects that—

6                                       (I) are located in a geographi-  
7                                       cally diverse range of eligible entities;

8                                       (II) support the development or  
9                                       demonstration of projects—

10   (aa) in economically dis-  
11   tressed areas and areas dis-  
12   proportionately impacted by pol-  
13   lution; and

14   (bb) that provide the great-  
15   est potential to reduce energy  
16   costs, as well as promote accessi-  
17   bility and community implemen-  
18   tation of demonstrated tech-  
19   nologies;

20   (III) can be replicated in a vari-  
21   ety of regions and climates;

22   (IV) include business commer-  
23   cialization plans that have the poten-  
24   tial for—

1 (aa) domestic manufacturing  
2 and production of wind energy  
3 technologies; or

4 (bb) exports of wind energy  
5 technologies; and

6 (V) are carried out in collabora-  
7 tion with Tribal energy development  
8 organizations, Indian Tribes, Tribal  
9 organizations, Native Hawaiian com-  
10 munity-based organizations, minority-  
11 serving institutions, or territories or  
12 freely associated States; and

13 (ii) with regards to professional devel-  
14 opment, activities that expand the number  
15 of individuals from underrepresented  
16 groups pursuing and attaining skills rel-  
17 evant to wind energy.

18 (D) COORDINATION.—To the maximum ex-  
19 tent practicable, the Secretary shall coordinate  
20 activities under the program with other relevant  
21 programs and capabilities of the Department  
22 and other Federal research programs.

23 (E) USE OF FUNDS.—To the extent that  
24 funding is not otherwise available through other  
25 Federal programs or power purchase agree-

1           ments, funding awarded for demonstration  
2           projects may be used for additional nontech-  
3           nology costs, as determined to be appropriate  
4           by the Secretary, such as engineering or feasi-  
5           bility studies.

6           (F) SOLICITATION.—Not less than once  
7           every two years, the Secretary shall conduct a  
8           national solicitation for applications for dem-  
9           onstration projects under this section.

10          (G) REPORT.—

11           (i) IN GENERAL.—Not later than 180  
12           days after the date of the enactment of  
13           this Act, the Secretary shall submit to the  
14           Committee on Science, Space, and Tech-  
15           nology of the House of Representatives  
16           and the Committee on Energy and Natural  
17           Resources of the Senate a report on the  
18           potential for, and technical viability of, air-  
19           borne wind energy systems to provide a  
20           significant source of energy in the United  
21           States.

22           (ii) CONTENTS.—The report under  
23           paragraph (1) shall include a summary of  
24           research, development, demonstration, and  
25           commercialization needs, including an esti-

1           mate of Federal funding requirements, to  
2           further examine and validate the technical  
3           and economic viability of airborne wind en-  
4           ergy concepts over the 10-year period be-  
5           ginning on the date of the enactment of  
6           this Act.

7           (3) WIND TECHNICIAN TRAINING GRANT PRO-  
8           GRAM.—The Secretary may award grants, on a com-  
9           petitive basis, to eligible entities to purchase large  
10          pieces of wind component equipment, such as na-  
11          celles, towers, and blades, for use in training wind  
12          technician students in onshore or offshore wind ap-  
13          plications.

14          (4) WIND ENERGY TECHNOLOGY RECYCLING  
15          RESEARCH, DEVELOPMENT, AND DEMONSTRATION  
16          PROGRAM.—

17                (A) IN GENERAL.—In addition to the pro-  
18                gram activities described in paragraph (2), in  
19                carrying out the program, the Secretary shall  
20                award financial assistance to eligible entities for  
21                research, development, and demonstration, and  
22                commercialization projects to create innovative  
23                and practical approaches to increase the reuse  
24                and recycling of wind energy technologies, in-  
25                cluding—

1 (i) by increasing the efficiency and  
2 cost effectiveness of the recovery of raw  
3 materials from wind energy technology  
4 components and systems, including ena-  
5 bling technologies such as inverters;

6 (ii) by minimizing potential environ-  
7 mental impacts from the recovery and dis-  
8 posal processes;

9 (iii) by advancing technologies and  
10 processes for the disassembly and recycling  
11 of wind energy devices;

12 (iv) by developing alternative mate-  
13 rials, designs, manufacturing processes,  
14 and other aspects of wind energy tech-  
15 nologies and the disassembly and resource  
16 recovery process that enable efficient, cost  
17 effective, and environmentally responsible  
18 disassembly of, and resource recovery  
19 from, wind energy technologies; and

20 (v) strategies to increase consumer ac-  
21 ceptance of, and participation in, the recy-  
22 cling of wind energy technologies.

23 (B) DISSEMINATION OF RESULTS.—The  
24 Secretary shall make available to the public and  
25 the relevant committees of Congress the results

1 of the projects carried out through financial as-  
2 sistance awarded under subparagraph (A), in-  
3 cluding—

4 (i) development of best practices or  
5 training materials for use in the wind en-  
6 ergy technology manufacturing, design, in-  
7 stallation, decommissioning, or recycling  
8 industries;

9 (ii) dissemination at industry con-  
10 ferences;

11 (iii) coordination with information dis-  
12 semination programs relating to recycling  
13 of electronic devices in general;

14 (iv) demonstration projects; and

15 (v) educational materials.

16 (C) PRIORITY.—In carrying out the activi-  
17 ties authorized under this subsection, the Sec-  
18 retary shall give special consideration to  
19 projects that recover critical materials.

20 (D) SENSITIVE INFORMATION.—In car-  
21 rying out the activities authorized under this  
22 subsection, the Secretary shall ensure proper  
23 security controls are in place to protect propri-  
24 etary or sensitive information, as appropriate.

1           (5) WIND ENERGY TECHNOLOGY MATERIALS  
2           PHYSICAL PROPERTY DATABASE.—

3           (A) IN GENERAL.—Not later than Sep-  
4           tember 1, 2022, the Secretary shall establish a  
5           comprehensive physical property database of  
6           materials for use in wind energy technologies,  
7           which shall identify the type, quantity, country  
8           of origin, source, significant uses, projected  
9           availability, and physical properties of materials  
10          used in wind energy technologies.

11          (B) COORDINATION.—In establishing the  
12          database described in subparagraph (A), the  
13          Secretary shall coordinate and, to the extent  
14          practicable, avoid duplication with—

15               (i) other Department activities, in-  
16               cluding those carried out by the Office of  
17               Science;

18               (ii) the Director of the National Insti-  
19               tute of Standards and Technology;

20               (iii) the Administrator of the Environ-  
21               mental Protection Agency;

22               (iv) the Secretary of the Interior; and

23               (v) relevant industry stakeholders, as  
24               determined by the Secretary.

1           (6) WIND ENERGY PROGRAM STRATEGIC VI-  
2           SION.—

3           (A) IN GENERAL.—Not later than Sep-  
4           tember 1, 2022, and every 6 years thereafter,  
5           the Secretary shall submit to Congress a report  
6           on the strategic vision, progress, goals, and tar-  
7           gets of the program, including assessments of  
8           wind energy markets and manufacturing.

9           (B) PREPARATION.—The Secretary shall  
10          coordinate the preparation of the report under  
11          subparagraph (A) with—

12                 (i) existing peer review processes;

13                 (ii) studies conducted by the National  
14          Laboratories; and

15                 (iii) the multiyear program planning  
16          required under section 994 of the Energy  
17          Policy Act of 2005 (42 U.S.C. 16358).

18          (7) AUTHORIZATION OF APPROPRIATIONS.—  
19          There is authorized to be appropriated to the Sec-  
20          retary to carry out the program \$125,000,000 for  
21          each of fiscal years 2021 through 2025.

22 **SEC. 3004. SOLAR ENERGY RESEARCH AND DEVELOPMENT.**

23          (a) DEFINITIONS.—In this section:



1           (1) CRITICAL MATERIAL.—The term “critical  
2 material” has the meaning given the term in section  
3 7002 of this Act.

4           (2) ECONOMICALLY DISTRESSED AREA.—The  
5 term “economically distressed area” means an area  
6 described in section 301(a) of the Public Works and  
7 Economic Development Act of 1965 (42 U.S.C.  
8 3161(a)).

9           (3) ELIGIBLE ENTITY.—The term “eligible enti-  
10 ty” means—

11                   (A) an institution of higher education, in-  
12 cluding a minority-serving institution;

13                   (B) a National Laboratory;

14                   (C) a Federal research agency;

15                   (D) a State research agency;

16                   (E) a research agency associated with a  
17 territory or freely associated state;

18                   (F) a Tribal energy development organiza-  
19 tion;

20                   (G) an Indian Tribe;

21                   (H) a Tribal organization;

22                   (I) a Native Hawaiian community-based  
23 organization;

24                   (J) a nonprofit research organization;

25                   (K) an industrial entity;

1           (L) any other entity, as determined by the  
2           Secretary; and

3           (M) a consortium of 2 or more entities de-  
4           scribed in subparagraphs (A) through (L).

5           (4) INDIAN TRIBE.—The term “Indian Tribe”  
6           has the meaning given the term in section 4 of the  
7           Indian Self-Determination and Education Assistance  
8           Act (25 U.S.C. 5304).

9           (5) INSTITUTION OF HIGHER EDUCATION.—The  
10          term “institution of higher education” has the  
11          meaning given the term in section 101 of the Higher  
12          Education Act of 1965 (20 U.S.C. 1001).

13          (6) MINORITY-SERVING INSTITUTION.—The  
14          term “minority-serving institution” has the meaning  
15          given the term “eligible institution” in section  
16          371(a) of the Higher Education Act of 1965 (20  
17          U.S.C. 1067q(a)).

18          (7) NATIONAL LABORATORY.—The term “Na-  
19          tional Laboratory” has the meaning given such term  
20          in section 2(3) of the Energy Policy Act of 2005 (42  
21          U.S.C. 15801(3)).

22          (8) NATIVE HAWAIIAN COMMUNITY-BASED OR-  
23          GANIZATION.—The term “Native Hawaiian commu-  
24          nity-based organization” has the meaning given the

1 term in section 6207 of the Elementary and Sec-  
2 ondary Education Act of 1965 (20 U.S.C. 7517).

3 (9) PHOTOVOLTAIC DEVICE.—The term “photo-  
4 voltaic device” means—

5 (A) a device that converts light directly  
6 into electricity through a solid-state, semicon-  
7 ductor process;

8 (B) the photovoltaic cells of a device de-  
9 scribed in subparagraph (A); and

10 (C) the electronic and electrical compo-  
11 nents of a device described in subparagraph  
12 (A).

13 (10) PROGRAM.—The term “program” means  
14 the program established under subsection (b)(1)(A).

15 (11) SECRETARY.—The term “Secretary”  
16 means the Secretary of Energy.

17 (12) SOLAR ENERGY.—The term “solar energy”  
18 means—

19 (A) thermal or electric energy derived from  
20 radiation from the Sun; or

21 (B) energy resulting from a chemical reac-  
22 tion caused by radiation recently originated in  
23 the Sun.

24 (13) TERRITORY OR FREELY ASSOCIATED  
25 STATE.—The term “territory or freely associated

1 state” has the meaning given the term “insular  
2 area” in section 1404 of the Food and Agriculture  
3 Act of 1977 (7 U.S.C. 3103).

4 (14) TRIBAL ENERGY DEVELOPMENT ORGANI-  
5 ZATION.—The term “Tribal energy development or-  
6 ganization” has the meaning given the term “tribal  
7 energy development organization” in section 2601 of  
8 the Energy Policy Act of 1992 (25 U.S.C. 3501).

9 (15) TRIBAL ORGANIZATION.—The term “Trib-  
10 al organization” has the meaning given the term in  
11 section 4 of the Indian Self-Determination and Edu-  
12 cation Assistance Act (25 U.S.C. 5304).

13 (b) SOLAR ENERGY TECHNOLOGY PROGRAM.—

14 (1) ESTABLISHMENT.—

15 (A) IN GENERAL.—The Secretary shall es-  
16 tablish a program to conduct research, develop-  
17 ment, demonstration, and commercialization of  
18 solar energy technologies in accordance with  
19 this subsection.

20 (B) PURPOSES.—The purposes of the pro-  
21 gram are the following:

22 (i) To improve the energy efficiency,  
23 cost effectiveness, reliability, resilience, se-  
24 curity, siting, integration,  
25 manufacturability, installation, decommis-

1 sioning, and recyclability of solar energy  
2 technologies.

3 (ii) To optimize the performance and  
4 operation of solar energy components,  
5 cells, and systems, and enabling tech-  
6 nologies, including through the develop-  
7 ment of new materials, hardware, and soft-  
8 ware.

9 (iii) To optimize the design and  
10 adaptability of solar energy systems to the  
11 broadest practical range of geographic and  
12 atmospheric conditions.

13 (iv) To support the integration of  
14 solar energy technologies with the electric  
15 grid and complementary energy tech-  
16 nologies.

17 (v) To create and improve the conver-  
18 sion of solar energy to other useful forms  
19 of energy or other products.

20 (vi) To reduce the cost, risk, and  
21 other potential negative impacts across the  
22 lifespan of solar energy technologies, in-  
23 cluding manufacturing, siting, permitting,  
24 installation, operations, maintenance, de-  
25 commissioning, and recycling.

1 (vii) To reduce and mitigate potential  
2 life cycle negative impacts of solar energy  
3 technologies on human communities, wild-  
4 life, and wildlife habitats.

5 (viii) To address barriers to the com-  
6 mercialization and export of solar energy  
7 technologies.

8 (ix) To support the domestic solar in-  
9 dustry, workforce, and supply chain.

10 (C) TARGETS.—Not later than 180 days  
11 after the date of enactment of this Act, the Sec-  
12 retary shall establish targets for the program to  
13 address near-term (up to 2 years), mid-term  
14 (up to 7 years), and long-term (up to 15 years)  
15 challenges to the advancement of all types of  
16 solar energy systems.

17 (2) ACTIVITIES.—

18 (A) TYPES OF ACTIVITIES.—In carrying  
19 out the program, the Secretary shall carry out  
20 research, development, demonstration, and com-  
21 mercialization activities, including—

22 (i) awarding grants and awards, on a  
23 competitive, merit-reviewed basis;

24 (ii) performing precompetitive re-  
25 search and development;

- 1 (iii) establishing or maintaining dem-  
2 onstration facilities and projects, including  
3 through stewardship of existing facilities;  
4 (iv) providing technical assistance;  
5 (v) entering into contracts and cooper-  
6 ative agreements;  
7 (vi) providing small business vouchers;  
8 (vii) establishing prize competitions;  
9 (viii) conducting education and out-  
10 reach activities;  
11 (ix) conducting workforce development  
12 activities; and  
13 (x) conducting analyses, studies, and  
14 reports.

15 (B) SUBJECT AREAS.—The Secretary shall  
16 carry out research, development, demonstration,  
17 and commercialization activities in the following  
18 subject areas:

- 19 (i) Advanced solar energy technologies  
20 of varying scale and power production, in-  
21 cluding—

22 (I) new materials, components,  
23 designs, and systems, including  
24 perovskites, cadmium telluride, and  
25 organic materials;

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1 (II) advanced photovoltaic and  
2 thin-film devices;

3 (III) concentrated solar power;

4 (IV) solar heating and cooling;

5 and

6 (V) enabling technologies for  
7 solar energy systems, including hard-  
8 ware and software.

9 (ii) Solar energy technology siting,  
10 performance, installation, operations, resil-  
11 ience, and security.

12 (iii) Integration of solar energy tech-  
13 nologies with—

14 (I) the electric grid, including  
15 transmission, distribution, microgrids,  
16 and distributed energy systems;

17 (II) other energy technologies, in-  
18 cluding—

19 (aa) other generation  
20 sources;

21 (bb) demand response tech-  
22 nologies; and

23 (cc) energy storage tech-  
24 nologies; and



1 (III) other applications, such as  
2 in the agriculture, transportation,  
3 buildings, industrial, and fuels sectors.

4 (iv) Advanced solar energy manufac-  
5 turing technologies and practices, including  
6 materials, processes, and design.

7 (v) Methods to improve the lifetime,  
8 maintenance, decommissioning, recycling,  
9 reuse, and sustainability of solar energy  
10 components and systems, including tech-  
11 nologies and strategies that reduce the use  
12 of energy, water, critical materials, and  
13 other commodities that are determined to  
14 be vulnerable to disruption.

15 (vi) Solar energy forecasting, mod-  
16 eling, and atmospheric measurement sys-  
17 tems, including for small-scale, large-scale,  
18 and aggregated systems.

19 (vii) Integrated solar energy systems  
20 that incorporate diverse—

21 (I) generation sources;

22 (II) loads; and

23 (III) storage technologies.

24 (viii) Reducing market barriers, in-  
25 cluding nonhardware and information-

1 based barriers, to the adoption of solar en-  
2 ergy technologies, including impacts on, or  
3 challenges relating to—

4 (I) distributed and community  
5 solar technologies, including the devel-  
6 opment of best practices, models, and  
7 voluntary streamlined processes for  
8 local siting and permitting of distrib-  
9 uted solar energy systems to reduce  
10 costs;

11 (II) local communities, with spe-  
12 cial consideration given to economi-  
13 cally distressed areas, previously dis-  
14 turbed lands such as landfills and  
15 former mines, and other areas dis-  
16 proportionately impacted by environ-  
17 mental pollution;

18 (III) wildlife and wildlife habi-  
19 tats; and

20 (IV) any other appropriate mat-  
21 ter, as determined by the Secretary.

22 (ix) Transformational technologies for  
23 harnessing solar energy.

1                   (x) Other research areas that advance  
2                   the purposes of the program, as deter-  
3                   mined by the Secretary.

4                   (C) PRIORITIZATION.—In carrying out ac-  
5                   tivities under the program, the Secretary shall,  
6                   to the maximum extent practicable, give priority  
7                   to projects that—

8                   (i) are located in a geographically di-  
9                   verse range of eligible entities;

10                  (ii) support the development or dem-  
11                  onstration of projects—

12                   (I) in economically distressed  
13                   areas and areas disproportionately im-  
14                   pacted by pollution; or

15                   (II) that provide the greatest po-  
16                   tential to reduce energy costs, as well  
17                   as promote accessibility and commu-  
18                   nity implementation of demonstrated  
19                   technologies;

20                  (iii) can be replicated in a variety of  
21                  regions and climates;

22                  (iv) include business commercializa-  
23                  tion plans that have the potential for—

1 (I) domestic manufacturing and  
2 production of solar energy tech-  
3 nologies; or

4 (II) exports of solar energy tech-  
5 nologies;

6 (v) are carried out in collaboration  
7 with Tribal energy development organiza-  
8 tions, Indian Tribes, Tribal organizations,  
9 Native Hawaiian community-based organi-  
10 zations, minority-serving institutions, or  
11 territories or freely associated States; and

12 (vi) with regards to workforce develop-  
13 ment, activities that expand the number of  
14 individuals from underrepresented groups  
15 pursuing and attaining skills relevant to  
16 solar energy.

17 (D) COORDINATION.—To the maximum ex-  
18 tent practicable, the Secretary shall coordinate  
19 activities under the program with other relevant  
20 programs and capabilities of the Department  
21 and other Federal research programs.

22 (E) USE OF FUNDS.—To the extent that  
23 funding is not otherwise available through other  
24 Federal programs or power purchase agree-  
25 ments, funding awarded for demonstration

1 projects may be used for additional nontech-  
2 nology costs, as determined to be appropriate  
3 by the Secretary, such as engineering or feasi-  
4 bility studies.

5 (F) SOLICITATION.—Not less than once  
6 every two years, the Secretary shall conduct a  
7 national solicitation for applications for dem-  
8 onstration projects under this section.

9 (3) ADVANCED SOLAR ENERGY MANUFAC-  
10 TURING INITIATIVE.—

11 (A) GRANTS.—In addition to the program  
12 activities described in paragraph (2), in car-  
13 rying out the program, the Secretary shall  
14 award financial assistance to eligible entities for  
15 research, development, demonstration, and com-  
16 mercialization projects to advance new solar en-  
17 ergy manufacturing technologies and tech-  
18 niques.

19 (B) PRIORITY.—In awarding grants under  
20 subparagraph (A), to the extent practicable, the  
21 Secretary shall give priority to solar energy  
22 manufacturing projects that—

23 (i) increase efficiency and cost effec-  
24 tiveness in—

1 (I) the manufacturing process;

2 and

3 (II) the use of resources, such as

4 energy, water, and critical materials;

5 (ii) support domestic supply chains for  
6 materials and components;

7 (iii) identify and incorporate nonhaz-  
8 ardous alternative materials for compo-  
9 nents and devices;

10 (iv) operate in partnership with Tribal  
11 energy development organizations, Indian  
12 Tribes, Tribal organizations, Native Ha-  
13 waiian community-based organizations, mi-  
14 nority-serving institutions, or territories or  
15 freely associated states; or

16 (v) are located in economically dis-  
17 tressed areas.

18 (C) EVALUATION.—Not later than 3 years  
19 after the date of enactment of this Act, and  
20 every 4 years thereafter, the Secretary shall  
21 conduct, and make available to the public and  
22 the relevant committees of Congress, an inde-  
23 pendent review of the progress of the grants  
24 awarded under subparagraph (A).

1           (4) SOLAR ENERGY TECHNOLOGY RECYCLING  
2 RESEARCH, DEVELOPMENT, AND DEMONSTRATION  
3 PROGRAM.—

4           (A) IN GENERAL.—In addition to the pro-  
5 gram activities described in paragraph (2), in  
6 carrying out the program, the Secretary shall  
7 award financial assistance to eligible entities for  
8 research, development, demonstration, and com-  
9 mercialization projects to create innovative and  
10 practical approaches to increase the reuse and  
11 recycling of solar energy technologies, includ-  
12 ing—

13           (i) by increasing the efficiency and  
14 cost effectiveness of the recovery of raw  
15 materials from solar energy technology  
16 components and systems, including ena-  
17 bling technologies such as inverters;

18           (ii) by minimizing potential environ-  
19 mental impacts from the recovery and dis-  
20 posal processes;

21           (iii) by advancing technologies and  
22 processes for the disassembly and recycling  
23 of solar energy devices;

24           (iv) by developing alternative mate-  
25 rials, designs, manufacturing processes,

1                   and other aspects of solar energy tech-  
2                   nologies and the disassembly and resource  
3                   recovery process that enable efficient, cost  
4                   effective, and environmentally responsible  
5                   disassembly of, and resource recovery  
6                   from, solar energy technologies; and

7                   (v) strategies to increase consumer ac-  
8                   ceptance of, and participation in, the recy-  
9                   cling of photovoltaic devices.

10                  (B) DISSEMINATION OF RESULTS.—The  
11                  Secretary shall make available to the public and  
12                  the relevant committees of Congress the results  
13                  of the projects carried out through financial as-  
14                  sistance awarded under subparagraph (A), in-  
15                  cluding—

16                   (i) development of best practices or  
17                   training materials for use in the  
18                   photovoltaics manufacturing, design, in-  
19                   stallation, refurbishing, disposal, or recy-  
20                   cling industries;

21                   (ii) dissemination at industry con-  
22                   ferences;

23                   (iii) coordination with information dis-  
24                   semination programs relating to recycling  
25                   of electronic devices in general;



1 (iv) demonstration projects; and

2 (v) educational materials.

3 (C) PRIORITY.—In carrying out the activi-  
4 ties authorized under this subsection, the Sec-  
5 retary shall give special consideration to  
6 projects that recover critical materials.

7 (D) SENSITIVE INFORMATION.—In car-  
8 rying out the activities authorized under this  
9 subsection, the Secretary shall ensure proper  
10 security controls are in place to protect propri-  
11 etary or sensitive information, as appropriate.

12 (5) SOLAR ENERGY TECHNOLOGY MATERIALS  
13 PHYSICAL PROPERTY DATABASE.—

14 (A) IN GENERAL.—Not later than Sep-  
15 tember 1, 2022, the Secretary shall establish a  
16 comprehensive physical property database of  
17 materials for use in solar energy technologies,  
18 which shall identify the type, quantity, country  
19 of origin, source, significant uses, projected  
20 availability, and physical properties of materials  
21 used in solar energy technologies.

22 (B) COORDINATION.—In establishing the  
23 database described in subparagraph (A), the  
24 Secretary shall coordinate with—

1 (i) other Department activities, in-  
2 cluding those carried out by the Office of  
3 Science;

4 (ii) the Director of the National Insti-  
5 tute of Standards and Technology;

6 (iii) the Administrator of the Environ-  
7 mental Protection Agency;

8 (iv) the Secretary of the Interior; and

9 (v) relevant industry stakeholders, as  
10 determined by the Secretary.

11 (6) SOLAR ENERGY TECHNOLOGY PROGRAM  
12 STRATEGIC VISION.—

13 (A) IN GENERAL.—Not later than Sep-  
14 tember 1, 2022, and every 6 years thereafter,  
15 the Secretary shall submit to Congress a report  
16 on the strategic vision, progress, goals, and tar-  
17 gets of the program, including assessments of  
18 solar energy markets and manufacturing.

19 (B) INCLUSION.—As a part of the report  
20 described in subparagraph (A), the Secretary  
21 shall include a study that examines the viable  
22 market opportunities available for solar energy  
23 technology manufacturing in the United States,  
24 including—

25 (i) a description of—

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1 (I) the ability to competitively  
2 manufacture solar technology in the  
3 United States, including the manufac-  
4 ture of—

5 (aa) new and advanced ma-  
6 terials, such as cells made with  
7 new, high efficiency materials;

8 (bb) solar module equipment  
9 and enabling technologies, includ-  
10 ing smart inverters, sensors, and  
11 tracking equipment; and

12 (cc) innovative solar module  
13 designs and applications, includ-  
14 ing those that can directly inte-  
15 grate with new and existing  
16 buildings and other infrastruc-  
17 ture; and

18 (II) opportunities and barriers  
19 within the United States and inter-  
20 national solar energy technology mar-  
21 ket;

22 (ii) policy recommendations for en-  
23 hancing solar energy technology manufac-  
24 turing in the United States;

1 (iii) a 10-year target and plan to en-  
2 hance the competitiveness of solar energy  
3 technology manufacturing in the United  
4 States; and

5 (iv) any other research areas as deter-  
6 mined by the Secretary.

7 (C) PREPARATION.—The Secretary shall  
8 coordinate the preparation of the report under  
9 subparagraph (A) with—

10 (i) existing peer review processes;

11 (ii) studies conducted by the National  
12 Laboratories; and

13 (iii) the multiyear program planning  
14 required under section 994 of the Energy  
15 Policy Act of 2005 (42 U.S.C. 16358).

16 (7) AUTHORIZATION OF APPROPRIATIONS.—  
17 There is authorized to be appropriated to the Sec-  
18 retary to carry out the program \$300,000,000 for  
19 each of fiscal years 2021 through 2025.

20 **SEC. 3005. HYDROELECTRIC PRODUCTION INCENTIVES**  
21 **AND EFFICIENCY IMPROVEMENTS.**

22 (a) HYDROELECTRIC PRODUCTION INCENTIVES.—  
23 Section 242 of the Energy Policy Act of 2005 (42 U.S.C.  
24 15881) is amended—

1           (1) in subsection (b), by striking paragraph (1)  
2           and inserting the following:

3           “(1) QUALIFIED HYDROELECTRIC FACILITY.—  
4           The term ‘qualified hydroelectric facility’ means a  
5           turbine or other generating device owned or solely  
6           operated by a non-Federal entity—

7                   “(A) that generates hydroelectric energy  
8                   for sale; and

9                   “(B)(i) that is added to an existing dam or  
10                  conduit; or

11                  “(ii)(I) that has a generating capacity of  
12                  not more than 20 megawatts;

13                  “(II) for which the non-Federal entity has  
14                  received a construction authorization from the  
15                  Federal Energy Regulatory Commission, if ap-  
16                  plicable; and

17                  “(III) that is constructed in an area in  
18                  which there is inadequate electric service, as de-  
19                  termined by the Secretary, including by taking  
20                  into consideration—

21                          “(aa) access to the electric grid;

22                          “(bb) the frequency of electric out-  
23                          ages; or

24                          “(cc) the affordability of electricity.”;

1 (2) in subsection (c), by striking “10” and in-  
2 serting “22”;

3 (3) in subsection (e)(2), by striking “section  
4 29(d)(2)(B)” and inserting “section 45K(d)(2)(B)”;

5 (4) in subsection (f), by striking “20” and in-  
6 serting “32”; and

7 (5) in subsection (g), by striking “each of the  
8 fiscal years 2006 through 2015” and inserting “each  
9 of fiscal years 2021 through 2036”.

10 (b) **HYDROELECTRIC EFFICIENCY IMPROVEMENT.**—  
11 Section 243(c) of the Energy Policy Act of 2005 (42  
12 U.S.C. 15882(c)) is amended by striking “each of the fis-  
13 cal years 2006 through 2015” and inserting “each of fis-  
14 cal years 2021 through 2036”.

15 **SEC. 3006. CONFORMING AMENDMENTS.**

16 (a) **RENEWABLE ENERGY AND ENERGY EFFICIENCY**  
17 **TECHNOLOGY COMPETITIVENESS ACT OF 1989.**—

18 (1) **NATIONAL GOALS AND MULTI-YEAR FUND-**  
19 **ING.**—Section 4 of the Renewable Energy and En-  
20 ergy Efficiency Technology Competitiveness Act of  
21 1989 (42 U.S.C. 12003) is amended—

22 (A) in the section heading, by striking  
23 “**WIND, PHOTOVOLTAICS, AND SOLAR**  
24 **THERMAL**” and inserting “**ALCOHOL FROM**  
25 **BIOMASS AND OTHER TECHNOLOGY**”;

1 (B) in subsection (a)—

2 (i) in the matter preceding paragraph  
3 (1), by striking “wind, photovoltaics, and  
4 solar thermal energy” and inserting “alco-  
5 hol from biomass and other energy tech-  
6 nology”;

7 (ii) by striking paragraphs (1)  
8 through (3);

9 (iii) by redesignating paragraphs (4)  
10 and (5) as paragraphs (1) and (2), respec-  
11 tively; and

12 (iv) in paragraph (2) (as so redesign-  
13 ated), by striking “Ocean” and inserting  
14 “Marine”; and

15 (C) in subsection (c)—

16 (i) in the matter preceding paragraph  
17 (1)—

18 (I) by striking “the Wind Energy  
19 Research Program, the Photovoltaic  
20 Energy Systems Program, the Solar  
21 Thermal Energy Systems Program,”;  
22 and

23 (II) by striking “Ocean” and in-  
24 serting “Marine”;

25 (ii) in paragraph (1)—

1 (I) by striking subparagraph (A);  
2 and  
3 (II) by redesignating subpara-  
4 graphs (B) and (C) as subparagraphs  
5 (A) and (B), respectively; and  
6 (iii) in paragraph (2)—  
7 (I) by striking subparagraph (A);  
8 and  
9 (II) by redesignating subpara-  
10 graphs (B) and (C) as subparagraphs  
11 (A) and (B), respectively.

12 (2) REPORTS.—Section 9(c) of the Renewable  
13 Energy and Energy Efficiency Technology Competi-  
14 tiveness Act of 1989 (42 U.S.C. 12006(c)) is amend-  
15 ed by striking “ocean,” and inserting “marine,”.

16 (b) ENERGY POLICY ACT OF 2005.—The Energy  
17 Policy Act of 2005 (42 U.S.C. 15801 et seq.) is amend-  
18 ed—

19 (1) ASSESSMENT OF RENEWABLE ENERGY RE-  
20 SOURCES.—Section 201(a) of the Energy Policy Act  
21 of 2005 (42 U.S.C. 15851(a)) is amended by strik-  
22 ing “ocean (including tidal, wave, current, and ther-  
23 mal)” and inserting “marine”.



1           (2) FEDERAL PURCHASE REQUIREMENT.—Sec-  
2           tion 203(b)(2) of the Energy Policy Act of 2005 (42  
3           U.S.C. 15852(b)(2)) is amended—

4                   (A) by inserting “marine energy (as de-  
5                   fined in section 632 of the Energy Independ-  
6                   ence and Security Act of 2007), or” before  
7                   “electric energy”; and

8                   (B) by striking “ocean (including tidal,  
9                   wave, current, and thermal),”.

10           (3) RENEWABLE ENERGY.—Section 931 of the  
11           Energy Policy Act of 2005 (42 U.S.C. 16231) is  
12           amended—

13                   (A) in subsection (a)(2)—

14                           (i) by striking subparagraphs (A) and  
15                           (B);

16                           (ii) by redesignating subparagraphs  
17                           (C) through (E) as subparagraphs (A)  
18                           through (C), respectively; and

19                           (iii) in subparagraph (C)(i) (as so re-  
20                           designated), by striking “ocean energy, in-  
21                           cluding wave energy” and inserting “ma-  
22                           rine energy (as defined in section 632 of  
23                           the Energy Independence and Security Act  
24                           of 2007)”;

25                   (B) by striking subsection (d); and

1           (C) by redesignating subsections (e)  
2           through (g) as subsections (d) through (f), re-  
3           spectively.

4           (c) ENERGY POLICY ACT OF 1992.—Section 1212 of  
5 the Energy Policy Act of 1992 (42 U.S.C. 13317) is  
6 amended—

7           (1) in subsection (a)(4)(A)(i), by striking  
8           “ocean (including tidal, wave, current, and ther-  
9           mal)” and inserting “marine energy (as defined in  
10          section 632 of the Energy Independence and Secu-  
11          rity Act of 2007)”;

12          (2) in subsection (b), in the matter preceding  
13          paragraph (1), by striking “ocean (including tidal,  
14          wave, current, and thermal)” and inserting “marine  
15          energy (as defined in section 632 of the Energy  
16          Independence and Security Act of 2007)”; and

17          (3) in subsection (e)(1), in the first sentence, by  
18          striking “ocean (including tidal, wave, current, and  
19          thermal)” and inserting “marine energy (as defined  
20          in section 632 of the Energy Independence and Se-  
21          curity Act of 2007)”.

22          (d) FEDERAL NONNUCLEAR ENERGY RESEARCH  
23 AND DEVELOPMENT ACT OF 1974.—Section 6(b)(3) of  
24 the Federal Nonnuclear Energy Research and Develop-  
25 ment Act of 1974 (42 U.S.C. 5905(b)(3)) is amended—

1 (1) by striking subparagraph (L); and

2 (2) by redesignating subparagraphs (M)  
3 through (S) as subparagraphs (L) through (R), re-  
4 spectively.

5 (e) SOLAR ENERGY RESEARCH, DEVELOPMENT, AND  
6 DEMONSTRATION ACT OF 1974.—

7 (1) REPEAL.—The Solar Energy Research, De-  
8 velopment, and Demonstration Act of 1974 (42  
9 U.S.C. 5551 et seq.) is repealed.

10 (2) SAVINGS PROVISION.—The repeal of the  
11 Solar Energy Research, Development, and Dem-  
12 onstration Act of 1974 (42 U.S.C. 5551 et seq.)  
13 under paragraph (1) shall not affect the authority of  
14 the Secretary of Energy to conduct research and de-  
15 velopment on solar energy.

16 (f) SOLAR PHOTOVOLTAIC ENERGY RESEARCH, DE-  
17 VELOPMENT, AND DEMONSTRATION ACT OF 1978.—The  
18 Solar Photovoltaic Energy Research, Development, and  
19 Demonstration Act of 1978 (42 U.S.C. 5581 et seq.) is  
20 repealed.

21 (g) ENERGY INDEPENDENCE AND SECURITY ACT OF  
22 2007.—

23 (1) REPEALS.—Sections 606 and 607 of the  
24 Energy Independence and Security Act of 2007 (42  
25 U.S.C. 17174, 17175) are repealed.

1           (2) CONFORMING AMENDMENT.—The table of  
2 contents in section 1(b) of the Energy Independence  
3 and Security Act of 2007 (Public Law 110–140; 121  
4 Stat. 1495) is amended by striking the items relat-  
5 ing to sections 606 and 607.

6           **Subtitle B—Natural Resources**  
7                                   **Provisions**

8   **SEC. 3101. DEFINITIONS.**

9           In this subtitle:

10           (1) COVERED LAND.—The term “covered land”  
11 means land that is—

12                   (A) Federal lands administered by the Sec-  
13 retary concerned; and

14                   (B) not excluded from the development of  
15 geothermal, solar, or wind energy under—

16                           (i) a land use plan; or

17                           (ii) other Federal law.

18           (2) FEDERAL LAND.—The term “Federal land”  
19 means—

20                   (A) public land as defined by section 103  
21 of the Federal Land Policy Management Act of  
22 1976 (43 U.S.C. 1702); or

23                   (B) land of the National Forest System (as  
24 defined in section 11(a) of the Forest and

1 Rangeland Renewable Resources Planning Act  
2 of 1974 (16 U.S.C. 1609(a)).

3 (3) LAND USE PLAN.—The term “land use  
4 plan” means—

5 (A) for public land, a land use plan estab-  
6 lished under the Federal Land Policy and Man-  
7 agement Act of 1976 (43 U.S.C. 1701 et seq.);  
8 and

9 (B) for National Forest System land, a  
10 land management plan approved, amended, or  
11 revised under section 6 of the Forest and  
12 Rangeland Renewable Resources Planning Act  
13 of 1974 (16 U.S.C. 1604).

14 (4) ELIGIBLE PROJECT.—The term “eligible  
15 project” means a project carried out on covered land  
16 that uses wind, solar, or geothermal energy to gen-  
17 erate energy.

18 (5) SECRETARY.—The term “Secretary” means  
19 the Secretary of the Interior.

20 **SEC. 3102. PROGRAM TO IMPROVE ELIGIBLE PROJECT PER-**  
21 **MIT COORDINATION.**

22 (a) ESTABLISHMENT.—The Secretary shall establish  
23 a national Renewable Energy Coordination Office and  
24 State, district, or field offices, as appropriate, with respon-  
25 sibility to establish and implement a program to improve

1 Federal permit coordination with respect to eligible  
2 projects on covered land and such other activities as the  
3 Secretary determines necessary. In carrying out the pro-  
4 gram, the Secretary may temporarily assign qualified staff  
5 to Renewable Energy Coordination Offices to expedite the  
6 permitting of eligible projects.

7 (b) MEMORANDUM OF UNDERSTANDING.—

8 (1) IN GENERAL.—Not later than 180 days  
9 after the date of the enactment of this Act, the Sec-  
10 retary shall enter into a memorandum of under-  
11 standing for purposes of this section with—

12 (A) the Secretary of Agriculture;

13 (B) the Administrator of the Environ-  
14 mental Protection Agency; and

15 (C) the Secretary of Defense.

16 (2) STATE AND TRIBAL PARTICIPATION.—The  
17 Secretary may request the Governor of any inter-  
18 ested State or any Tribal leader of any interested  
19 Indian Tribe (as defined in section 4 of the Indian  
20 Self-Determination and Education Assistance Act  
21 (25 U.S.C. 5304)) to be a signatory to the memo-  
22 randum of understanding under paragraph (1).

23 (c) DESIGNATION OF QUALIFIED STAFF.—

24 (1) IN GENERAL.—Not later than 30 days after  
25 the date on which the memorandum of under-

1 standing under subsection (b) is executed, all Fed-  
2 eral signatories, as appropriate, shall identify for  
3 each of the Bureau of Land Management Renewable  
4 Energy Coordination Offices one or more employees  
5 who have expertise in the regulatory issues relating  
6 to the office in which the employee is employed, in-  
7 cluding, as applicable, particular expertise in—

8 (A) consultation regarding, and prepara-  
9 tion of, biological opinions under section 7 of  
10 the Endangered Species Act of 1973 (16 U.S.C.  
11 1536);

12 (B) permits under section 404 of the Fed-  
13 eral Water Pollution Control Act (33 U.S.C.  
14 1344);

15 (C) regulatory matters under the Clean Air  
16 Act (42 U.S.C. 7401 et seq.);

17 (D) the Federal Land Policy and Manage-  
18 ment Act of 1976 (43 U.S.C. 1701 et seq.);

19 (E) the Migratory Bird Treaty Act (16  
20 U.S.C. 703 et seq.);

21 (F) the preparation of analyses under the  
22 National Environmental Policy Act of 1969 (42  
23 U.S.C. 4321 et seq.);

24 (G) implementation of the requirements of  
25 section 306108 of title 54, United States Code

1 (formerly known as section 106 of the National  
2 Historic Preservation Act);

3 (H) planning under section 14 of the Na-  
4 tional Forest Management Act of 1976 (16  
5 U.S.C. 472a);

6 (I) developing geothermal resources under  
7 the Geothermal Steam Act of 1970 (30 U.S.C.  
8 1001 et seq.);

9 (J) the Act of June 8, 1940 (16 U.S.C.  
10 668 et seq., popularly known as the Bald and  
11 Golden Eagle Protection Act); and

12 (K) section 100101(a), chapter 1003, and  
13 sections 100751(a), 100752, 100753 and  
14 102101 of title 54, United States Code (pre-  
15 viously known as the National Park Service Or-  
16 ganic Act).

17 (2) DUTIES.—Each employee assigned under  
18 paragraph (1) shall—

19 (A) be responsible for addressing all issues  
20 relating to the jurisdiction of the home office or  
21 agency of the employee; and

22 (B) participate as part of the team of per-  
23 sonnel working on proposed energy projects,  
24 planning, monitoring, inspection, enforcement,  
25 and environmental analyses.



1 (d) ADDITIONAL PERSONNEL.—The Secretary may  
2 assign such additional personnel for the Bureau of Land  
3 Management Renewable Energy Coordination Offices as  
4 are necessary to ensure the effective implementation of  
5 any programs administered by the offices in accordance  
6 with the multiple use mandate of the Federal Land Policy  
7 and Management Act of 1976 (43 U.S.C. 1701 et seq.).

8 (e) TRANSFER OF FUNDS.—To facilitate the coordi-  
9 nation and processing of eligible project permits on Fed-  
10 eral land under the Renewable Energy Coordination Of-  
11 fices, the Secretary may authorize the expenditure or  
12 transfer of any funds that are necessary to—

- 13 (1) the United States Fish and Wildlife Service;
- 14 (2) the Bureau of Indian Affairs;
- 15 (3) the Forest Service;
- 16 (4) the Corps of Engineers;
- 17 (5) the National Park Service;
- 18 (6) the Environmental Protection Agency; or
- 19 (7) the Department of Defense.

20 (f) REPORT TO CONGRESS.—

21 (1) IN GENERAL.—Not later than February 1  
22 of the first fiscal year beginning after the date of the  
23 enactment of this Act, and each February 1 there-  
24 after, the Secretary shall submit to the Committee  
25 on Energy and Natural Resources and the Com-

1        mittee on Environment and Public Works of the  
2        Senate and the Committee on Natural Resources of  
3        the House of Representatives a report describing the  
4        progress made under the program established under  
5        subsection (a) during the preceding year.

6            (2) INCLUSIONS.—Each report under this sub-  
7        section shall include—

8            (A) projections for renewable energy pro-  
9        duction and capacity installations; and

10          (B) a description of any problems relating  
11        to leasing, permitting, siting, or production.

12 **SEC. 3103. INCREASING ECONOMIC CERTAINTY.**

13        (a) CONSIDERATIONS.—The Secretary may consider  
14        acreage rental rates, capacity fees, and other recurring an-  
15        nual fees in total when evaluating existing rates paid for  
16        the use of Federal land by eligible projects.

17        (b) REDUCTIONS IN BASE RENTAL RATES.—The  
18        Secretary may reduce acreage rental rates and capacity  
19        fees, or both, for existing and new wind and solar author-  
20        izations if the Secretary determines—

21            (1) that the existing rates—

22            (A) exceed fair market value;

23            (B) impose economic hardships;

24            (C) limit commercial interest in a competi-  
25        tive lease sale or right-of-way grant; or

1 (D) are not competitively priced compared  
2 to other available land; or

3 (2) that a reduced rental rate or capacity fee is  
4 necessary to promote the greatest use of wind and  
5 solar energy resources.

6 **SEC. 3104. NATIONAL GOAL FOR RENEWABLE ENERGY PRO-**  
7 **DUCTION ON FEDERAL LAND.**

8 (a) IN GENERAL.—Not later than September 1,  
9 2022, the Secretary shall, in consultation with the Sec-  
10 retary of Agriculture and other heads of relevant Federal  
11 agencies, establish national goals for renewable energy  
12 production on Federal land.

13 (b) MINIMUM PRODUCTION GOAL.—The Secretary  
14 shall seek to issue permits that, in total, authorize produc-  
15 tion of not less than 25 gigawatts of electricity from wind,  
16 solar, and geothermal energy projects by not later than  
17 2025, through management of public lands and adminis-  
18 tration of Federal laws.

19 **SEC. 3105. FACILITATION OF COPRODUCTION OF GEO-**  
20 **THERMAL ENERGY ON OIL AND GAS LEASES.**

21 Section 4(b) of the Geothermal Steam Act of 1970  
22 (30 U.S.C. 1003(b)) is amended by adding at the end the  
23 following:

24 “(4) LAND SUBJECT TO OIL AND GAS LEASE.—  
25 Land under an oil and gas lease issued pursuant to

1 the Mineral Leasing Act (30 U.S.C. 181 et seq.) or  
2 the Mineral Leasing Act for Acquired Lands (30  
3 U.S.C. 351 et seq.) that is subject to an approved  
4 application for permit to drill and from which oil  
5 and gas production is occurring may be available for  
6 noncompetitive leasing under subsection (c) by the  
7 holder of the oil and gas lease—

8 “(A) on a determination that geothermal  
9 energy will be produced from a well producing  
10 or capable of producing oil and gas; and

11 “(B) to provide for the coproduction of  
12 geothermal energy with oil and gas.”.

13 **SEC. 3106. SAVINGS CLAUSE.**

14 Notwithstanding any other provision of this subtitle,  
15 the Secretary of the Interior and the Secretary of Agri-  
16 culture shall continue to manage public lands under the  
17 principles of multiple use and sustained yield in accord-  
18 ance with the Federal Land Policy and Management Act  
19 of 1976 (43 U.S.C. 1701 et seq.) or the Forest and  
20 Rangeland Renewable Resources Planning Act of 1974  
21 (16 U.S.C. 1600 et seq.), respectively, including for due  
22 consideration of mineral and nonrenewable energy-related  
23 projects and other nonrenewable energy uses, for the pur-  
24 poses of land use planning, permit processing, and con-  
25 ducting environmental reviews.

1           **Subtitle C—Energy Storage**

2   **SEC. 3201. BETTER ENERGY STORAGE TECHNOLOGY.**

3           (a) DEFINITIONS.—In this section:

4                   (1) ENERGY STORAGE SYSTEM.—The term “en-  
5           ergy storage system” means any system, equipment,  
6           facility, or technology that—

7                           (A) is capable of absorbing or converting  
8                           energy, storing the energy for a period of time,  
9                           and dispatching the energy; and

10                           (B)(i) uses mechanical, electrochemical,  
11                           thermal, electrolysis, or other processes to con-  
12                           vert and store electric energy that was gen-  
13                           erated at an earlier time for use at a later time;

14                           (ii) uses mechanical, electrochemical, bio-  
15                           chemical, or thermal processes to convert and  
16                           store energy generated from mechanical proc-  
17                           esses that would otherwise be wasted, for deliv-  
18                           ery at a later time; or

19                           (iii) stores energy in an electric, thermal,  
20                           or gaseous state for direct use for heating or  
21                           cooling at a later time in a manner that avoids  
22                           the need to use electricity or other fuel sources  
23                           at that later time, such as a grid-enabled water  
24                           heater.

1           (2) PROGRAM.—The term “program” means  
2           the Energy Storage System Research, Development,  
3           and Deployment Program established under sub-  
4           section (b)(1).

5           (3) SECRETARY.—The term “Secretary” means  
6           the Secretary of Energy.

7           (b) ENERGY STORAGE SYSTEM RESEARCH, DEVEL-  
8           OPMENT, AND DEPLOYMENT PROGRAM.—

9           (1) ESTABLISHMENT.—Not later than 180 days  
10          after the date of enactment of this Act, the Sec-  
11          retary shall establish a program, to be known as the  
12          Energy Storage System Research, Development, and  
13          Deployment Program.

14          (2) INITIAL PROGRAM OBJECTIVES.—The pro-  
15          gram shall focus on research, development, and de-  
16          ployment of—

17                  (A) energy storage systems, components,  
18                  and materials designed to further the develop-  
19                  ment of technologies—

20                          (i) for large-scale commercial deploy-  
21                          ment;

22                          (ii) for deployment at cost targets es-  
23                          tablished by the Secretary;

1 (iii) for hourly and subhourly dura-  
2 tions required to provide reliability services  
3 to the grid;

4 (iv) for daily durations, which have  
5 the capacity to discharge energy for a min-  
6 imum of 6 hours;

7 (v) for weekly or monthly durations,  
8 which have the capacity to discharge en-  
9 ergy for 10 to 100 hours, at a minimum;  
10 and

11 (vi) for seasonal durations, which have  
12 the capability to address seasonal vari-  
13 ations in supply and demand;

14 (B) distributed energy storage technologies  
15 and applications, including building-grid inte-  
16 gration;

17 (C) long-term cost, performance, and dem-  
18 onstration targets for different types of energy  
19 storage systems and for use in a variety of re-  
20 gions, including rural areas;

21 (D) transportation energy storage tech-  
22 nologies and applications, including vehicle-grid  
23 integration;

24 (E) cost-effective systems and methods  
25 for—

1 (i) the sustainable and secure  
2 sourcing, reclamation, recycling, and dis-  
3 posal of energy storage systems, including  
4 critical minerals; and

5 (ii) the reuse and repurposing of en-  
6 ergy storage system technologies;

7 (F) advanced control methods for energy  
8 storage systems;

9 (G) pumped hydroelectric energy storage  
10 systems to advance—

11 (i) adoption of innovative technologies,  
12 including—

13 (I) systems with adjustable-speed  
14 and other new pumping and gener-  
15 ating equipment designs;

16 (II) modular systems;

17 (III) closed-loop systems, includ-  
18 ing mines and quarries; and

19 (IV) other innovative equipment  
20 and materials as determined by the  
21 Secretary; and

22 (ii) reductions of civil works costs and  
23 construction times for hydropower and  
24 pumped storage systems, including com-  
25 prehensive data and systems analysis of



1           hydropower and pumped storage construc-  
2           tion technologies and processes in order to  
3           identify areas for whole-system efficiency  
4           gains;

5           (H) models and tools to demonstrate the  
6           costs and benefits of energy storage to—

7                   (i) power and water supply systems;

8                   (ii) electric generation portfolio opti-  
9           mization; and

10                   (iii) expanded deployment of other re-  
11           newable energy technologies, including in  
12           integrated energy storage systems;

13           (I) energy storage use cases from indi-  
14           vidual and combination technology applications,  
15           including value from various-use cases and en-  
16           ergy storage services; and

17           (J) advanced manufacturing technologies  
18           that have the potential to improve United  
19           States competitiveness in energy storage manu-  
20           facturing or reduce United States dependence  
21           on critical materials.

22           (3) TESTING AND VALIDATION.—In coordina-  
23           tion with 1 or more National Laboratories, the Sec-  
24           retary shall support the development, standardized  
25           testing, and validation of energy storage systems

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1 under the program, including test-bed and field  
2 trials, by developing testing and evaluation meth-  
3 odologies for—

4 (A) storage technologies, controls, and  
5 power electronics for energy storage systems  
6 under a variety of operating conditions;

7 (B) standardized and grid performance  
8 testing for energy storage systems, materials,  
9 and technologies during each stage of develop-  
10 ment;

11 (C) reliability, safety, degradation, and du-  
12 rability testing under standard and evolving  
13 duty cycles; and

14 (D) accelerated life testing protocols to  
15 predict estimated lifetime metrics with accu-  
16 racy.

17 (4) PERIODIC EVALUATION OF PROGRAM OB-  
18 JECTIVES.—Not less frequently than once every cal-  
19 endar year, the Secretary shall evaluate and, if nec-  
20 essary, update the program objectives to ensure that  
21 the program continues to advance energy storage  
22 systems toward widespread commercial deployment  
23 by lowering the costs and increasing the duration of  
24 energy storage resources.

25 (5) ENERGY STORAGE STRATEGIC PLAN.—

## 1001

1 (A) IN GENERAL.—The Secretary shall de-  
2 velop a 10-year strategic plan for the program,  
3 and update the plan, in accordance with this  
4 paragraph.

5 (B) CONTENTS.—The strategic plan devel-  
6 oped under subparagraph (A) shall—

7 (i) be coordinated with and integrated  
8 across other relevant offices in the Depart-  
9 ment;

10 (ii) to the extent practicable, include  
11 metrics that can be used to evaluate stor-  
12 age technologies;

13 (iii) identify Department programs  
14 that—

15 (I) support the research and de-  
16 velopment activities described in para-  
17 graph (2) and the demonstration  
18 projects under subsection (c); and

19 (II)(aa) do not support the ac-  
20 tivities or projects described in sub-  
21 clause (I); but

22 (bb) are important to the devel-  
23 opment of energy storage systems and  
24 the mission of the Department, as de-  
25 termined by the Secretary;

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1 (iv) include expected timelines for—

2 (I) the accomplishment of rel-  
3 evant objectives under current pro-  
4 grams of the Department relating to  
5 energy storage systems; and

6 (II) the commencement of any  
7 new initiatives within the Department  
8 relating to energy storage systems to  
9 accomplish those objectives; and

10 (v) incorporate relevant activities de-  
11 scribed in the Grid Modernization Initia-  
12 tive Multi-Year Program Plan.

13 (C) SUBMISSION TO CONGRESS.—Not later  
14 than 180 days after the date of enactment of  
15 this Act, the Secretary shall submit to the Com-  
16 mittee on Energy and Natural Resources of the  
17 Senate and the Committees on Energy and  
18 Commerce and Science, Space, and Technology  
19 of the House of Representatives the strategic  
20 plan developed under subparagraph (A).

21 (D) UPDATES TO PLAN.—The Secretary—

22 (i) shall annually review the strategic  
23 plan developed under subparagraph (A);  
24 and

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1 (ii) may periodically revise the stra-  
2 tegic plan as appropriate.

3 (6) LEVERAGING OF RESOURCES.—The pro-  
4 gram may be led by a specific office of the Depart-  
5 ment, but shall be cross-cutting in nature, so that in  
6 carrying out activities under the program, the Sec-  
7 retary (or a designee of the Secretary charged with  
8 leading the program) shall leverage existing Federal  
9 resources, including, at a minimum, the expertise  
10 and resources of—

11 (A) the Office of Electricity;

12 (B) the Office of Energy Efficiency and  
13 Renewable Energy, including the Water Power  
14 Technologies Office; and

15 (C) the Office of Science, including—

16 (i) the Basic Energy Sciences Pro-  
17 gram;

18 (ii) the Advanced Scientific Com-  
19 puting Research Program;

20 (iii) the Biological and Environmental  
21 Research Program; and

22 (D) the Electricity Storage Research Ini-  
23 tiative established under section 975 of the En-  
24 ergy Policy Act of 2005 (42 U.S.C. 16315).

## 1004

1           (7) PROTECTING PRIVACY AND SECURITY.—In  
2 carrying out this subsection, the Secretary shall  
3 identify, incorporate, and follow best practices for  
4 protecting the privacy of individuals and businesses  
5 and the respective sensitive data of the individuals  
6 and businesses, including by managing privacy risk  
7 and implementing the Fair Information Practice  
8 Principles of the Federal Trade Commission for the  
9 collection, use, disclosure, and retention of individual  
10 electric consumer information in accordance with the  
11 Office of Management and Budget Circular A–130  
12 (or successor circulars).

13           (c) ENERGY STORAGE DEMONSTRATION PROJECTS;  
14 PILOT GRANT PROGRAM.—

15           (1) DEMONSTRATION PROJECTS.—Not later  
16 than September 30, 2023, the Secretary shall, to the  
17 maximum extent practicable, enter into agreements  
18 to carry out 3 energy storage system demonstration  
19 projects, including at least 1 energy storage system  
20 demonstration project designed to further the devel-  
21 opment of technologies described in clause (v) or (vi)  
22 of subsection (b)(2)(A).

23           (2) ENERGY STORAGE PILOT GRANT PRO-  
24 GRAM.—

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1 (A) DEFINITION OF ELIGIBLE ENTITY.—In  
2 this paragraph, the term “eligible entity”  
3 means—

4 (i) a State energy office (as defined in  
5 section 124(a) of the Energy Policy Act of  
6 2005 (42 U.S.C. 15821(a)));

7 (ii) an Indian Tribe (as defined in sec-  
8 tion 4 of the Native American Housing As-  
9 sistance and Self-Determination Act of  
10 1996 (25 U.S.C. 4103);

11 (iii) a Tribal organization (as defined  
12 in section 3765 of title 38, United States  
13 Code);

14 (iv) an institution of higher education  
15 (as defined in section 101 of the Higher  
16 Education Act of 1965 (20 U.S.C. 1001));

17 (v) an electric utility, including—

18 (I) an electric cooperative;

19 (II) a political subdivision of a  
20 State, such as a municipally owned  
21 electric utility, or any agency, author-  
22 ity, corporation, or instrumentality of  
23 a State political subdivision; and

24 (III) an investor-owned utility;

25 and

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1 (vi) a private energy storage company.

2 (B) ESTABLISHMENT.—The Secretary  
3 shall establish a competitive grant program  
4 under which the Secretary shall award grants  
5 to eligible entities to carry out demonstration  
6 projects for pilot energy storage systems.

7 (C) SELECTION REQUIREMENTS.—In se-  
8 lecting eligible entities to receive a grant under  
9 subparagraph (B), the Secretary shall, to the  
10 maximum extent practicable—

11 (i) ensure regional diversity among el-  
12 igible entities awarded grants, including  
13 ensuring participation of eligible entities  
14 that are rural States and States with high  
15 energy costs;

16 (ii) ensure that grants are awarded  
17 for demonstration projects that—

18 (I) expand on the existing tech-  
19 nology demonstration programs of the  
20 Department;

21 (II) are designed to achieve 1 or  
22 more of the objectives described in  
23 subparagraph (D); and

24 (III) inject or withdraw energy  
25 from the bulk power system, electric



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1 distribution system, building energy  
2 system, or microgrid (grid-connected  
3 or islanded mode) where the project is  
4 located;

5 (iii) give consideration to proposals  
6 from eligible entities for securing energy  
7 storage through competitive procurement  
8 or contract for service; and

9 (iv) prioritize projects that leverage  
10 matching funds from non-Federal sources.

11 (D) OBJECTIVES.—Each demonstration  
12 project carried out by a grant awarded under  
13 subparagraph (B) shall have 1 or more of the  
14 following objectives:

15 (i) To improve the security of critical  
16 infrastructure and emergency response sys-  
17 tems.

18 (ii) To improve the reliability of trans-  
19 mission and distribution systems, particu-  
20 larly in rural areas, including high-energy  
21 cost rural areas.

22 (iii) To optimize transmission or dis-  
23 tribution system operation and power qual-  
24 ity to defer or avoid costs of replacing or

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1 upgrading electric grid infrastructure, in-  
2 cluding transformers and substations.

3 (iv) To supply energy at peak periods  
4 of demand on the electric grid or during  
5 periods of significant variation of electric  
6 grid supply.

7 (v) To reduce peak loads of homes  
8 and businesses.

9 (vi) To improve and advance power  
10 conversion systems.

11 (vii) To provide ancillary services for  
12 grid stability and management.

13 (viii) To integrate renewable energy  
14 resource production.

15 (ix) To increase the feasibility of  
16 microgrids (grid-connected or islanded  
17 mode).

18 (x) To enable the use of stored energy  
19 in forms other than electricity to support  
20 the natural gas system and other industrial  
21 processes.

22 (xi) To integrate fast charging of elec-  
23 tric vehicles.

24 (xii) To improve energy efficiency.

1           (3) REPORTS.—Not less frequently than once  
2           every 3 years for the duration of the programs  
3           under paragraphs (1) and (2), the Secretary shall  
4           submit to Congress and make publicly available a re-  
5           port describing the performance of those programs.

6           (4) NO PROJECT OWNERSHIP INTEREST.—The  
7           Federal Government shall not hold any equity or  
8           other ownership interest in any energy storage sys-  
9           tem that is part of a project under this subsection  
10          unless the holding is agreed to by each participant  
11          of the project.

12          (d) LONG-DURATION DEMONSTRATION INITIATIVE  
13          AND JOINT PROGRAM.—

14           (1) DEFINITIONS.—In this subsection:

15           (A) INITIATIVE.—The term “Initiative”  
16           means the demonstration initiative established  
17           under paragraph (2).

18           (B) JOINT PROGRAM.—The term “Joint  
19           Program” means the joint program established  
20           under paragraph (4).

21           (2) ESTABLISHMENT OF INITIATIVE.—Not later  
22           than 180 days after the date of enactment of this  
23           Act, the Secretary shall establish a demonstration  
24           initiative composed of demonstration projects fo-

1 cused on the development of long-duration energy  
2 storage technologies.

3 (3) SELECTION OF PROJECTS.—To the max-  
4 imum extent practicable, in selecting demonstration  
5 projects to participate in the Initiative, the Secretary  
6 shall—

7 (A) ensure a range of technology types;

8 (B) ensure regional diversity among  
9 projects; and

10 (C) consider bulk power level, distribution  
11 power level, behind-the-meter, microgrid  
12 (gridconnected or islanded mode), and off-grid  
13 applications.

14 (4) JOINT PROGRAM.—

15 (A) ESTABLISHMENT.—As part of the Ini-  
16 tiative, the Secretary, in consultation with the  
17 Secretary of Defense, shall establish within the  
18 Department a joint program to carry out  
19 projects—

20 (i) to demonstrate promising long-du-  
21 ration energy storage technologies at dif-  
22 ferent scales; and

23 (ii) to help new, innovative long-dura-  
24 tion energy storage technologies become  
25 commercially viable.

1 (B) MEMORANDUM OF UNDERSTANDING.—  
2 Not later than 200 days after the date of enact-  
3 ment of this Act, the Secretary shall enter into  
4 a memorandum of understanding with the Sec-  
5 retary of Defense to administer the Joint Pro-  
6 gram.

7 (C) INFRASTRUCTURE.—In carrying out  
8 the Joint Program, the Secretary and the Sec-  
9 retary of Defense shall—

10 (i) use existing test-bed infrastructure  
11 at—

12 (I) Department facilities; and

13 (II) Department of Defense in-  
14 stallations; and

15 (ii) develop new infrastructure for  
16 identified projects, if appropriate.

17 (D) GOALS AND METRICS.—The Secretary  
18 and the Secretary of Defense shall develop goals  
19 and metrics for technological progress under  
20 the Joint Program consistent with energy resil-  
21 ience and energy security policies.

22 (E) SELECTION OF PROJECTS.—

23 (i) IN GENERAL.—To the maximum  
24 extent practicable, in selecting projects to  
25 participate in the Joint Program, the Sec-

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1                   retary and the Secretary of Defense  
2                   shall—

3                               (I) ensure that projects are car-  
4                               ried out under conditions that rep-  
5                               resent a variety of environments with  
6                               different physical conditions and mar-  
7                               ket constraints; and

8                               (II) ensure an appropriate bal-  
9                               ance of—

10                                       (aa) larger, higher-cost  
11                                       projects; and

12                                       (bb) smaller, lower-cost  
13                                       projects.

14                               (ii) PRIORITY.—In carrying out the  
15                               Joint Program, the Secretary and the Sec-  
16                               retary of Defense shall give priority to  
17                               demonstration projects that—

18                                       (I) make available to the public  
19                                       project information that will accel-  
20                                       erate deployment of long-duration en-  
21                                       ergy storage technologies; and

22                                       (II) will be carried out in the  
23                                       field.

24                   (e) CRITICAL MATERIAL RECYCLING AND REUSE RE-  
25 SEARCH, DEVELOPMENT, AND DEMONSTRATION PRO-

1 GRAM.—The United States Energy Storage Competitive-  
2 ness Act of 2007 (42 U.S.C. 17231) is amended by adding  
3 at the end the following:

4 “(q) CRITICAL MATERIAL RECYCLING AND REUSE  
5 RESEARCH, DEVELOPMENT, AND DEMONSTRATION PRO-  
6 GRAM.—

7 “(1) DEFINITIONS.—In this subsection:

8 “(A) CRITICAL MATERIAL.—The term  
9 ‘critical material’ has the meaning given the  
10 term in 7002 of the Energy Act of 2020.

11 “(B) CRITICAL MATERIAL RECYCLING.—  
12 The term ‘critical material recycling’ means the  
13 separation and recovery of critical materials  
14 embedded within an energy storage system  
15 through physical or chemical means for the pur-  
16 pose of reuse of those critical materials in other  
17 technologies.

18 “(2) ESTABLISHMENT.—Not later than 180  
19 days after the date of enactment of this subsection,  
20 the Secretary shall establish a research, develop-  
21 ment, and demonstration program for critical mate-  
22 rial recycling and reuse of energy storage systems  
23 containing critical materials.

24 “(3) RESEARCH, DEVELOPMENT, AND DEM-  
25 ONSTRATION.—In carrying out the program estab-

1 lished under paragraph (1), the Secretary shall con-  
2 duct—

3 “(A) research, development, and dem-  
4 onstration activities for—

5 “(i) technologies, process improve-  
6 ments, and design optimizations that facili-  
7 tate and promote critical material recycling  
8 of energy storage systems, including sepa-  
9 ration and sorting of component materials  
10 of such systems, and extraction, recovery,  
11 and reuse of critical materials from such  
12 systems;

13 “(ii) technologies and methods that  
14 mitigate emissions and environmental im-  
15 pacts that arise from critical material recy-  
16 cling, including disposal of toxic reagents  
17 and byproducts related to critical material  
18 recycling processes;

19 “(iii) technologies to enable extrac-  
20 tion, recovery, and reuse of energy storage  
21 systems from electric vehicles and critical  
22 material recycling from such vehicles; and

23 “(iv) technologies and methods to en-  
24 able the safe transport, storage, and dis-  
25 posal of energy storage systems containing



1 critical materials, including waste mate-  
2 rials and components recovered during the  
3 critical material recycling process; and

4 “(B) research on nontechnical barriers to  
5 improve the collection and critical material re-  
6 cycling of energy storage systems, including  
7 strategies to improve consumer education of,  
8 acceptance of, and participation in, the critical  
9 material recycling of energy storage systems.

10 “(4) REPORT TO CONGRESS.—Not later than 2  
11 years after the date of enactment of this subsection,  
12 and every 3 years thereafter, the Secretary shall  
13 submit to the Committee on Science, Space, and  
14 Technology and the Committee on Energy and Com-  
15 merce of the House of Representatives and the Com-  
16 mittee on Energy and Natural Resources of the Sen-  
17 ate a report summarizing the activities, findings,  
18 and progress of the program.”.

19 (f) COORDINATION.—To the maximum extent prac-  
20 ticable, the Secretary shall coordinate the activities under  
21 this section (including activities conducted pursuant to the  
22 amendments made by this section) among the offices and  
23 employees of the Department, other Federal agencies, and  
24 other relevant entities—

25 (1) to ensure appropriate collaboration;

1           (2) to avoid unnecessary duplication of those  
2 activities; and

3           (3) to increase domestic manufacturing and  
4 production of energy storage systems, such as those  
5 within the Department and within the National In-  
6 stitute of Standards and Technology.

7           (g) AUTHORIZATION OF APPROPRIATIONS.—There  
8 are authorized to be appropriated—

9           (1) to carry out subsection (b), \$100,000,000  
10 for each of fiscal years 2021 through 2025, to re-  
11 main available until expended;

12           (2) to carry out subsection (c), \$71,000,000 for  
13 each of fiscal years 2021 through 2025, to remain  
14 available until expended; and

15           (3) to carry out subsection (d), \$30,000,000 for  
16 each of fiscal years 2021 through 2025, to remain  
17 available until expended.

18 **SEC. 3202. ENERGY STORAGE TECHNOLOGY AND**

19 **MICROGRID ASSISTANCE PROGRAM.**

20 (a) DEFINITIONS.—In this section:

21           (1) ELIGIBLE ENTITY.—The term “eligible enti-  
22 ty” means—

23           (A) a rural electric cooperative;

24           (B) an agency, authority, or instrumen-  
25 tality of a State or political subdivision of a

1 State that sells or otherwise uses electrical en-  
2 ergy to provide electric services for customers;  
3 or

4 (C) a nonprofit organization working with  
5 at least 6 entities described in subparagraph  
6 (A) or (B).

7 (2) ENERGY STORAGE TECHNOLOGY.—The  
8 term “energy storage technology” includes grid-en-  
9 abled water heaters, building heating or cooling sys-  
10 tems, electric vehicles, the production of hydrogen  
11 for transportation or industrial use, or other tech-  
12 nologies that store energy.

13 (3) MICROGRID.—The term “microgrid” means  
14 a localized grid that operates autonomously regard-  
15 less of whether the grid can operate in connection  
16 with another grid.

17 (4) RENEWABLE ENERGY SOURCE.—The term  
18 “renewable energy source” has the meaning given  
19 the term in section 609(a) of the Public Utility Reg-  
20 ulatory Policies Act of 1978 (7 U.S.C. 918c(a)).

21 (5) RURAL ELECTRIC COOPERATIVE.—The term  
22 “rural electric cooperative” means an electric coop-  
23 erative (as defined in section 3 of the Federal Power  
24 Act (16 U.S.C. 796)) that sells electric energy to  
25 persons in rural areas.

1           (6) SECRETARY.—The term “Secretary” means  
2           the Secretary of Energy.

3           (b) IN GENERAL.—Not later than 180 days after the  
4           date of the enactment of this Act, the Secretary shall es-  
5           tablish a program under which the Secretary shall—

6           (1) provide grants to eligible entities under sub-  
7           section (d);

8           (2) provide technical assistance to eligible enti-  
9           ties under subsection (e); and

10          (3) disseminate information to eligible entities  
11          on—

12                   (A) the activities described in subsections  
13                   (d)(1) and (e); and

14                   (B) potential and existing energy storage  
15                   technology and microgrid projects.

16          (c) COOPERATIVE AGREEMENT.—The Secretary may  
17          enter into a cooperative agreement with an eligible entity  
18          to carry out subsection (b).

19          (d) GRANTS.—

20               (1) IN GENERAL.—The Secretary may award  
21               grants to eligible entities for identifying, evaluating,  
22               designing, and demonstrating energy storage tech-  
23               nology and microgrid projects that utilize energy  
24               from renewable energy sources.

1           (2) APPLICATION.—To be eligible to receive a  
2           grant under paragraph (1), an eligible entity shall  
3           submit to the Secretary an application at such time,  
4           in such manner, and containing such information as  
5           the Secretary may require.

6           (3) USE OF GRANT.—An eligible entity that re-  
7           ceives a grant under paragraph (1)—

8                   (A) shall use the grant—

9                           (i) to conduct feasibility studies to as-  
10                           sess the potential for implementation or  
11                           improvement of energy storage technology  
12                           or microgrid projects;

13                           (ii) to analyze and implement strate-  
14                           gies to overcome barriers to energy storage  
15                           technology or microgrid project implemen-  
16                           tation, including financial, contracting,  
17                           siting, and permitting barriers;

18                           (iii) to conduct detailed engineering of  
19                           energy storage technology or microgrid  
20                           projects;

21                           (iv) to perform a cost-benefit analysis  
22                           with respect to an energy storage tech-  
23                           nology or microgrid project;

24                           (v) to plan for both the short- and  
25                           long-term inclusion of energy storage tech-

1 nology or microgrid projects into the fu-  
2 ture development plans of the eligible enti-  
3 ty; or

4 (vi) to purchase and install necessary  
5 equipment, materials, and supplies for  
6 demonstration of emerging technologies;  
7 and

8 (B) may use the grant to obtain technical  
9 assistance from experts in carrying out the ac-  
10 tivities described in subparagraph (A).

11 (4) CONDITION.—As a condition of receiving a  
12 grant under paragraph (1), an eligible entity shall—

13 (A) implement a public awareness cam-  
14 paign, in coordination with the Secretary, about  
15 the project implemented under the grant in the  
16 community in which the eligible entity is lo-  
17 cated, which campaign shall include providing  
18 projected environmental benefits achieved under  
19 the project, where to find more information  
20 about the program established under this sec-  
21 tion, and any other information the Secretary  
22 determines necessary;

23 (B) submit to the Secretary, and make  
24 available to the public, a report that de-  
25 scribes—

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1 (i) any energy cost savings and envi-  
2 ronmental benefits achieved under the  
3 project; and

4 (ii) the results of the project, includ-  
5 ing quantitative assessments to the extent  
6 practicable, associated with each activity  
7 described in paragraph (3)(A); and

8 (C) create and disseminate tools and re-  
9 sources that will benefit other rural electric co-  
10 operatives, which may include cost calculators,  
11 guidebooks, handbooks, templates, and training  
12 courses.

13 (5) COST-SHARE.—Activities under this sub-  
14 section shall be subject to the cost-sharing require-  
15 ments of section 988 of the Energy Policy Act of  
16 2005 (42 U.S.C. 16352).

17 (e) TECHNICAL ASSISTANCE.—

18 (1) IN GENERAL.—In carrying out the program  
19 established under subsection (b), the Secretary may  
20 provide eligible entities with technical assistance re-  
21 lating to—

22 (A) identifying opportunities for energy  
23 storage technology and microgrid projects;

1 (B) understanding the technical and eco-  
2 nomic characteristics of energy storage tech-  
3 nology or microgrid projects;

4 (C) understanding financing alternatives;

5 (D) permitting and siting issues;

6 (E) obtaining case studies of similar and  
7 successful energy storage technology or  
8 microgrid projects;

9 (F) reviewing and obtaining computer soft-  
10 ware for assessment, design, and operation and  
11 maintenance of energy storage technology or  
12 microgrid systems; and

13 (G) understanding and utilizing the reli-  
14 ability and resiliency benefits of energy storage  
15 technology and microgrid projects.

16 (2) EXTERNAL CONTRACTS.—In carrying out  
17 paragraph (1), the Secretary may enter into con-  
18 tracts with third-party experts, including engineer-  
19 ing, finance, and insurance experts, to provide tech-  
20 nical assistance to eligible entities relating to the ac-  
21 tivities described in such paragraph, or other rel-  
22 evant activities, as determined by the Secretary.

23 (f) AUTHORIZATION OF APPROPRIATIONS.—



1           (1) IN GENERAL.—There is authorized to be  
2           appropriated to carry out this section \$15,000,000  
3           for each of fiscal years 2021 through 2025.

4           (2) ADMINISTRATIVE COSTS.—Not more than 5  
5           percent of the amount appropriated under para-  
6           graph (1) for each fiscal year shall be used for ad-  
7           ministrative expenses.

## 8                                   **TITLE IV—CARBON** 9                                   **MANAGEMENT**

### 10   **SEC. 4001. FOSSIL ENERGY.**

11           Section 961(a) of the Energy Policy Act of 2005 (42  
12   U.S.C. 16291(a)) is amended—

13           (1) by redesignating paragraphs (1) through  
14           (7) as subparagraphs (A) through (G), respectively,  
15           and indenting appropriately;

16           (2) in subparagraph (F) (as so redesignated),  
17           by inserting “, including technology development to  
18           reduce emissions of carbon dioxide and associated  
19           emissions of heavy metals within coal combustion  
20           residues and gas streams resulting from fossil fuel  
21           use and production” before the period at the end;

22           (3) by striking subparagraph (G) (as so redesi-  
23           gnated) and inserting the following:

24                               “(G) Increasing the export of fossil energy-  
25                               related equipment, technology, including emis-

1           sions control technologies, and services from the  
2           United States.

3           “(H) Decreasing the cost of emissions con-  
4           trol technologies for fossil energy production,  
5           generation, and delivery.

6           “(I) Significantly lowering greenhouse gas  
7           emissions for all fossil fuel production, genera-  
8           tion, delivery, and utilization technologies.

9           “(J) Developing carbon removal and utili-  
10          zation technologies, products, and methods that  
11          result in net reductions in greenhouse gas emis-  
12          sions, including direct air capture and storage,  
13          and carbon use and reuse for commercial appli-  
14          cation.

15          “(K) Improving the conversion, use, and  
16          storage of carbon oxides produced from fossil  
17          fuels.

18          “(L) Reducing water use, improving water  
19          reuse, and minimizing surface and subsurface  
20          environmental impact in the development of un-  
21          conventional domestic oil and natural gas re-  
22          sources.”;

23          (4) by striking the subsection designation and  
24          all that follows through “The Secretary” in the first

1 sentence of the matter preceding subparagraph (A)  
2 (as so redesignated) and inserting the following:

3 “(a) ESTABLISHMENT.—

4 “(1) IN GENERAL.—The Secretary”;

5 (5) in paragraph (1) (as so designated), in the  
6 second sentence of the matter preceding subpara-  
7 graph (A) (as so redesignated), by striking “Such  
8 programs” and inserting the following:

9 “(2) OBJECTIVES.—The programs described in  
10 paragraph (1) shall”; and

11 (6) by adding at the end the following:

12 “(3) PRIORITY.—In carrying out the objectives  
13 described in subparagraphs (F) through (K) of para-  
14 graph (2), the Secretary shall prioritize activities  
15 and strategies that have the potential to significantly  
16 reduce emissions for each technology relevant to the  
17 applicable objective and the international commit-  
18 ments of the United States.”.

19 **SEC. 4002. ESTABLISHMENT OF CARBON CAPTURE TECH-**  
20 **NOLOGY PROGRAM.**

21 (a) IN GENERAL.—The Energy Policy Act of 2005  
22 is amended by striking section 962 (42 U.S.C. 16292) and  
23 inserting the following:

24 **“SEC. 962. CARBON CAPTURE TECHNOLOGY PROGRAM.**

25 “(a) DEFINITIONS.—In this section:

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

4                   “(A) represents the scale of technology de-  
5                   velopment beyond laboratory development and  
6                   bench scale testing, but not yet advanced to the  
7                   point of being tested under real operational con-  
8                   ditions at commercial scale;

9                   “(B) represents the scale of technology  
10                  necessary to gain the operational data needed  
11                  to understand the technical and performance  
12                  risks of the technology before the application of  
13                  that technology at commercial scale or in com-  
14                  mercial-scale demonstration; and

15                  “(C) is large enough—

16                          “(i) to validate scaling factors; and

17                          “(ii) to demonstrate the interaction  
18                          between major components so that control  
19                          philosophies for a new process can be de-  
20                          veloped and enable the technology to ad-  
21                          vance from large-scale pilot project appli-  
22                          cation to commercial-scale demonstration  
23                          or application.

24           “(2) NATURAL GAS.—The term ‘natural gas’  
25           means any fuel consisting in whole or in part of—

1 “(A) natural gas;

2 “(B) liquid petroleum gas;

3 “(C) synthetic gas derived from petroleum  
4 or natural gas liquids;

5 “(D) any mixture of natural gas and syn-  
6 thetic gas; or

7 “(E) biomethane.

8 “(3) NATURAL GAS ELECTRIC GENERATION FA-  
9 CILITY.—

10 “(A) IN GENERAL.—The term ‘natural gas  
11 electric generation facility’ means a facility that  
12 generates electric energy using natural gas as  
13 the fuel.

14 “(B) INCLUSIONS.—The term ‘natural gas  
15 electric generation facility’ includes without lim-  
16 itation a new or existing—

17 “(i) simple cycle plant;

18 “(ii) combined cycle plant;

19 “(iii) combined heat and power plant;

20 or

21 “(iv) steam methane reformer that  
22 produces hydrogen from natural gas for  
23 use in the production of electric energy.

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

1 “(5) TRANSFORMATIONAL TECHNOLOGY.—

2 “(A) IN GENERAL.—The term ‘trans-  
3 formational technology’ means a technology  
4 that represents a significant change in the  
5 methods used to convert energy that will enable  
6 a step change in performance, efficiency, cost of  
7 electricity, and reduction of emissions as com-  
8 pared to the technology in existence on the date  
9 of enactment of the Energy Act of 2020.

10 “(B) INCLUSIONS.—The term ‘trans-  
11 formational technology’ includes a broad range  
12 of potential technology improvements, includ-  
13 ing—

14 “(i) thermodynamic improvements in  
15 energy conversion and heat transfer, in-  
16 cluding—

17 “(I) advanced combustion sys-  
18 tems, including oxygen combustion  
19 systems and chemical looping; and

20 “(II) the replacement of steam  
21 cycles with supercritical carbon diox-  
22 ide cycles;

23 “(ii) improvements in steam or carbon  
24 dioxide turbine technology;

1 “(iii) improvements in carbon capture,  
2 utilization, and storage systems technology;

3 “(iv) improvements in small-scale and  
4 modular coal-fired technologies with re-  
5 duced carbon output or carbon capture  
6 that can support incremental power gen-  
7 eration capacity additions;

8 “(v) fuel cell technologies for low-cost,  
9 high-efficiency modular power systems;

10 “(vi) advanced gasification systems;

11 “(vii) thermal cycling technologies;

12 and

13 “(viii) any other technology the Sec-  
14 retary recognizes as transformational tech-  
15 nology.

16 “(b) CARBON CAPTURE TECHNOLOGY PROGRAM.—

17 “(1) IN GENERAL.—The Secretary shall estab-  
18 lish a carbon capture technology program for the de-  
19 velopment of transformational technologies that will  
20 significantly improve the efficiency, effectiveness,  
21 costs, emissions reductions, and environmental per-  
22 formance of coal and natural gas use, including in  
23 manufacturing and industrial facilities.

24 “(2) REQUIREMENTS.—The program shall in-  
25 clude—

1 “(A) a research and development program;

2 “(B) large-scale pilot projects;

3 “(C) demonstration projects, in accordance  
4 with paragraph (4); and

5 “(D) a front-end engineering and design  
6 program.

7 “(3) PROGRAM GOALS AND OBJECTIVES.—In  
8 consultation with the interested entities described in  
9 paragraph (6)(C), the Secretary shall develop goals  
10 and objectives for the program to be applied to the  
11 transformational technologies developed within the  
12 program, taking into consideration the following:

13 “(A) Increasing the performance of coal  
14 electric generation facilities and natural gas  
15 electric generation facilities, including by—

16 “(i) ensuring reliable, low-cost power  
17 from new and existing coal electric genera-  
18 tion facilities and natural gas electric gen-  
19 eration facilities;

20 “(ii) achieving high conversion effi-  
21 ciencies;

22 “(iii) addressing emissions of carbon  
23 dioxide and other air pollutants;

24 “(iv) developing small-scale and mod-  
25 ular technologies to support incremental



1 capacity additions and load following gen-  
2 eration, in addition to large-scale genera-  
3 tion technologies;

4 “(v) supporting dispatchable oper-  
5 ations for new and existing applications of  
6 coal and natural gas generation; and

7 “(vi) accelerating the development of  
8 technologies that have transformational en-  
9 ergy conversion characteristics.

10 “(B) Using carbon capture, utilization, and  
11 sequestration technologies to decrease the car-  
12 bon dioxide emissions, and the environmental  
13 impact from carbon dioxide emissions, from new  
14 and existing coal electric generation facilities  
15 and natural gas electric generation facilities, in-  
16 cluding by—

17 “(i) accelerating the development, de-  
18 ployment, and commercialization of tech-  
19 nologies to capture and sequester carbon  
20 dioxide emissions from new and existing  
21 coal electric generation facilities and nat-  
22 ural gas electric generation facilities;

23 “(ii) supporting sites for safe geologi-  
24 cal storage of large volumes of anthropo-  
25 genic sources of carbon dioxide and the de-

1           velopment of the infrastructure needed to  
2           support a carbon dioxide utilization and  
3           storage industry;

4           “(iii) improving the conversion, utili-  
5           zation, and storage of carbon dioxide pro-  
6           duced from fossil fuels and other anthropo-  
7           genic sources of carbon dioxide;

8           “(iv) lowering greenhouse gas emis-  
9           sions for all fossil fuel production, genera-  
10          tion, delivery, and use, to the maximum ex-  
11          tent practicable;

12          “(v) developing carbon utilization  
13          technologies, products, and methods, in-  
14          cluding carbon use and reuse for commer-  
15          cial application;

16          “(vi) developing net-negative carbon  
17          dioxide emissions technologies; and

18          “(vii) developing technologies for the  
19          capture of carbon dioxide produced during  
20          the production of hydrogen from natural  
21          gas.

22          “(C) Decreasing the non-carbon dioxide  
23          relevant environmental impacts of coal and nat-  
24          ural gas production, including by—

1                   “(i) further reducing non-carbon diox-  
2                   ide air emissions; and

3                   “(ii) reducing the use, and managing  
4                   the discharge, of water in power plant op-  
5                   erations.

6                   “(D) Accelerating the development of tech-  
7                   nologies to significantly decrease emissions from  
8                   manufacturing and industrial facilities, includ-  
9                   ing—

10                   “(i) nontraditional fuel manufacturing  
11                   facilities, including ethanol or other biofuel  
12                   production plants or hydrogen production  
13                   plants; and

14                   “(ii) energy-intensive manufacturing  
15                   facilities that produce carbon dioxide as a  
16                   byproduct of operations.

17                   “(E) Entering into cooperative agreements  
18                   to carry out and expedite demonstration  
19                   projects (including pilot projects) to dem-  
20                   onstrate the technical and commercial viability  
21                   of technologies to reduce carbon dioxide emis-  
22                   sions released from coal electric generation fa-  
23                   cilities and natural gas electric generation facili-  
24                   ties for commercial deployment.

1           “(F) Identifying any barriers to the com-  
2           mercial deployment of any technologies under  
3           development for the capture of carbon dioxide  
4           produced by coal electric generation facilities  
5           and natural gas electric generation facilities.

6           “(4) DEMONSTRATION PROJECTS.—

7           “(A) IN GENERAL.—In carrying out the  
8           program, the Secretary shall establish a dem-  
9           onstration program under which the Secretary,  
10          through a competitive, merit-reviewed process,  
11          shall enter into cooperative agreements by not  
12          later than September 30, 2025, for demonstra-  
13          tion projects to demonstrate the construction  
14          and operation of 6 facilities to capture carbon  
15          dioxide from coal electric generation facilities,  
16          natural gas electric generation facilities, and in-  
17          dustrial facilities.

18          “(B) TECHNICAL ASSISTANCE.—The Sec-  
19          retary, to the maximum extent practicable, shall  
20          provide technical assistance to any eligible enti-  
21          ty seeking to enter into a cooperative agreement  
22          described in subparagraph (A) for the purpose  
23          of obtaining any necessary permits and licenses  
24          to demonstrate qualifying technologies.

1           “(C) ELIGIBLE ENTITIES.—The Secretary  
2           may enter into cooperative agreements under  
3           subparagraph (A) with industry stakeholders,  
4           including any industry stakeholder operating in  
5           partnership with the National Laboratories, in-  
6           stitutions of higher education, multiinstitutional  
7           collaborations, and other appropriate entities.

8           “(D) COMMERCIAL-SCALE DEMONSTRA-  
9           TION PROJECTS.—

10           “(i) IN GENERAL.—In carrying out  
11           the program, the Secretary shall establish  
12           a carbon capture technology commer-  
13           cialization program to demonstrate sub-  
14           stantial improvements in the efficiency, ef-  
15           fectiveness, cost, and environmental per-  
16           formance of carbon capture technologies  
17           for power, industrial, and other commercial  
18           applications.

19           “(ii) REQUIREMENT.—The program  
20           established under clause (i) shall include  
21           funding for commercial-scale carbon cap-  
22           ture technology demonstrations of projects  
23           supported by the Department, including  
24           projects in addition to the projects de-  
25           scribed in subparagraph (A), including

1 funding for not more than 2 projects to  
2 demonstrate substantial improvements in a  
3 particular technology type beyond the first  
4 of a kind demonstration and to account for  
5 considerations described in subparagraph  
6 (G).

7 “(E) REQUIREMENT.—Of the demonstra-  
8 tion projects carried out under subparagraph  
9 (A)—

10 “(i) 2 shall be designed to capture  
11 carbon dioxide from a natural gas electric  
12 generation facility;

13 “(ii) 2 shall be designed to capture  
14 carbon dioxide from a coal electric genera-  
15 tion facility; and

16 “(iii) 2 shall be designed to capture  
17 carbon dioxide from an industrial facility  
18 not purposed for electric generation.

19 “(F) GOALS.—Each demonstration project  
20 under the demonstration program under sub-  
21 paragraph (A)—

22 “(i) shall be designed to further the  
23 development, deployment, and commer-  
24 cialization of technologies to capture and  
25 sequester carbon dioxide emissions from

1 new and existing coal electric generation  
2 facilities, natural gas electric generation  
3 facilities, and industrial facilities;

4 “(ii) shall be financed in part by the  
5 private sector; and

6 “(iii) if necessary, shall secure agree-  
7 ments for the offtake of carbon dioxide  
8 emissions captured by qualifying tech-  
9 nologies during the project.

10 “(G) APPLICATIONS.—

11 “(i) IN GENERAL.—To be eligible to  
12 enter into an agreement with the Secretary  
13 for a demonstration project under subpara-  
14 graphs (A) and (D), an entity shall submit  
15 to the Secretary an application at such  
16 time, in such manner, and containing such  
17 information as the Secretary may require.

18 “(ii) REVIEW OF APPLICATIONS.—In  
19 reviewing applications submitted under  
20 clause (i), the Secretary, to the maximum  
21 extent practicable, shall—

22 “(I) ensure a broad geographic  
23 distribution of project sites;

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1                   “(II) ensure that a broad selec-  
2                   tion of electric generation facilities are  
3                   represented;

4                   “(III) ensure that a broad selec-  
5                   tion of technologies are represented;  
6                   and

7                   “(IV) leverage existing public-pri-  
8                   vate partnerships and Federal re-  
9                   sources.

10                   “(H) GAO STUDY AND REPORT.—

11                   “(i) STUDY AND REPORT.—

12                   “(I) IN GENERAL.—Not later  
13                   than 1 year after the date of enact-  
14                   ment of the Energy Act of 2020, the  
15                   Comptroller General of the United  
16                   States shall conduct, and submit to  
17                   the Committee on Energy and Nat-  
18                   ural Resources of the Senate and the  
19                   Committee on Science, Space, and  
20                   Technology of the House of Rep-  
21                   resentatives a report on the results of,  
22                   a study of the successes, failures,  
23                   practices, and improvements of the  
24                   Department in carrying out dem-



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1 onstration projects under this para-  
2 graph.

3 “(II) CONSIDERATIONS.—In con-  
4 ducting the study under subclause (I),  
5 the Comptroller General of the United  
6 States shall consider—

7 “(aa) applicant and con-  
8 tractor qualifications;

9 “(bb) project management  
10 practices at the Department;

11 “(cc) economic or market  
12 changes and other factors im-  
13 pacting project viability;

14 “(dd) completion of third-  
15 party agreements, including  
16 power purchase agreements and  
17 carbon dioxide offtake agree-  
18 ments;

19 “(ee) regulatory challenges;  
20 and

21 “(ff) construction chal-  
22 lenges.

23 “(ii) RECOMMENDATIONS.—The Sec-  
24 retary shall—

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1           “(I) consider any relevant rec-  
2           ommendations, as determined by the  
3           Secretary, provided in the report re-  
4           quired under clause (i)(I); and

5           “(II) adopt such recommenda-  
6           tions as the Secretary considers ap-  
7           propriate.

8           “(I) REPORT.—

9           “(i) IN GENERAL.—Not later than  
10          180 days after the date on which the Sec-  
11          retary solicits applications under subpara-  
12          graph (G), and annually thereafter, the  
13          Secretary shall submit to the appropriate  
14          committees of jurisdiction of the Senate  
15          and the House of Representatives a report  
16          that includes a detailed description of how  
17          the applications under the demonstration  
18          program established under subparagraph  
19          (A) were or will be solicited and how the  
20          applications were or will be evaluated, in-  
21          cluding—

22               “(I) a list of any activities car-  
23               ried out by the Secretary to solicit or  
24               evaluate the applications; and

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1                   “(II) a process for ensuring that  
2                   any projects carried out under a coop-  
3                   erative agreement entered into under  
4                   subparagraph (A) are designed to re-  
5                   sult in the development or demonstra-  
6                   tion of qualifying technologies.

7                   “(ii) INCLUSIONS.—The Secretary  
8                   shall include—

9                   “(I) in the first report required  
10                  under clause (i), a detailed list of  
11                  technical milestones for the develop-  
12                  ment and demonstration of each  
13                  qualifying technology pursued under  
14                  the demonstration program estab-  
15                  lished under subparagraph (A);

16                  “(II) in each subsequent report  
17                  required under clause (i), a descrip-  
18                  tion of the progress made towards  
19                  achieving the technical milestones de-  
20                  scribed in subclause (I) during the ap-  
21                  plicable period covered by the report;  
22                  and

23                  “(III) in each report required  
24                  under clause (i)—

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1                   “(aa) an estimate of the cost  
2                   of licensing, permitting, con-  
3                   structing, and operating each  
4                   carbon capture facility expected  
5                   to be constructed under the dem-  
6                   onstration program established  
7                   under subparagraph (A);

8                   “(bb) a schedule for the  
9                   planned construction and oper-  
10                  ation of each demonstration or  
11                  pilot project under the dem-  
12                  onstration program; and

13                  “(cc) an estimate of any fi-  
14                  nancial assistance, compensation,  
15                  or incentives proposed to be paid  
16                  by the host State, Indian Tribe,  
17                  or local government with respect  
18                  to each facility described in item  
19                  (aa).

20                  “(5) INTRAAGENCY COORDINATION FOR CAR-  
21                  BON CAPTURE, UTILIZATION, AND SEQUESTRATION  
22                  ACTIVITIES.—The carbon capture, utilization, and  
23                  sequestration activities described in paragraph  
24                  (3)(B) shall be carried out by the Assistant Sec-  
25                  retary for Fossil Energy, in coordination with the

1 heads of other relevant offices of the Department  
2 and the National Laboratories.

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

5 “(A) undertake international collabora-  
6 tions, taking into consideration the rec-  
7 ommendations of the National Coal Council and  
8 the National Petroleum Council;

9 “(B) use existing authorities to encourage  
10 international cooperation; and

11 “(C) consult with interested entities, in-  
12 cluding—

13 “(i) coal and natural gas producers;

14 “(ii) industries that use coal and nat-  
15 ural gas;

16 “(iii) organizations that promote coal,  
17 advanced coal, and natural gas tech-  
18 nologies;

19 “(iv) environmental organizations;

20 “(v) organizations representing work-  
21 ers; and

22 “(vi) organizations representing con-  
23 sumers.

24 “(c) REPORT.—

1           “(1) IN GENERAL.—Not later than 18 months  
2 after the date of enactment of the Energy Act of  
3 2020, the Secretary shall submit to Congress a re-  
4 port describing the program goals and objectives  
5 adopted under subsection (b)(3).

6           “(2) UPDATE.—Not less frequently than once  
7 every 2 years after the initial report is submitted  
8 under paragraph (1), the Secretary shall submit to  
9 Congress a report describing the progress made to-  
10 wards achieving the program goals and objectives  
11 adopted under subsection (b)(3).

12           “(d) FUNDING.—

13           “(1) AUTHORIZATION OF APPROPRIATIONS.—  
14 There are authorized to be appropriated to the Sec-  
15 retary to carry out this section, to remain available  
16 until expended—

17           “(A) for activities under the research and  
18 development program component described in  
19 subsection (b)(2)(A)—

20           “(i) \$230,000,000 for each of fiscal  
21 years 2021 and 2022; and

22           “(ii) \$150,000,000 for each of fiscal  
23 years 2023 through 2025;

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1 “(B) subject to paragraph (2), for activi-  
2 ties under the large-scale pilot projects program  
3 component described in subsection (b)(2)(B)—

4 “(i) \$225,000,000 for each of fiscal  
5 years 2021 and 2022;

6 “(ii) \$200,000,000 for each of fiscal  
7 years 2023 and 2024; and

8 “(iii) \$150,000,000 for fiscal year  
9 2025;

10 “(C) for activities under the demonstration  
11 projects program component described in sub-  
12 section (b)(2)(C)—

13 “(i) \$500,000,000 for each of fiscal  
14 years 2021 through 2024; and

15 “(ii) \$600,000,000 for fiscal year  
16 2025; and

17 “(D) for activities under the front-end en-  
18 gineering and design program described in sub-  
19 section (b)(2)(D), \$50,000,000 for each of fis-  
20 cal years 2021 through 2024.

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

25 “(e) CARBON CAPTURE TEST CENTERS.—

1           “(1) IN GENERAL.—Not later than 2 years  
2 after the date of enactment of the Energy Act of  
3 2020, the Secretary shall award grants to 1 or more  
4 entities for the operation of 1 or more test centers  
5 (referred to in this subsection as a ‘Center’) to pro-  
6 vide distinct testing capabilities for innovative car-  
7 bon capture technologies.

8           “(2) PURPOSE.—Each Center shall—

9                   “(A) advance research, development, dem-  
10 onstration, and commercial application of car-  
11 bon capture technologies;

12                   “(B) support large-scale pilot projects and  
13 demonstration projects and test carbon capture  
14 technologies; and

15                   “(C) develop front-end engineering design  
16 and economic analysis.

17           “(3) SELECTION.—

18                   “(A) IN GENERAL.—The Secretary shall  
19 select entities to receive grants under this sub-  
20 section according to such criteria as the Sec-  
21 retary may develop.

22                   “(B) COMPETITIVE BASIS.—The Secretary  
23 shall select entities to receive grants under this  
24 subsection on a competitive basis.



1           “(C) PRIORITY CRITERIA.—In selecting en-  
2           tities to receive grants under this subsection,  
3           the Secretary shall prioritize consideration of  
4           applicants that—

5                   “(i) have access to existing or planned  
6                   research facilities for carbon capture tech-  
7                   nologies;

8                   “(ii) are institutions of higher edu-  
9                   cation with established expertise in engi-  
10                  neering for carbon capture technologies, or  
11                  partnerships with such institutions of high-  
12                  er education; or

13                  “(iii) have access to existing research  
14                  and test facilities for bulk materials design  
15                  and testing, component design and testing,  
16                  or professional engineering design.

17           “(D) EXISTING CENTERS.—In selecting  
18           entities to receive grants under this subsection,  
19           the Secretary shall prioritize carbon capture  
20           test centers in existence on the date of enact-  
21           ment of the Energy Act of 2020.

22           “(4) FORMULA FOR AWARDING GRANTS.—The  
23           Secretary may develop a formula for awarding  
24           grants under this subsection.

25           “(5) SCHEDULE.—

1           “(A) IN GENERAL.—Each grant awarded  
2           under this subsection shall be for a term of not  
3           more than 5 years, subject to the availability of  
4           appropriations.

5           “(B) RENEWAL.—The Secretary may  
6           renew a grant for 1 or more additional 5-year  
7           terms, subject to a competitive merit review and  
8           the availability of appropriations.

9           “(6) TERMINATION.—To the extent otherwise  
10          authorized by law, the Secretary may eliminate, and  
11          terminate grant funding under this subsection for, a  
12          Center during any 5-year term described in para-  
13          graph (5) if the Secretary determines that the Cen-  
14          ter is underperforming.

15          “(7) AUTHORIZATION OF APPROPRIATIONS.—  
16          There is authorized to be appropriated to carry out  
17          this subsection \$25,000,000 for each of fiscal years  
18          2021 through 2025.”.

19          (b) TECHNICAL AMENDMENT.—The table of contents  
20          for the Energy Policy Act of 2005 (Public Law 109–58;  
21          119 Stat. 600) is amended by striking the item relating  
22          to section 962 and inserting the following:

          “Sec. 962. Carbon capture technology program.”.

23       **SEC. 4003. CARBON STORAGE VALIDATION AND TESTING.**

24          (a) IN GENERAL.—Section 963 of the Energy Policy  
25          Act of 2005 (42 U.S.C. 16293) is amended—

1           (1) by striking subsection (d) and inserting the  
2 following:

3           “(g) AUTHORIZATION OF APPROPRIATIONS.—There  
4 are authorized to be appropriated to the Secretary to carry  
5 out this section—

6           “(1) \$200,000,000 for fiscal year 2021;

7           “(2) \$200,000,000 for fiscal year 2022;

8           “(3) \$150,000,000 for fiscal year 2023;

9           “(4) \$150,000,000 for fiscal year 2024; and

10           “(5) \$100,000,000 for fiscal year 2025.”;

11           (2) in subsection (c)—

12           (A) by striking paragraphs (5) and (6) and  
13 inserting the following:

14           “(f) COST SHARING.—Activities carried out under  
15 this section shall be subject to the cost-sharing require-  
16 ments of section 988.”; and

17           (B) by redesignating paragraph (4) as sub-  
18 section (e) and indenting appropriately;

19           (3) in subsection (e) (as so redesignated)—

20           (A) by redesignating subparagraphs (A)  
21 and (B) as paragraphs (1) and (2), respectively,  
22 and indenting appropriately; and

23           (B) by striking “subsection” each place it  
24 appears and inserting “section”; and

1           (4) by striking the section designation and  
2           heading and all that follows through the end of sub-  
3           section (c)(3) and inserting the following:

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

5           “(a) DEFINITIONS.—In this section:

6           “(1) LARGE-SCALE CARBON SEQUESTRATION.—

7           The term ‘large-scale carbon sequestration’ means a  
8           scale that—

9                   “(A) demonstrates the ability to inject into  
10                  geologic formations and sequester carbon diox-  
11                  ide; and

12                   “(B) has a goal of sequestering not less  
13                  than 50 million metric tons of carbon dioxide  
14                  over a 10-year period.

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

17           “(b) CARBON STORAGE PROGRAM.—

18                   “(1) IN GENERAL.—The Secretary shall estab-  
19                  lish a program of research, development, and dem-  
20                  onstration for carbon storage.

21                   “(2) PROGRAM ACTIVITIES.—Activities under  
22                  the program shall include—

23                           “(A) in coordination with relevant Federal  
24                           agencies, developing and maintaining mapping

1 tools and resources that assess the capacity of  
2 geologic storage formation in the United States;

3 “(B) developing monitoring tools, modeling  
4 of geologic formations, and analyses—

5 “(i) to predict carbon dioxide contain-  
6 ment; and

7 “(ii) to account for sequestered car-  
8 bon dioxide in geologic storage sites;

9 “(C) researching—

10 “(i) potential environmental, safety,  
11 and health impacts in the event of a leak  
12 into the atmosphere or to an aquifer; and

13 “(ii) any corresponding mitigation ac-  
14 tions or responses to limit harmful con-  
15 sequences of such a leak;

16 “(D) evaluating the interactions of carbon  
17 dioxide with formation solids and fluids, includ-  
18 ing the propensity of injections to induce seis-  
19 mic activity;

20 “(E) assessing and ensuring the safety of  
21 operations relating to geologic sequestration of  
22 carbon dioxide;

23 “(F) determining the fate of carbon diox-  
24 ide concurrent with and following injection into  
25 geologic formations;

1           “(G) supporting cost and business model  
2 assessments to examine the economic viability  
3 of technologies and systems developed under the  
4 program; and

5           “(H) providing information to the Environ-  
6 mental Protection Agency, States, local govern-  
7 ments, Tribal governments, and other appro-  
8 priate entities, to ensure the protection of  
9 human health and the environment.

10           “(3) GEOLOGIC SETTINGS.—In carrying out re-  
11 search activities under this subsection, the Secretary  
12 shall consider a variety of candidate onshore and off-  
13 shore geologic settings, including—

14           “(A) operating oil and gas fields;

15           “(B) depleted oil and gas fields;

16           “(C) residual oil zones;

17           “(D) unconventional reservoirs and rock  
18 types;

19           “(E) unmineable coal seams;

20           “(F) saline formations in both sedimentary  
21 and basaltic geologies;

22           “(G) geologic systems that may be used as  
23 engineered reservoirs to extract economical  
24 quantities of brine from geothermal resources of  
25 low permeability or porosity; and

1                   “(H) geologic systems containing in situ  
2                   carbon dioxide mineralization formations.

3                   “(c) LARGE-SCALE CARBON SEQUESTRATION DEM-  
4                   ONSTRATION PROGRAM.—

5                   “(1) IN GENERAL.—The Secretary shall estab-  
6                   lish a demonstration program under which the Sec-  
7                   retary shall provide funding for demonstration  
8                   projects to collect and validate information on the  
9                   cost and feasibility of commercial deployment of  
10                  large-scale carbon sequestration technologies.

11                  “(2) EXISTING REGIONAL CARBON SEQUESTRATION PARTNERSHIPS.—In carrying out paragraph  
12                  (1), the Secretary may provide additional funding to  
13                  regional carbon sequestration partnerships that are  
14                  carrying out or have completed a large-scale carbon  
15                  sequestration demonstration project under this sec-  
16                  tion (as in effect on the day before the date of enact-  
17                  ment of the Energy Act of 2020) for additional work  
18                  on that project.

19                  “(3) DEMONSTRATION COMPONENTS.—Each  
20                  demonstration project carried out under this sub-  
21                  section shall include longitudinal tests involving car-  
22                  bon dioxide injection and monitoring, mitigation,  
23                  and verification operations.  
24

1           “(4) CLEARINGHOUSE.—The National Energy  
2           Technology Laboratory shall act as a clearinghouse  
3           of shared information and resources for—

4                   “(A) existing or completed demonstration  
5                   projects receiving additional funding under  
6                   paragraph (2); and

7                   “(B) any new demonstration projects fund-  
8                   ed under this subsection.

9           “(5) REPORT.—Not later than 1 year after the  
10          date of enactment of the Energy Act of 2020, the  
11          Secretary shall submit to the Committee on Energy  
12          and Natural Resources of the Senate and the Com-  
13          mittee on Science, Space, and Technology of the  
14          House of Representatives a report that—

15                   “(A) assesses the progress of all regional  
16                   carbon sequestration partnerships carrying out  
17                   a demonstration project under this subsection;

18                   “(B) identifies the remaining challenges in  
19                   achieving large-scale carbon sequestration that  
20                   is reliable and safe for the environment and  
21                   public health; and

22                   “(C) creates a roadmap for carbon storage  
23                   research and development activities of the De-  
24                   partment through 2025, with the goal of reduc-



1           ing economic and policy barriers to commercial  
2           carbon sequestration.

3           “(d) INTEGRATED STORAGE.—

4           “(1) IN GENERAL.—The Secretary may transi-  
5           tion large-scale carbon sequestration demonstration  
6           projects under subsection (c) into integrated com-  
7           mercial storage complexes.

8           “(2) GOALS AND OBJECTIVES.—The goals and  
9           objectives of the Secretary in seeking to transition  
10          large-scale carbon sequestration demonstration  
11          projects into integrated commercial storage com-  
12          plexes under paragraph (1) shall be—

13               “(A) to identify geologic storage sites that  
14               are able to accept large volumes of carbon diox-  
15               ide acceptable for commercial contracts;

16               “(B) to understand the technical and com-  
17               mercial viability of carbon dioxide geologic stor-  
18               age sites; and

19               “(C) to carry out any other activities nec-  
20               essary to transition the large-scale carbon se-  
21               questration demonstration projects under sub-  
22               section (c) into integrated commercial storage  
23               complexes.”.

24          (b) TECHNICAL AMENDMENT.—The table of contents  
25          for the Energy Policy Act of 2005 (Public Law 109–58;

1 119 Stat. 600; 121 Stat. 1708) is amended by striking  
2 the item relating to section 963 and inserting the fol-  
3 lowing:

“Sec. 963. Carbon storage validation and testing.”.

4 (c) CONFORMING AMENDMENTS.—

5 (1) Section 703(a)(3) of the Department of En-  
6 ergy Carbon Capture and Sequestration Research,  
7 Development, and Demonstration Act of 2007 (42  
8 U.S.C. 17251(a)(3)) is amended, in the first sen-  
9 tence of the matter preceding subparagraph (A),  
10 by—

11 (A) striking “section 963(c)(3)” and in-  
12 serting “section 963(c)”; and

13 (B) striking “16293(c)(3)” and inserting  
14 “16293(c)”.

15 (2) Section 704 of the Department of Energy  
16 Carbon Capture and Sequestration Research, Devel-  
17 opment, and Demonstration Act of 2007 (42 U.S.C.  
18 17252) is amended, in the first sentence, by—

19 (A) striking “section 963(c)(3)” and in-  
20 serting “section 963(c)”; and

21 (B) striking “16293(c)(3)” and inserting  
22 “16293(c)”.

23 **SEC. 4004. CARBON UTILIZATION PROGRAM.**

24 (a) CARBON UTILIZATION PROGRAM.—

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

4       **“SEC. 969A. CARBON UTILIZATION PROGRAM.**

5           “(a) IN GENERAL.—The Secretary shall establish a  
6       program of research, development, and demonstration for  
7       carbon utilization—

8           “(1) to assess and monitor—

9           “(A) potential changes in lifecycle carbon  
10       dioxide and other greenhouse gas emissions;  
11       and

12           “(B) other environmental safety indicators  
13       of new technologies, practices, processes, or  
14       methods used in enhanced hydrocarbon recovery  
15       as part of the activities authorized under sec-  
16       tion 963;

17           “(2) to identify and assess novel uses for car-  
18       bon, including the conversion of carbon and carbon  
19       oxides for commercial and industrial products and  
20       other products with potential market value;

21           “(3) to identify and assess carbon capture tech-  
22       nologies for industrial systems; and

23           “(4) to identify and assess alternative uses for  
24       raw coal and processed coal products in all phases  
25       that result in no significant emissions of carbon di-

1 oxide or other pollutants, including products derived  
2 from carbon engineering, carbon fiber, and coal con-  
3 version methods.

4 “(b) DEMONSTRATION PROGRAMS FOR THE PUR-  
5 POSE OF COMMERCIALIZATION.—

6 “(1) IN GENERAL.—Not later than 180 days  
7 after the date of enactment of the Energy Act of  
8 2020, as part of the program established under sub-  
9 section (a), the Secretary shall establish a 2-year  
10 demonstration program in each of the 2 major coal-  
11 producing regions of the United States for the pur-  
12 pose of partnering with private institutions in coal  
13 mining regions to accelerate the commercial deploy-  
14 ment of coal-carbon products.

15 “(2) COST SHARING.—Activities under para-  
16 graph (1) shall be subject to the cost-sharing re-  
17 quirements of section 988.

18 “(c) CARBON UTILIZATION RESEARCH CENTER.—

19 “(1) IN GENERAL.—In carrying out the pro-  
20 gram under subsection (a), the Secretary shall es-  
21 tablish and operate a national Carbon Utilization  
22 Research Center (referred to in this subsection as  
23 the ‘Center’), which shall focus on early stage re-  
24 search and development activities including—

1           “(A) post-combustion and pre-combustion  
2 capture of carbon dioxide;

3           “(B) advanced compression technologies  
4 for new and existing fossil fuel-fired power  
5 plants;

6           “(C) technologies to convert carbon dioxide  
7 to valuable products and commodities; and

8           “(D) advanced carbon dioxide storage tech-  
9 nologies that consider a range of storage re-  
10 gimes.

11           “(2) SELECTION.—The Secretary shall—

12           “(A) select the Center under this sub-  
13 section on a competitive, merit-reviewed basis;  
14 and

15           “(B) consider applications from the Na-  
16 tional Laboratories, institutions of higher edu-  
17 cation, multiinstitutional collaborations, and  
18 other appropriate entities.

19           “(3) EXISTING CENTERS.—In selecting the  
20 Center under this subsection, the Secretary shall  
21 prioritize carbon utilization research centers in exist-  
22 ence on the date of enactment of the Energy Act of  
23 2020.

24           “(4) DURATION.—The Center established under  
25 this subsection shall receive support for a period of

1 not more than 5 years, subject to the availability of  
2 appropriations.

3 “(5) RENEWAL.—On the expiration of any pe-  
4 riod of support of the Center, the Secretary may  
5 renew support for the Center, on a merit-reviewed  
6 basis, for a period of not more than 5 years.

7 “(6) TERMINATION.—Consistent with the exist-  
8 ing authorities of the Department, the Secretary  
9 may terminate the Center for cause during the per-  
10 formance period.

11 “(d) AUTHORIZATION OF APPROPRIATIONS.—There  
12 are authorized to be appropriated to the Secretary to carry  
13 out this section—

14 “(1) \$54,000,000 for fiscal year 2021;

15 “(2) \$55,250,000 for fiscal year 2022;

16 “(3) \$56,562,500 for fiscal year 2023;

17 “(4) \$57,940,625 for fiscal year 2024; and

18 “(5) \$59,387,656 for fiscal year 2025.

19 “(e) COORDINATION.—The Secretary shall coordinate  
20 the activities authorized in this section with the activities  
21 authorized in section 969 as part of one consolidated pro-  
22 gram at the Department. Nothing in section 969 shall be  
23 construed as limiting the authorities provided in this sec-  
24 tion.”.

1           (2) TECHNICAL AMENDMENT.—The table of  
2 contents for the Energy Policy Act of 2005 (Public  
3 Law 109–58; 119 Stat. 600) is amended by adding  
4 at the end of the items relating to subtitle F of title  
5 IX the following:

“Sec. 969A. Carbon utilization program.”.

6           (b) STUDY.—

7           (1) IN GENERAL.—The Secretary of Energy (in  
8 this section referred to as the “Secretary”) shall  
9 enter into an agreement with the National Acad-  
10 emies of Sciences, Engineering, and Medicine under  
11 which the National Academies of Sciences, Engineer-  
12 ing, and Medicine shall conduct a study to assess  
13 any barriers and opportunities relating to commer-  
14 cializing carbon, coal-derived carbon, and carbon di-  
15 oxide in the United States.

16           (2) REQUIREMENTS.—The study under para-  
17 graph (1) shall—

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

20                   (i) expanding carbon dioxide pipeline  
21 capacity;

22                   (ii) mitigating environmental impacts;

23                   (iii) access to capital;

24                   (iv) geographic barriers; and

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1 (v) regional economic challenges and  
2 opportunities;

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

6 (C) determine the feasibility of, and oppor-  
7 tunities for, the commercialization of coal-de-  
8 rived carbon products, including for—

9 (i) commercial purposes;

10 (ii) industrial purposes;

11 (iii) defense and military purposes;

12 (iv) agricultural purposes, including  
13 soil amendments and fertilizers;

14 (v) medical and pharmaceutical appli-  
15 cations;

16 (vi) construction and building applica-  
17 tions;

18 (vii) energy applications; and

19 (viii) production of critical minerals;

20 (D) assess—

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

23 (ii) any necessary updates to infra-  
24 structure to allow for the integration of



1 safe and reliable carbon dioxide transpor-  
2 tation, use, and storage;

3 (E) describe the economic, climate, and en-  
4 vironmental impacts of any well-integrated na-  
5 tional carbon dioxide pipeline system, including  
6 suggestions for policies that could—

7 (i) improve the economic impact of  
8 the system; and

9 (ii) mitigate impacts of the system;

10 (F) assess the global status and progress  
11 of chemical and biological carbon utilization  
12 technologies in practice as of the date of the  
13 study that utilize anthropogenic carbon, includ-  
14 ing carbon dioxide, carbon monoxide, methane,  
15 and biogas, from power generation, biofuels  
16 production, and other industrial processes;

17 (G) identify emerging technologies and ap-  
18 proaches for carbon utilization that show prom-  
19 ise for scale-up, demonstration, deployment,  
20 and commercialization;

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

1 (I)(i) assess the major technical challenges  
2 associated with increasing the commercial via-  
3 bility of carbon reuse technologies; and

4 (ii) identify the research and development  
5 questions that will address the challenges de-  
6 scribed in clause (i);

7 (J)(i) assess research efforts being carried  
8 out as of the date of the study, including basic,  
9 applied, engineering, and computational re-  
10 search efforts, that are addressing the chal-  
11 lenges described in subparagraph (I)(i); and

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

14 (K) develop a comprehensive research  
15 agenda that addresses long- and short-term re-  
16 search needs and opportunities for technologies  
17 that may be important to minimizing net green-  
18 house gas emissions from the use of coal and  
19 natural gas; and

20 (L)(i) identify appropriate Federal agen-  
21 cies with capabilities to support small business  
22 entities; and

23 (ii) determine what assistance the Federal  
24 agencies identified under clause (i) could pro-  
25 vide to small business entities to further the de-

1           velopment and commercial deployment of car-  
2           bon dioxide-based products.

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

8   **SEC. 4005. HIGH EFFICIENCY TURBINES.**

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

12   **“SEC. 969B. HIGH EFFICIENCY TURBINES.**

13          “(a) IN GENERAL.—The Secretary, acting through  
14          the Assistant Secretary for Fossil Energy (referred to in  
15          this section as the ‘Secretary’), shall establish a multiyear,  
16          multiphase program (referred to in this section as the  
17          ‘program’) of research, development, and technology dem-  
18          onstration to improve the efficiency of gas turbines used  
19          in power generation systems and aviation.

20          “(b) PROGRAM ELEMENTS.—The program shall—

21                  “(1) support first-of-a-kind engineering and de-  
22                  tailed gas turbine design for small-scale and utility-  
23                  scale electric power generation, including—

24                          “(A) high temperature materials, including  
25                          superalloys, coatings, and ceramics;

1 “(B) improved heat transfer capability;

2 “(C) manufacturing technology required to  
3 construct complex 3-dimensional geometry parts  
4 with improved aerodynamic capability;

5 “(D) combustion technology to produce  
6 higher firing temperature while lowering nitro-  
7 gen oxide and carbon monoxide emissions per  
8 unit of output;

9 “(E) advanced controls and systems inte-  
10 gration;

11 “(F) advanced high performance com-  
12 pressor technology; and

13 “(G) validation facilities for the testing of  
14 components and subsystems;

15 “(2) include technology demonstration through  
16 component testing, subscale testing, and full-scale  
17 testing in existing fleets;

18 “(3) include field demonstrations of the devel-  
19 oped technology elements to demonstrate technical  
20 and economic feasibility;

21 “(4) assess overall combined cycle and simple  
22 cycle system performance;

23 “(5) increase fuel flexibility by enabling gas  
24 turbines to operate with high proportions of, or  
25 pure, hydrogen or other renewable gas fuels;

1           “(6) enhance foundational knowledge needed  
2           for low-emission combustion systems that can work  
3           in high-pressure, high-temperature environments re-  
4           quired for high-efficiency cycles;

5           “(7) increase operational flexibility by reducing  
6           turbine start-up times and improving the ability to  
7           accommodate flexible power demand; and

8           “(8) include any other elements necessary to  
9           achieve the goals described in subsection (c), as de-  
10          termined by the Secretary, in consultation with pri-  
11          vate industry.

12          “(c) PROGRAM GOALS.—

13           “(1) IN GENERAL.—The goals of the program  
14           shall be—

15           “(A) in phase I, to develop a conceptual  
16           design of, and to develop and demonstrate the  
17           technology required for—

18           “(i) advanced high efficiency gas tur-  
19           bines to achieve, on a lower heating value  
20           basis—

21           “(I) a combined cycle efficiency  
22           of not less than 65 percent; or

23           “(II) a simple cycle efficiency of  
24           not less than 47 percent; and

1                   “(ii) aviation gas turbines to achieve a  
2                   25 percent reduction in fuel burn by im-  
3                   proving fuel efficiency to existing best-in-  
4                   class turbo-fan engines; and

5                   “(B) in phase II, to develop a conceptual  
6                   design of advanced high efficiency gas turbines  
7                   that can achieve, on a lower heating value  
8                   basis—

9                   “(i) a combined cycle efficiency of not  
10                  less than 67 percent; or

11                  “(ii) a simple cycle efficiency of not  
12                  less than 50 percent.

13                  “(2) ADDITIONAL GOALS.—If a goal described  
14                  in paragraph (1) has been achieved, the Secretary,  
15                  in consultation with private industry and the Na-  
16                  tional Academy of Sciences, may develop additional  
17                  goals or phases for advanced gas turbine research  
18                  and development.

19                  “(d) FINANCIAL ASSISTANCE.—

20                  “(1) IN GENERAL.—The Secretary may provide  
21                  financial assistance, including grants, to carry out  
22                  the program.

23                  “(2) PROPOSALS.—Not later than 180 days  
24                  after the date of enactment of the Energy Act of  
25                  2020, the Secretary shall solicit proposals from in-

1 industry, small businesses, universities, and other ap-  
2 propriate parties for conducting activities under this  
3 section.

4 “(3) CONSIDERATIONS.—In selecting proposed  
5 projects to receive financial assistance under this  
6 subsection, the Secretary shall give special consider-  
7 ation to the extent to which the proposed project  
8 will—

9 “(A) stimulate the creation or increased  
10 retention of jobs in the United States; and

11 “(B) promote and enhance technology  
12 leadership in the United States.

13 “(4) COMPETITIVE AWARDS.—The Secretary  
14 shall provide financial assistance under this sub-  
15 section on a competitive basis, with an emphasis on  
16 technical merit.

17 “(5) COST SHARING.—Financial assistance pro-  
18 vided under this subsection shall be subject to the  
19 cost sharing requirements of section 988.

20 “(e) AUTHORIZATION OF APPROPRIATIONS.—There  
21 is authorized to be appropriated to carry out this section  
22 \$50,000,000 for each of fiscal years 2021 through 2025.”.

23 (b) TECHNICAL AMENDMENT.—The table of contents  
24 for the Energy Policy Act of 2005 (Public Law 109–58;

1 119 Stat. 600) is further amended by adding at the end  
2 of the items relating to subtitle F of title IX the following:

“Sec. 969B. High efficiency gas turbines.”.

3 **SEC. 4006. NATIONAL ENERGY TECHNOLOGY LABORATORY**  
4 **REFORMS.**

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

8 **“SEC. 969C. NATIONAL ENERGY TECHNOLOGY LABORA-**  
9 **TORY REFORMS.**

10 “(a) SPECIAL HIRING AUTHORITY FOR SCIENTIFIC,  
11 ENGINEERING, AND PROJECT MANAGEMENT PER-  
12 SONNEL.—

13 “(1) IN GENERAL.—The Director of the Na-  
14 tional Energy Technology Laboratory (referred to in  
15 this section as the ‘Director’) may—

16 “(A) make appointments to positions in  
17 the National Energy Technology Laboratory to  
18 assist in meeting a specific project or research  
19 need, without regard to civil service laws, of in-  
20 dividuals who—

21 “(i) have an advanced scientific or en-  
22 gineering background; or

23 “(ii) have a business background and  
24 can assist in specific technology-to-market  
25 needs;



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1           “(B) fix the basic pay of any employee ap-  
2           pointed under subparagraph (A) at a rate not  
3           to exceed level II of the Executive Schedule  
4           under section 5313 of title 5, United States  
5           Code; and

6           “(C) pay any employee appointed under  
7           subparagraph (A) payments in addition to the  
8           basic pay fixed under subparagraph (B), sub-  
9           ject to the condition that the total amount of  
10          additional payments paid to an employee under  
11          this subparagraph for any 12-month period  
12          shall not exceed the least of—

13                   “(i) \$25,000;

14                   “(ii) the amount equal to 25 percent  
15                   of the annual rate of basic pay of that em-  
16                   ployee; and

17                   “(iii) the amount of the limitation  
18                   that is applicable for a calendar year under  
19                   section 5307(a)(1) of title 5, United States  
20                   Code.

21          “(2) LIMITATIONS.—

22                   “(A) IN GENERAL.—The term of any em-  
23                   ployee appointed under paragraph (1)(A) shall  
24                   not exceed 3 years.

1           “(B) FULL-TIME EMPLOYEES.—Not more  
2           than 10 full-time employees appointed under  
3           paragraph (1)(A) may be employed at the Na-  
4           tional Energy Technology Laboratory at any  
5           given time.

6           “(b) LABORATORY-DIRECTED RESEARCH AND DE-  
7           VELOPMENT.—

8           “(1) IN GENERAL.—Beginning in fiscal year  
9           2021, the National Energy Technology Laboratory  
10          shall be eligible for laboratory-directed research and  
11          development funding.

12          “(2) AUTHORIZATION OF FUNDING.—

13                 “(A) IN GENERAL.—Each fiscal year, of  
14                 funds made available to the National Energy  
15                 Technology Laboratory, the Secretary may de-  
16                 posit an amount, not to exceed the rate made  
17                 available to the National Laboratories for lab-  
18                 oratory-directed research and development, in a  
19                 special fund account.

20                 “(B) USE.—Amounts in the account under  
21                 subparagraph (A) shall only be available for  
22                 laboratory-directed research and development.

23                 “(C) REQUIREMENTS.—The account under  
24                 subparagraph (A)—

1                   “(i) shall be administered by the Sec-  
2                   retary;

3                   “(ii) shall be available without fiscal  
4                   year limitation; and

5                   “(iii) shall not be subject to appro-  
6                   priation.

7                   “(3) REQUIREMENT.—The Director shall carry  
8                   out laboratory-directed research and development ac-  
9                   tivities at the National Energy Technology Labora-  
10                  tory consistent with Department of Energy Order  
11                  413.2C, dated August 2, 2018 (or a successor  
12                  order).

13                  “(4) ANNUAL REPORT ON USE OF AUTHOR-  
14                  ITY.—Annually, the Secretary shall submit to the  
15                  Committee on Energy and Natural Resources of the  
16                  Senate and the Committee on Science, Space, and  
17                  Technology of the House of Representatives a report  
18                  on the use of the authority provided under this sub-  
19                  section during the preceding fiscal year.

20                  “(c) LABORATORY OPERATIONS.—The Secretary  
21                  shall delegate human resources operations of the National  
22                  Energy Technology Laboratory to the Director to assist  
23                  in carrying out this section.

24                  “(d) REVIEW.—Not later than 2 years after the date  
25                  of enactment of the Energy Act of 2020, the Secretary

1 shall submit to the Committee on Energy and Natural Re-  
2 sources of the Senate and the Committee on Science,  
3 Space, and Technology of the House of Representatives  
4 a report assessing the management and research activities  
5 of the National Energy Technology Laboratory, which  
6 shall include—

7           “(1) an assessment of the quality of science and  
8           research at the National Energy Technology Labora-  
9           tory, relative to similar work at other National Lab-  
10          oratories;

11           “(2) a review of the effectiveness of authorities  
12          provided in subsections (a) and (b); and

13           “(3) recommendations for policy changes within  
14          the Department and legislative changes to provide  
15          the National Energy Technology Laboratory with  
16          the necessary tools and resources to advance the re-  
17          search mission of the National Energy Technology  
18          Laboratory.”.

19          (b) TECHNICAL AMENDMENT.—The table of contents  
20          for the Energy Policy Act of 2005 (Public Law 109–58;  
21          119 Stat. 600) is further amended by adding at the end  
22          of the items relating to subtitle F of title IX the following:  
            “Sec. 969C. National energy technology laboratory reforms.”.

23          **SEC. 4007. STUDY ON BLUE HYDROGEN TECHNOLOGY.**

24           (a) STUDY.—The Secretary of Energy shall conduct  
25          a study to examine opportunities for research and develop-

1 ment in integrating blue hydrogen technology in the indus-  
2 trial power sector and how that could enhance the deploy-  
3 ment and adoption of carbon capture and storage.

4 (b) REPORT.—Not later than 1 year after the date  
5 of enactment of this Act, the Secretary of Energy shall  
6 submit to the Committee on Energy and Natural Re-  
7 sources of the Senate and the Committee on Science,  
8 Space, and Technology of the House of Representatives  
9 a report that describes the results of the study under sub-  
10 section (a).

11 **SEC. 4008. PRODUCED WATER RESEARCH AND DEVELOP-**  
12 **MENT.**

13 (a) ESTABLISHMENT.—As soon as possible after the  
14 date of enactment of this Act, the Secretary of Energy  
15 (in this section referred to as the “Secretary”) shall estab-  
16 lish a research and development program on produced  
17 water to develop—

18 (1) new technologies and practices to reduce the  
19 environmental impact; and

20 (2) opportunities for reprocessing of produced  
21 water at natural gas or oil development sites.

22 (b) PRIORITIZATION.—In carrying out the program  
23 established under subsection (a), the Secretary shall give  
24 priority to projects that develop and bring to market—

1 (1) effective systems for on-site management or  
2 repurposing of produced water; and

3 (2) new technologies or approaches to reduce  
4 the environmental impact of produced water on local  
5 water sources and the environment.

6 (c) CONDUCT OF PROGRAM.—In carrying out the  
7 program established under subsection (a), the Secretary  
8 shall carry out science-based research and development ac-  
9 tivities to pursue—

10 (1) improved efficiency, technologies, and tech-  
11 niques for produced water recycling stations; and

12 (2) alternative approaches to treating, reusing,  
13 storing, or decontaminating produced water.

14 (d) AUTHORIZATION OF APPROPRIATIONS.—There  
15 are authorized to be appropriated to carry out this section  
16 \$10,000,000 for each of fiscal years 2021 through 2025.

## 17 **TITLE V—CARBON REMOVAL**

### 18 **SEC. 5001. CARBON REMOVAL.**

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

#### 22 **“SEC. 969D. CARBON REMOVAL.**

23 “(a) ESTABLISHMENT.—The Secretary, in coordina-  
24 tion with the heads of appropriate Federal agencies, in-  
25 cluding the Secretary of Agriculture, shall establish a re-

1 search, development, and demonstration program (re-  
2 ferred to in this section as the ‘program’) to test, validate,  
3 or improve technologies and strategies to remove carbon  
4 dioxide from the atmosphere on a large scale.

5 “(b) INTRAAGENCY COORDINATION.—The Secretary  
6 shall ensure that the program includes the coordinated  
7 participation of the Office of Fossil Energy, the Office of  
8 Science, and the Office of Energy Efficiency and Renew-  
9 able Energy.

10 “(c) PROGRAM ACTIVITIES.—The program may in-  
11 clude research, development, and demonstration activities  
12 relating to—

13 “(1) direct air capture and storage technologies;

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

16 “(3) enhanced geological weathering;

17 “(4) agricultural practices;

18 “(5) forest management and afforestation; and

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

21 “(d) REQUIREMENTS.—In developing and identifying  
22 carbon removal technologies and strategies under the pro-  
23 gram, the Secretary shall consider—

24 “(1) land use changes, including impacts on  
25 natural and managed ecosystems;

- 1 “(2) ocean acidification;  
2 “(3) net greenhouse gas emissions;  
3 “(4) commercial viability;  
4 “(5) potential for near-term impact;  
5 “(6) potential for carbon reductions on a  
6 gigaton scale; and  
7 “(7) economic cobenefits.

8 “(e) AIR CAPTURE PRIZE COMPETITIONS.—

- 9 “(1) DEFINITIONS.—In this subsection:

10 “(A) DILUTE MEDIA.—The term ‘dilute  
11 media’ means media in which the concentration  
12 of carbon dioxide is less than 1 percent by vol-  
13 ume.

14 “(B) PRIZE COMPETITION.—The term  
15 ‘prize competition’ means the competitive tech-  
16 nology prize competition established under  
17 paragraph (2).

18 “(C) QUALIFIED CARBON DIOXIDE.—

19 “(i) IN GENERAL.—The term ‘quali-  
20 fied carbon dioxide’ means any carbon di-  
21 oxide that—

22 “(I) is captured directly from the  
23 ambient air; and



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1                   “(II) is measured at the source  
2                   of capture and verified at the point of  
3                   disposal, injection, or utilization.

4                   “(ii) INCLUSION.—The term ‘qualified  
5                   carbon dioxide’ includes the initial deposit  
6                   of captured carbon dioxide used as a ter-  
7                   tiary injectant.

8                   “(iii) EXCLUSION.—The term ‘quali-  
9                   fied carbon dioxide’ does not include car-  
10                  bon dioxide that is recaptured, recycled,  
11                  and reinjected as part of the enhanced oil  
12                  and natural gas recovery process.

13                  “(D) QUALIFIED DIRECT AIR CAPTURE FA-  
14                  CILITY.—

15                  “(i) IN GENERAL.—The term ‘quali-  
16                  fied direct air capture facility’ means any  
17                  facility that—

18                         “(I) uses carbon capture equip-  
19                         ment to capture carbon dioxide di-  
20                         rectly from the ambient air; and

21                         “(II) captures more than 50,000  
22                         metric tons of qualified carbon dioxide  
23                         annually.

24                         “(ii) EXCLUSION.—The term ‘quali-  
25                         fied direct air capture facility’ does not in-

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1           clude any facility that captures carbon di-  
2           oxide—

3                       “(I) that is deliberately released  
4                       from naturally occurring subsurface  
5                       springs; or

6                       “(II) using natural photosyn-  
7                       thesis.

8           “(2) ESTABLISHMENT.—Not later than 2 years  
9           after the date of enactment of the Energy Act of  
10          2020, the Secretary, in consultation with the Admin-  
11          istrator of the Environmental Protection Agency,  
12          shall establish as part of the program a competitive  
13          technology prize competition to award prizes for—

14                       “(A) precommercial carbon dioxide capture  
15                       from dilute media; and

16                       “(B) commercial applications of direct air  
17                       capture technologies.

18          “(3) REQUIREMENTS.—In carrying out this  
19          subsection, the Secretary, in accordance with section  
20          24 of the Stevenson-Wydler Technology Innovation  
21          Act of 1980 (15 U.S.C. 3719), shall develop require-  
22          ments for—

23                       “(A) the prize competition process; and

1           “(B) monitoring and verification proce-  
2           dures for projects selected to receive a prize  
3           under the prize competition.

4           “(4) ELIGIBLE PROJECTS.—

5           “(A) PRECOMMERCIAL AIR CAPTURE  
6           PROJECTS.—With respect to projects described  
7           in paragraph (2)(A), to be eligible to be award-  
8           ed a prize under the prize competition, a project  
9           shall—

10                   “(i) meet minimum performance  
11                   standards set by the Secretary;

12                   “(ii) meet minimum levels set by the  
13                   Secretary for the capture of carbon dioxide  
14                   from dilute media; and

15                   “(iii) demonstrate in the application  
16                   of the project for a prize—

17                           “(I) a design for a promising car-  
18                           bon capture technology that will—

19                                   “(aa) be operated on a dem-  
20                                   onstration scale; and

21   “(bb) have the potential to  
22   achieve significant reduction in  
23   the level of carbon dioxide in the  
24   atmosphere;

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1                   “(II) a successful bench-scale  
2                   demonstration of a carbon capture  
3                   technology; or

4                   “(III) an operational carbon cap-  
5                   ture technology on a commercial scale.

6                   “(B) COMMERCIAL DIRECT AIR CAPTURE  
7                   PROJECTS.—

8                   “(i) IN GENERAL.—With respect to  
9                   projects described in paragraph (2)(B), the  
10                  Secretary shall award prizes under the  
11                  prize competition to qualified direct air  
12                  capture facilities for metric tons of quali-  
13                  fied carbon dioxide captured and verified  
14                  at the point of disposal, injection, or utili-  
15                  zation.

16                  “(ii) AMOUNT OF AWARD.—The  
17                  amount of the award per metric ton under  
18                  clause (i)—

19                         “(I) shall be equal for each quali-  
20                         fied direct air capture facility selected  
21                         for a prize under the prize competi-  
22                         tion; and

23                         “(II) shall be determined by the  
24                         Secretary and in any case shall not  
25                         exceed—

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1                   “(aa) \$180 for qualified car-  
2                   bon dioxide captured and stored  
3                   in saline storage formations;

4                   “(bb) a lesser amount, as  
5                   determined by the Secretary, for  
6                   qualified carbon dioxide captured  
7                   and stored in conjunction with  
8                   enhanced oil recovery operations;  
9                   or

10                   “(cc) a lesser amount, as de-  
11                   termined by the Secretary, for  
12                   qualified carbon dioxide captured  
13                   and utilized in any activity con-  
14                   sistent with section 45Q(f)(5) of  
15                   the Internal Revenue Code of  
16                   1986.

17                   “(iii) REQUIREMENT.—The Secretary  
18                   shall make awards under this subpara-  
19                   graph until appropriated funds are ex-  
20                   pended.

21                   “(f) DIRECT AIR CAPTURE TEST CENTER.—

22                   “(1) IN GENERAL.—Not later than 2 years  
23                   after the date of enactment of the Energy Act of  
24                   2020, the Secretary shall award grants to 1 or more  
25                   entities for the operation of 1 or more test centers

1 (referred to in this subsection as a ‘Center’) to pro-  
2 vide distinct testing capabilities for innovative direct  
3 air capture and storage technologies.

4 “(2) PURPOSE.—Each Center shall—

5 “(A) advance research, development, dem-  
6 onstration, and commercial application of direct  
7 air capture and storage technologies;

8 “(B) support large-scale pilot and dem-  
9 onstration projects and test direct air capture  
10 and storage technologies; and

11 “(C) develop front-end engineering design  
12 and economic analysis.

13 “(3) SELECTION.—

14 “(A) IN GENERAL.—The Secretary shall  
15 select entities to receive grants under this sub-  
16 section according to such criteria as the Sec-  
17 retary may develop.

18 “(B) COMPETITIVE BASIS.—The Secretary  
19 shall select entities to receive grants under this  
20 subsection on a competitive basis.

21 “(C) PRIORITY CRITERIA.—In selecting en-  
22 tities to receive grants under this subsection,  
23 the Secretary shall prioritize consideration of  
24 applicants that—

1           “(i) have access to existing or planned  
2           research facilities for direct air capture  
3           and storage technologies;

4           “(ii) are institutions of higher edu-  
5           cation with established expertise in engi-  
6           neering for direct air capture and storage  
7           technologies, or partnerships with such in-  
8           stitutions of higher education; or

9           “(iii) have access to existing research  
10          and test facilities for bulk materials design  
11          and testing, component design and testing,  
12          or professional engineering design.

13          “(4) FORMULA FOR AWARDING GRANTS.—The  
14          Secretary may develop a formula for awarding  
15          grants under this subsection.

16          “(5) SCHEDULE.—

17                 “(A) IN GENERAL.—Each grant awarded  
18                 under this subsection shall be for a term of not  
19                 more than 5 years, subject to the availability of  
20                 appropriations.

21                 “(B) RENEWAL.—The Secretary may  
22                 renew a grant for 1 or more additional 5-year  
23                 terms, subject to a competitive merit review and  
24                 the availability of appropriations.

1           “(6) TERMINATION.—To the extent otherwise  
2           authorized by law, the Secretary may eliminate, and  
3           terminate grant funding under this subsection for, a  
4           Center during any 5-year term described in para-  
5           graph (5) if the Secretary determines that the Cen-  
6           ter is underperforming.

7           “(g) PILOT AND DEMONSTRATION PROJECTS.—In  
8           supporting the technology development activities under  
9           this section, the Secretary is encouraged to support carbon  
10          removal pilot and demonstration projects, including—

11           “(1) pilot projects that test direct air capture  
12          systems capable of capturing 10 to 100 tonnes of  
13          carbon oxides per year to provide data for dem-  
14          onstration-scale projects; and

15           “(2) direct air capture demonstration projects  
16          capable of capturing greater than 1,000 tonnes of  
17          carbon oxides per year.

18          “(h) INTRAAGENCY COLLABORATION.—In carrying  
19          out the program, the Secretary shall encourage and pro-  
20          mote collaborations among relevant offices and agencies  
21          within the Department.

22          “(i) ACCOUNTING.—The Secretary shall collaborate  
23          with the Administrator of the Environmental Protection  
24          Agency and the heads of other relevant Federal agencies  
25          to develop and improve accounting frameworks and tools



1 to accurately measure carbon removal and sequestration  
2 methods and technologies.

3 “(j) AUTHORIZATION OF APPROPRIATIONS.—There  
4 are authorized to be appropriated to the Secretary to carry  
5 out this section—

6 “(1) \$175,000,000 for fiscal year 2021, of  
7 which—

8 “(A) \$15,000,000 shall be used to carry  
9 out subsection (e)(2)(A), to remain available  
10 until expended; and

11 “(B) \$100,000,000 shall be used to carry  
12 out subsection (e)(2)(B), to remain available  
13 until expended;

14 “(2) \$63,500,000 for fiscal year 2022;

15 “(3) \$66,150,000 for fiscal year 2023;

16 “(4) \$69,458,000 for fiscal year 2024; and

17 “(5) \$72,930,000 for fiscal year 2025.”

18 (b) TECHNICAL AMENDMENT.—The table of contents  
19 for the Energy Policy Act of 2005 (Public Law 109–58;  
20 119 Stat. 600) is further amended by adding at the end  
21 of the items relating to subtitle F of title IX the following:

“Sec. 969D. Carbon removal.”

22 **SEC. 5002. CARBON DIOXIDE REMOVAL TASK FORCE AND**  
23 **REPORT.**

24 (a) DEFINITION OF CARBON DIOXIDE REMOVAL.—

25 In this section, the term “carbon dioxide removal” means

1 the capture of carbon dioxide directly from ambient air  
2 or, in dissolved form, from seawater, combined with the  
3 sequestration of that carbon dioxide, including through—

- 4 (1) direct air capture and sequestration;
- 5 (2) enhanced carbon mineralization;
- 6 (3) bioenergy with carbon capture and seques-  
7 tration;
- 8 (4) forest restoration;
- 9 (5) soil carbon management; and
- 10 (6) direct ocean capture.

11 (b) REPORT.—Not later than 180 days after the date  
12 of enactment of this Act, the Secretary of Energy (in this  
13 section referred to as the “Secretary”), in consultation  
14 with the heads of any other relevant Federal agencies,  
15 shall prepare a report that—

- 16 (1) estimates the magnitude of excess carbon  
17 dioxide in the atmosphere that will need to be re-  
18 moved by 2050 to achieve net-zero emissions and  
19 stabilize the climate;
- 20 (2) inventories current and emerging ap-  
21 proaches of carbon dioxide removal and evaluates  
22 the advantages and disadvantages of each of the ap-  
23 proaches; and
- 24 (3) identifies recommendations for legislation,  
25 funding, rules, revisions to rules, financing mecha-

1 nisms, or other policy tools that the Federal Govern-  
2 ment can use to sufficiently advance the deployment  
3 of carbon dioxide removal projects in order to meet,  
4 in the aggregate, the magnitude of needed removals  
5 estimated under paragraph (1), including policy  
6 tools, such as—

7 (A) grants;

8 (B) loans or loan guarantees;

9 (C) public-private partnerships;

10 (D) direct procurement;

11 (E) incentives, including subsidized Fed-  
12 eral financing mechanisms available to project  
13 developers;

14 (F) advance market commitments;

15 (G) regulations; and

16 (H) any other policy mechanism deter-  
17 mined by the Secretary to be beneficial for ad-  
18 vancing carbon dioxide removal methods and  
19 the deployment of carbon dioxide removal  
20 projects.

21 (c) SUBMISSION; PUBLICATION.—The Secretary  
22 shall—

23 (1) submit the report prepared under sub-  
24 section (b) to the Committee on Energy and Natural  
25 Resources of the Senate and the Committees on En-

1           ergy and Commerce and Science, Space, and Tech-  
2           nology of the House of Representatives; and

3           (2) as soon as practicable after completion of  
4           the report, make the report publicly available.

5           (d) EVALUATION; REVISION.—

6           (1) IN GENERAL.—Not later than 2 years after  
7           the date on which the Secretary publishes the report  
8           under subsection (c)(2), and every 2 years there-  
9           after, the Secretary shall evaluate the findings and  
10          recommendations of the report, or the most recent  
11          updated report submitted under paragraph (2)(B),  
12          as applicable, taking into consideration any issues  
13          and recommendations identified by the task force es-  
14          tablished under subsection (e)(1).

15          (2) REVISION.—After completing each evalua-  
16          tion under paragraph (1), the Secretary shall—

17                  (A) revise the report as necessary; and

18                  (B) if the Secretary revises the report  
19                  under subparagraph (A), submit and publish  
20                  the updated report in accordance with sub-  
21                  section (c).

22          (e) TASK FORCE.—

23          (1) ESTABLISHMENT AND DUTIES.—Not later  
24          than 60 days after the date of enactment of this  
25          Act, the Secretary shall establish a task force—

1 (A) to identify barriers to advancement of  
2 carbon dioxide removal methods and the deploy-  
3 ment of carbon dioxide removal projects;

4 (B) to inventory existing or potential Fed-  
5 eral legislation, rules, revisions to rules, financ-  
6 ing mechanisms, or other policy tools that are  
7 capable of advancing carbon dioxide removal  
8 methods and the deployment of carbon dioxide  
9 removal projects;

10 (C) to assist in preparing the report de-  
11 scribed in subsection (b) and any updates to the  
12 report under subsection (d); and

13 (D) to advise the Secretary on matters  
14 pertaining to carbon dioxide removal.

15 (2) MEMBERS AND SELECTION.—The Secretary  
16 shall—

17 (A) develop criteria for the selection of  
18 members to the task force established under  
19 paragraph (1); and

20 (B) select members for the task force in  
21 accordance with the criteria developed under  
22 subparagraph (A).

23 (3) MEETINGS.—The task force shall meet not  
24 less frequently than once each year.

1           (4) EVALUATION.—Not later than 7 years after  
2           the date of enactment of this Act, the Secretary  
3           shall—

4                   (A) reevaluate the need for the task force  
5                   established under paragraph (1); and

6                   (B) submit to Congress a recommendation  
7                   as to whether the task force should continue.

8       **TITLE VI—INDUSTRIAL AND**  
9       **MANUFACTURING TECH-**  
10      **NOLOGIES**

11      **SEC. 6001. PURPOSE.**

12      The purpose of this title and the amendments made  
13      by this title is to encourage the development and evalua-  
14      tion of innovative technologies aimed at increasing—

15           (1) the technological and economic competitive-  
16           ness of industry and manufacturing in the United  
17           States; and

18           (2) the emissions reduction of nonpower indus-  
19           trial sectors.

20      **SEC. 6002. COORDINATION OF RESEARCH AND DEVELOP-**  
21                   **MENT OF ENERGY EFFICIENT TECH-**  
22                   **NOLOGIES FOR INDUSTRY.**

23      Section 6(a) of the American Energy Manufacturing  
24      Technical Corrections Act (42 U.S.C. 6351(a)) is amend-  
25      ed—

1           (1) by striking “Industrial Technologies Pro-  
2           gram” each place it appears and inserting “Ad-  
3           vanced Manufacturing Office”; and

4           (2) in the matter preceding paragraph (1), by  
5           striking “Office of Energy” and all that follows  
6           through “Office of Science” and inserting “Depart-  
7           ment of Energy”.

8   **SEC. 6003. INDUSTRIAL EMISSIONS REDUCTION TECH-**  
9                                   **NOLOGY DEVELOPMENT PROGRAM.**

10          (a) IN GENERAL.—Subtitle D of title IV of the En-  
11          ergy Independence and Security Act of 2007 is amended  
12          by adding at the end the following:

13   **“SEC. 454. INDUSTRIAL EMISSIONS REDUCTION TECH-**  
14                                   **NOLOGY DEVELOPMENT PROGRAM.**

15          “(a) DEFINITIONS.—In this section:

16                 “(1) DIRECTOR.—The term ‘Director’ means  
17                 the Director of the Office of Science and Technology  
18                 Policy.

19                 “(2) ELIGIBLE ENTITY.—The term ‘eligible en-  
20                 tity’ means—

21                         “(A) a scientist or other individual with  
22                         knowledge and expertise in emissions reduction;

23                         “(B) an institution of higher education;

24                         “(C) a nongovernmental organization;

25                         “(D) a National Laboratory;

1           “(E) a private entity; and

2           “(F) a partnership or consortium of 2 or  
3 more entities described in subparagraphs (B)  
4 through (E).

5           “(3) EMISSIONS REDUCTION.—

6           “(A) IN GENERAL.—The term ‘emissions  
7 reduction’ means the reduction, to the max-  
8 imum extent practicable, of net nonwater green-  
9 house gas emissions to the atmosphere by en-  
10 ergy services and industrial processes.

11           “(B) EXCLUSION.—The term ‘emissions  
12 reduction’ does not include the elimination of  
13 carbon embodied in the principal products of in-  
14 dustrial manufacturing.

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

17           “(5) CRITICAL MATERIAL OR MINERAL.—The  
18 term ‘critical material or mineral’ means a material  
19 or mineral that serves an essential function in the  
20 manufacturing of a product and has a high risk of  
21 a supply disruption, such that a shortage of such a  
22 material or mineral would have significant con-  
23 sequences for United States economic or national se-  
24 curity.



1           “(b) INDUSTRIAL EMISSIONS REDUCTION TECH-  
2 NOLOGY DEVELOPMENT PROGRAM.—

3           “(1) IN GENERAL.—Not later than 1 year after  
4 the date of enactment of the Energy Act of 2020,  
5 the Secretary, in consultation with the Director, the  
6 heads of relevant Federal agencies, National Labora-  
7 tories, industry, and institutions of higher education,  
8 shall establish a crosscutting industrial emissions re-  
9 duction technology development program of re-  
10 search, development, demonstration, and commercial  
11 application to advance innovative technologies that—

12                   “(A) increase the technological and eco-  
13 nomic competitiveness of industry and manufac-  
14 turing in the United States;

15                   “(B) increase the viability and competitive-  
16 ness of United States industrial technology ex-  
17 ports; and

18                   “(C) achieve emissions reduction in  
19 nonpower industrial sectors.

20           “(2) COORDINATION.—In carrying out the pro-  
21 gram, the Secretary shall—

22                   “(A) coordinate with each relevant office in  
23 the Department and any other Federal agency;

1           “(B) coordinate and collaborate with the  
2           Industrial Technology Innovation Advisory  
3           Committee established under section 456; and

4           “(C) coordinate and seek to avoid duplica-  
5           tion with the energy-intensive industries pro-  
6           gram established under section 452.

7           “(3) LEVERAGE OF EXISTING RESOURCES.—In  
8           carrying out the program, the Secretary shall lever-  
9           age, to the maximum extent practicable—

10           “(A) existing resources and programs of  
11           the Department and other relevant Federal  
12           agencies; and

13           “(B) public-private partnerships.

14           “(c) FOCUS AREAS.—The program shall focus on—

15           “(1) industrial production processes, including  
16           technologies and processes that—

17           “(A) achieve emissions reduction in high  
18           emissions industrial materials production pro-  
19           cesses, including production processes for iron,  
20           steel, steel mill products, aluminum, cement,  
21           concrete, glass, pulp, paper, and industrial ce-  
22           ramics;

23           “(B) achieve emissions reduction in  
24           medium- and high-temperature heat generation,  
25           including—

1                   “(i) through electrification of heating  
2                   processes;

3                   “(ii) through renewable heat genera-  
4                   tion technology;

5                   “(iii) through combined heat and  
6                   power; and

7                   “(iv) by switching to alternative fuels,  
8                   including hydrogen and nuclear energy;

9                   “(C) achieve emissions reduction in chem-  
10                  ical production processes, including by incor-  
11                  porating, if appropriate and practicable, prin-  
12                  ciples, practices, and methodologies of sustain-  
13                  able chemistry and engineering;

14                  “(D) leverage smart manufacturing tech-  
15                  nologies and principles, digital manufacturing  
16                  technologies, and advanced data analytics to de-  
17                  velop advanced technologies and practices in in-  
18                  formation, automation, monitoring, computa-  
19                  tion, sensing, modeling, and networking to—

20                   “(i) model and simulate manufac-  
21                   turing production lines;

22                   “(ii) monitor and communicate pro-  
23                   duction line status;

1                   “(iii) manage and optimize energy  
2                   productivity and cost throughout produc-  
3                   tion; and

4                   “(iv) model, simulate, and optimize  
5                   the energy efficiency of manufacturing  
6                   processes;

7                   “(E) leverage the principles of sustainable  
8                   manufacturing to minimize the potential nega-  
9                   tive environmental impacts of manufacturing  
10                  while conserving energy and resources, includ-  
11                  ing—

12                  “(i) by designing products that enable  
13                  reuse, refurbishment, remanufacturing,  
14                  and recycling;

15                  “(ii) by minimizing waste from indus-  
16                  trial processes, including through the reuse  
17                  of waste as other resources in other indus-  
18                  trial processes for mutual benefit; and

19                  “(iii) by increasing resource efficiency;  
20                  and

21                  “(F) increase the energy efficiency of in-  
22                  dustrial processes;

23                  “(2) alternative materials that produce fewer  
24                  emissions during production and result in fewer  
25                  emissions during use, including—

1           “(A) high-performance lightweight mate-  
2           rials; and

3           “(B) substitutions for critical materials  
4           and minerals;

5           “(3) development of net-zero emissions liquid  
6           and gaseous fuels;

7           “(4) emissions reduction in shipping, aviation,  
8           and long distance transportation;

9           “(5) carbon capture technologies for industrial  
10          processes;

11          “(6) other technologies that achieve net-zero  
12          emissions in nonpower industrial sectors, as deter-  
13          mined by the Secretary, in consultation with the Di-  
14          rector; and

15          “(7) high-performance computing to develop ad-  
16          vanced materials and manufacturing processes con-  
17          tributing to the focus areas described in paragraphs  
18          (1) through (6), including—

19                 “(A) modeling, simulation, and optimiza-  
20                 tion of the design of energy efficient and sus-  
21                 tainable products; and

22                 “(B) the use of digital prototyping and ad-  
23                 ditive manufacturing to enhance product de-  
24                 sign.

1           “(8) incorporation of sustainable chemistry and  
2           engineering principles, practices, and methodologies,  
3           as the Secretary determines appropriate; and

4           “(9) other research or technology areas identi-  
5           fied in the Strategic Plan authorized in section 455.

6           “(d) GRANTS, CONTRACTS, COOPERATIVE AGREE-  
7           MENTS, AND DEMONSTRATION PROJECTS.—

8           “(1) GRANTS.—In carrying out the program,  
9           the Secretary shall award grants on a competitive  
10          basis to eligible entities for projects that the Sec-  
11          retary determines would best achieve the goals of the  
12          program.

13          “(2) CONTRACTS AND COOPERATIVE AGREE-  
14          MENTS.—In carrying out the program, the Secretary  
15          may enter into contracts and cooperative agreements  
16          with eligible entities and Federal agencies for  
17          projects that the Secretary determines would further  
18          the purposes of the program.

19          “(3) DEMONSTRATION PROJECTS.—In sup-  
20          porting technologies developed under this section,  
21          the Secretary shall fund demonstration projects that  
22          test and validate technologies described in subsection  
23          (c).

24          “(4) APPLICATION.—An entity seeking funding  
25          or a contract or agreement under this subsection

1 shall submit to the Secretary an application at such  
2 time, in such manner, and containing such informa-  
3 tion as the Secretary may require.

4 “(5) COST SHARING.—In awarding funds under  
5 this section, the Secretary shall require cost sharing  
6 in accordance with section 988 of the Energy Policy  
7 Act of 2005 (42 U.S.C. 16352).

8 “(e) AUTHORIZATION OF APPROPRIATIONS.—There  
9 are authorized to be appropriated to the Secretary to carry  
10 out the demonstration projects authorized in subsection  
11 (d)(3)—

12 “(1) \$20,000,000 for fiscal year 2021;

13 “(2) \$80,000,000 for fiscal year 2022;

14 “(3) \$100,000,000 for fiscal year 2023;

15 “(4) \$150,000,000 for fiscal year 2024; and

16 “(5) \$150,000,000 for fiscal year 2025.

17 “(f) COORDINATION.—The Secretary shall carry out  
18 the activities authorized in this section in accordance with  
19 section 203 of the Department of Energy Research and  
20 Innovation Act (42 U.S.C. 18631).”

21 (b) TECHNICAL AMENDMENT.—The table of contents  
22 of the Energy Independence and Security Act of 2007  
23 (Public Law 110–140; 121 Stat. 1494) is amended by in-  
24 serting after the item relating to section 453 the following:

“Sec. 454. Industrial emissions reduction technology development program.”

1 **SEC. 6004. INDUSTRIAL TECHNOLOGY INNOVATION ADVI-**  
2 **SORY COMMITTEE.**

3 (a) IN GENERAL.—Subtitle D of title IV of the En-  
4 ergy Independence and Security Act of 2007, as amended  
5 by section 6003, is amended by adding at the end the fol-  
6 lowing:

7 **“SEC. 455. INDUSTRIAL TECHNOLOGY INNOVATION ADVI-**  
8 **SORY COMMITTEE.**

9 “(a) DEFINITIONS.—In this section:

10 “(1) COMMITTEE.—The term ‘Committee’  
11 means the Industrial Technology Innovation Advi-  
12 sory Committee established under subsection (b).

13 “(2) DIRECTOR.—The term ‘Director’ means  
14 the Director of the Office of Science and Technology  
15 Policy.

16 “(3) EMISSIONS REDUCTION.—The term ‘emis-  
17 sions reduction’ has the meaning given the term in  
18 section 454(a).

19 “(4) PROGRAM.—The term ‘program’ means  
20 the industrial emissions reduction technology devel-  
21 opment program established under section  
22 454(b)(1).

23 “(b) ESTABLISHMENT.—Not later than 180 days  
24 after the date of enactment of the Energy Act of 2020,  
25 the Secretary, in consultation with the Director, shall es-



1 tablish an advisory committee, to be known as the ‘Indus-  
2 trial Technology Innovation Advisory Committee’.

3 “(c) MEMBERSHIP.—

4 “(1) APPOINTMENT.—The Committee shall be  
5 comprised of not fewer than 16 members and not  
6 more than 20 members, who shall be appointed by  
7 the Secretary, in consultation with the Director.

8 “(2) REPRESENTATION.—Members appointed  
9 pursuant to paragraph (1) shall include—

10 “(A) not less than 1 representative of each  
11 relevant Federal agency, as determined by the  
12 Secretary;

13 “(B) the Chair of the Secretary of Energy  
14 Advisory Board, if that position is filled;

15 “(C) not less than 2 representatives of  
16 labor groups;

17 “(D) not less than 3 representatives of the  
18 research community, which shall include aca-  
19 demia and National Laboratories;

20 “(E) not less than 2 representatives of  
21 nongovernmental organizations;

22 “(F) not less than 6 representatives of  
23 small- and large-scale industry, the collective  
24 expertise of which shall cover every focus area  
25 described in section 454(e); and

1           “(F) not less than 1 representative of a  
2           State government; and

3           “(G) any other individuals the Secretary,  
4           in coordination with the Director, determines to  
5           be necessary to ensure that the Committee is  
6           comprised of a diverse group of representatives  
7           of industry, academia, independent researchers,  
8           and public and private entities.

9           “(3) CHAIR.—The Secretary shall designate a  
10          member of the Committee to serve as Chair.

11          “(d) DUTIES.—

12           “(1) IN GENERAL.—The Committee shall—

13           “(A) in consultation with the Secretary  
14           and the Director, propose missions and goals  
15           for the program, which shall be consistent with  
16           the purposes of the program described in sec-  
17           tion 454(b)(1); and

18           “(B) advise the Secretary with respect to  
19           the program—

20           “(i) by identifying and evaluating any  
21           technologies being developed by the private  
22           sector relating to the focus areas described  
23           in section 454(c);

24           “(ii) by identifying technology gaps in  
25           the private sector or other Federal agen-

1                   cies in those focus areas, and making rec-  
2                   ommendations to address those gaps;

3                   “ (iii) by surveying and analyzing fac-  
4                   tors that prevent the adoption of emissions  
5                   reduction technologies by the private sec-  
6                   tor; and

7                   “ (iv) by recommending technology  
8                   screening criteria for technology developed  
9                   under the program to encourage adoption  
10                  of the technology by the private sector; and

11                  “ (C) develop the strategic plan described  
12                  in paragraph (2).

13                  “ (2) STRATEGIC PLAN.—

14                  “ (A) PURPOSE.—The purpose of the stra-  
15                  tegic plan developed under paragraph (1)(C) is  
16                  to set forth a plan for achieving the goals of the  
17                  program established in section 454(b)(1), in-  
18                  cluding for the focus areas described in section  
19                  454(c).

20                  “ (B) CONTENTS.—The strategic plan de-  
21                  veloped under paragraph (1)(C) shall—

22                  “ (i) specify near-term and long-term  
23                  qualitative and quantitative objectives re-  
24                  lating to each focus area described in sec-  
25                  tion 454(c), including research, develop-

1                   ment, demonstration, and commercial ap-  
2                   plication objectives;

3                   “(ii) leverage existing roadmaps rel-  
4                   evant to the program in section 454(b)(1)  
5                   and the focus areas in section 454(c);

6                   “(iii) specify the anticipated time-  
7                   frame for achieving the objectives specified  
8                   under clause (i);

9                   “(iv) include plans for developing  
10                  emissions reduction technologies that are  
11                  globally cost-competitive, including, as ap-  
12                  plicable, in developing economies;

13                  “(v) identify the appropriate role for  
14                  investment by the Federal Government, in  
15                  coordination with the private sector, to  
16                  achieve the objectives specified under  
17                  clause (i);

18                  “(vi) identify the public and private  
19                  costs of achieving the objectives specified  
20                  under clause (i); and

21                  “(vii) estimate the economic and em-  
22                  ployment impact in the United States of  
23                  achieving those objectives.

24                  “(e) MEETINGS.—

1           “(1) FREQUENCY.—The Committee shall meet  
2 not less frequently than 2 times per year, at the call  
3 of the Chair.

4           “(2) INITIAL MEETING.—Not later than 30  
5 days after the date on which the members are ap-  
6 pointed under subsection (b), the Committee shall  
7 hold its first meeting.

8           “(f) COMMITTEE REPORT.—

9           “(1) IN GENERAL.—Not later than 2 years  
10 after the date of enactment of the Energy Act of  
11 2020, and not less frequently than once every 3  
12 years thereafter, the Committee shall submit to the  
13 Secretary a report on the progress of achieving the  
14 purposes of the program.

15           “(2) CONTENTS.—The report under paragraph  
16 (1) shall include—

17           “(A) a description of any technology inno-  
18 vation opportunities identified by the Com-  
19 mittee;

20           “(B) a description of any technology gaps  
21 identified by the Committee under subsection  
22 (d)(1)(B)(ii);

23           “(C) recommendations for improving tech-  
24 nology screening criteria and management of  
25 the program;

1           “(D) an evaluation of the progress of the  
2           program and the research, development, and  
3           demonstration activities funded under the pro-  
4           gram;

5           “(E) any recommended changes to the  
6           focus areas of the program described in section  
7           454(c);

8           “(F) a description of the manner in which  
9           the Committee has carried out the duties de-  
10          scribed in subsection (d)(1) and any relevant  
11          findings as a result of carrying out those duties;

12          “(G) if necessary, an update to the stra-  
13          tegic plan developed by the Committee under  
14          subsection (d)(1)(C);

15          “(H) the progress made in achieving the  
16          goals set out in that strategic plan;

17          “(I) a review of the management, coordina-  
18          tion, and industry utility of the program;

19          “(J) an assessment of the extent to which  
20          progress has been made under the program in  
21          developing commercial, cost-competitive tech-  
22          nologies in each focus area described in section  
23          454(c); and

24          “(K) an assessment of the effectiveness of  
25          the program in coordinating efforts within the

1 Department and with other Federal agencies to  
2 achieve the purposes of the program.

3 “(g) REPORT TO CONGRESS.—Not later than 60 days  
4 after receiving a report from the Committee under sub-  
5 section (f), the Secretary shall submit a copy of that re-  
6 port to the Committees on Appropriations and Science,  
7 Space, and Technology of the House of Representatives,  
8 the Committees on Appropriations and Energy and Nat-  
9 ural Resources of the Senate, and any other relevant Com-  
10 mittee of Congress.

11 “(h) APPLICABILITY OF FEDERAL ADVISORY COM-  
12 MITTEE ACT.—Except as otherwise provided in this sec-  
13 tion, the Federal Advisory Committee Act (5 U.S.C. App.)  
14 shall apply to the Committee.”.

15 (b) TECHNICAL AMENDMENT.—The table of contents  
16 of the Energy Independence and Security Act of 2007  
17 (Public Law 110–140; 121 Stat. 1494) (as amended by  
18 section 6003(b)) is amended by inserting after the item  
19 relating to section 454 the following:

“Sec. 455. Industrial Technology Innovation Advisory Committee.”.

20 **SEC. 6005. TECHNICAL ASSISTANCE PROGRAM TO IMPLE-**  
21 **MENT INDUSTRIAL EMISSIONS REDUCTION.**

22 (a) IN GENERAL.—Subtitle D of title IV of the En-  
23 ergy Independence and Security Act of 2007, as amended  
24 by section 6004, is amended by adding at the end the fol-  
25 lowing:

1 **“SEC. 456. TECHNICAL ASSISTANCE PROGRAM TO IMPLE-**  
2 **MENT INDUSTRIAL EMISSIONS REDUCTION.**

3 “(a) DEFINITIONS.—In this section:

4 “(1) ELIGIBLE ENTITY.—The term ‘eligible en-  
5 tity’ means—

6 “(A) a State;

7 “(B) a unit of local government;

8 “(C) a territory or possession of the  
9 United States;

10 “(D) a relevant State or local office, in-  
11 cluding an energy office;

12 “(E) a tribal organization (as defined in  
13 section 3765 of title 38, United States Code);

14 “(F) an institution of higher education;  
15 and

16 “(G) a private entity; and

17 “(H) a trade association or technical soci-  
18 ety.

19 “(2) EMISSIONS REDUCTION.—The term ‘emis-  
20 sions reduction’ has the meaning given the term in  
21 section 454(a).

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

24 “(b) ESTABLISHMENT.—Not later than 1 year after  
25 the date of enactment of the Energy Act of 2020, the Sec-  
26 retary shall establish a program to provide technical as-



1 sistance to eligible entities to promote the commercial ap-  
2 plication of emission reduction technologies developed  
3 through the program established in section 454(b).

4 “(c) APPLICATIONS.—

5 “(1) IN GENERAL.—An eligible entity desiring  
6 technical assistance under the program shall submit  
7 to the Secretary an application at such time, in such  
8 manner, and containing such information as the Sec-  
9 retary may require.

10 “(2) APPLICATION PROCESS.—The Secretary  
11 shall seek applications for technical assistance under  
12 the program on a periodic basis, but not less fre-  
13 quently than once every 12 months.

14 “(3) FACTORS FOR CONSIDERATION.—In select-  
15 ing eligible entities for technical assistance under the  
16 program, the Secretary shall, to the maximum ex-  
17 tent practicable—

18 “(A) give priority to—

19 “(i) activities carried out with tech-  
20 nical assistance under the program that  
21 have the greatest potential for achieving  
22 emissions reduction in nonpower industrial  
23 sectors;

24 “(ii) activities carried out in a State  
25 in which there are active or inactive indus-

1 trial facilities that may be used or retro-  
2 fitted to carry out activities under the  
3 focus areas described in section 454(c);  
4 and

5 “(iii) activities carried out in an eco-  
6 nomically distressed area (as described in  
7 section 301(a) of the Public Works and  
8 Economic Development Act of 1965 (42  
9 U.S.C. 3161(a)); and

10 “(B) ensure that—

11 “(i) there is geographic diversity  
12 among the eligible entities selected; and

13 “(ii) the activities carried out with  
14 technical assistance under the program re-  
15 flect a majority of the focus areas de-  
16 scribed in section 454(c).”.

17 (b) TECHNICAL AMENDMENT.—The table of contents  
18 of the Energy Independence and Security Act of 2007  
19 (Public Law 110–140; 121 Stat. 1494) (as amended by  
20 section 6004(b)) is amended by inserting after the item  
21 relating to section 455 the following:

“Sec. 456. Technical assistance program to implement industrial emissions re-  
duction.”.

1 **SEC. 6006. DEVELOPMENT OF NATIONAL SMART MANUFAC-**  
2 **TURING PLAN.**

3 (a) IN GENERAL.—Not later than 3 years after the  
4 date of enactment of this Act, the Secretary of Energy  
5 (in this section referred to as the “Secretary”), in con-  
6 sultation with the National Academies, shall develop and  
7 complete a national plan for smart manufacturing tech-  
8 nology development and deployment to improve the pro-  
9 ductivity and energy efficiency of the manufacturing sec-  
10 tor of the United States.

11 (b) CONTENT.—

12 (1) IN GENERAL.—The plan developed under  
13 subsection (a) shall identify areas in which agency  
14 actions by the Secretary and other heads of relevant  
15 Federal agencies would—

16 (A) facilitate quicker development, deploy-  
17 ment, and adoption of smart manufacturing  
18 technologies and processes;

19 (B) result in greater energy efficiency and  
20 lower environmental impacts for all American  
21 manufacturers; and

22 (C) enhance competitiveness and strength-  
23 en the manufacturing sectors of the United  
24 States.

25 (2) INCLUSIONS.—Agency actions identified  
26 under paragraph (1) shall include—

1 (A) an assessment of previous and current  
2 actions of the Department relating to smart  
3 manufacturing;

4 (B) the establishment of voluntary inter-  
5 connection protocols and performance stand-  
6 ards;

7 (C) the use of smart manufacturing to im-  
8 prove energy efficiency and reduce emissions in  
9 supply chains across multiple companies;

10 (D) actions to increase cybersecurity in  
11 smart manufacturing infrastructure;

12 (E) deployment of existing research re-  
13 sults;

14 (F) the leveraging of existing high-per-  
15 formance computing infrastructure; and

16 (G) consideration of the impact of smart  
17 manufacturing on existing manufacturing jobs  
18 and future manufacturing jobs.

19 (c) BIENNIAL REVISIONS.—Not later than 2 years  
20 after the date on which the Secretary completes the plan  
21 under subsection (a), and not less frequently than once  
22 every 2 years thereafter, the Secretary shall revise the  
23 plan to account for advancements in information and com-  
24 munication technology and manufacturing needs.

1 (d) REPORT.—Annually until the completion of the  
2 plan under subsection (a), the Secretary shall submit to  
3 Congress a report on the progress made in developing the  
4 plan.

5 (e) DEFINITION.—In this section, the term “smart  
6 manufacturing” means advanced technologies in informa-  
7 tion, automation, monitoring, computation, sensing, mod-  
8 eling, artificial intelligence, analytics, and networking  
9 that—

10 (1) digitally—

11 (A) simulate manufacturing production  
12 lines;

13 (B) operate computer-controlled manufac-  
14 turing equipment;

15 (C) monitor and communicate production  
16 line status; and

17 (D) manage and optimize energy produc-  
18 tivity and cost throughout production;

19 (2) model, simulate, and optimize the energy ef-  
20 ficiency of a factory building;

21 (3) monitor and optimize building energy per-  
22 formance;

23 (4) model, simulate, and optimize the design of  
24 energy efficient and sustainable products, including

1 the use of digital prototyping and additive manufac-  
2 turing to enhance product design;

3 (5) connect manufactured products in networks  
4 to monitor and optimize the performance of the net-  
5 works, including automated network operations; and

6 (6) digitally connect the supply chain network.

## 7 **TITLE VII—CRITICAL MINERALS**

### 8 **SEC. 7001. RARE EARTH ELEMENTS.**

9 (a) RESEARCH PROGRAM.—

10 (1) IN GENERAL.—The Secretary of Energy,  
11 acting through the Assistant Secretary for Fossil  
12 Energy (referred to in this section as the “Sec-  
13 retary”), shall conduct a program of research and  
14 development—

15 (A) to develop and assess advanced separa-  
16 tion technologies for the extraction and recovery  
17 of rare earth elements and other critical mate-  
18 rials from coal and coal byproducts; and

19 (B) to determine if there are, and mitigate,  
20 any potential environmental or public health im-  
21 pacts that could arise from the recovery of rare  
22 earth elements from coal-based resources.

23 (2) AUTHORIZATION OF APPROPRIATIONS.—

24 There is authorized to be appropriated to the Sec-

1       retary to carry out the program described in para-  
2       graph (1)—

3               (A) \$23,000,000 for each of fiscal years  
4               2021 and 2022;

5               (B) \$24,200,000 for fiscal year 2023;

6               (C) \$25,400,000 for fiscal year 2024;

7               (D) \$26,600,000 for fiscal year 2025; and

8               (E) \$27,800,000 for fiscal year 2026.

9       (b) REPORT.—Not later than 1 year after the date  
10 of enactment of this Act, the Secretary shall submit to  
11 the Committee on Energy and Natural Resources of the  
12 Senate and the Committees on Science, Space, and Tech-  
13 nology and Energy and Commerce of the House of Rep-  
14 resentatives a report evaluating the development of ad-  
15 vanced separation technologies for the extraction and re-  
16 covery of rare earth elements and other critical materials  
17 from coal and coal byproducts, including acid mine drain-  
18 age from coal mines.

19       (c) CRITICAL MATERIAL.—In this section, the term  
20 “critical material” has the meaning given the term in sec-  
21 tion 7002 of this Act.

22 **SEC. 7002. MINERAL SECURITY.**

23       (a) DEFINITIONS.—In this section:

24               (1) BYPRODUCT.—The term “byproduct”  
25       means a critical mineral—

1 (A) the recovery of which depends on the  
2 production of a host mineral that is not des-  
3 igned as a critical mineral; and

4 (B) that exists in sufficient quantities to  
5 be recovered during processing or refining.

6 (2) CRITICAL MATERIAL.—The term “critical  
7 material” means—

8 (A) any non-fuel mineral, element, sub-  
9 stance, or material that the Secretary of En-  
10 ergy determines—

11 (i) has a high risk of a supply chain  
12 disruption; and

13 (ii) serves an essential function in 1  
14 or more energy technologies, including  
15 technologies that produce, transmit, store,  
16 and conserve energy; or

17 (B) a critical mineral.

18 (3) CRITICAL MINERAL.—

19 (A) IN GENERAL.—The term “critical min-  
20 eral” means any mineral, element, substance, or  
21 material designated as critical by the Secretary  
22 under subsection (c).

23 (B) EXCLUSIONS.—The term “critical  
24 mineral” does not include—

25 (i) fuel minerals;



1 (ii) water, ice, or snow;

2 (iii) common varieties of sand, gravel,  
3 stone, pumice, cinders, and clay.

4 (4) INDIAN TRIBE.—The term “Indian Tribe”  
5 has the meaning given the term in section 4 of the  
6 Indian Self-Determination and Education Assistance  
7 Act (25 U.S.C. 5304).

8 (5) SECRETARY.—The term “Secretary” means  
9 the Secretary of the Interior.

10 (6) STATE.—The term “State” means—

11 (A) a State;

12 (B) the District of Columbia;

13 (C) the Commonwealth of Puerto Rico;

14 (D) Guam;

15 (E) American Samoa;

16 (F) the Commonwealth of the Northern  
17 Mariana Islands; and

18 (G) the United States Virgin Islands.

19 (7) INSTITUTION OF HIGHER EDUCATION.—The  
20 term “institution of higher education” means—

21 (A) an institution of higher education (as  
22 defined in section 101(a) of the Higher Edu-  
23 cation Act of 1965 (20 U.S.C. 1001(a))); or

1 (B) a postsecondary vocational institution  
2 (as defined in section 102(c) of the Higher  
3 Education Act of 1965 (20 U.S.C. 1002(c))).

4 (b) POLICY.—

5 (1) IN GENERAL.—Section 3 of the National  
6 Materials and Minerals Policy, Research and Devel-  
7 opment Act of 1980 (30 U.S.C. 1602) is amended—

8 (A) by striking paragraph (3) and insert-  
9 ing the following:

10 “(3) establish an analytical and forecasting ca-  
11 pability for identifying critical mineral demand, sup-  
12 ply, and other factors to allow informed actions to  
13 be taken to avoid supply shortages, mitigate price  
14 volatility, and prepare for demand growth and other  
15 market shifts;”;

16 (B) in paragraph (6), by striking “and”  
17 after the semicolon at the end; and

18 (C) by striking paragraph (7) and insert-  
19 ing the following:

20 “(7) facilitate the availability, development, and  
21 environmentally responsible production of domestic  
22 resources to meet national material or critical min-  
23 eral needs;

24 “(8) avoid duplication of effort, prevent unnec-  
25 essary paperwork, and minimize delays in the ad-

1       ministration of applicable laws (including regula-  
2       tions) and the issuance of permits and authoriza-  
3       tions necessary to explore for, develop, and produce  
4       critical minerals and to construct critical mineral  
5       manufacturing facilities in accordance with applica-  
6       ble environmental and land management laws;

7               “(9) strengthen—

8                       “(A) educational and research capabilities  
9                       at not lower than the secondary school level;  
10                      and

11                     “(B) workforce training for exploration  
12                     and development of critical minerals and critical  
13                     mineral manufacturing;

14               “(10) bolster international cooperation through  
15       technology transfer, information sharing, and other  
16       means;

17               “(11) promote the efficient production, use, and  
18       recycling of critical minerals;

19               “(12) develop alternatives to critical minerals;  
20       and

21               “(13) establish contingencies for the production  
22       of, or access to, critical minerals for which viable  
23       sources do not exist within the United States.”.

24               (2) CONFORMING AMENDMENT.—Section 2(b)  
25       of the National Materials and Minerals Policy, Re-

1 search and Development Act of 1980 (30 U.S.C.  
2 1601(b)) is amended by striking “(b) As used in this  
3 Act, the term” and inserting the following:

4 “(b) DEFINITIONS.—In this Act:

5 “(1) CRITICAL MINERAL.—The term ‘critical  
6 mineral’ means any mineral, element, substance, or  
7 material designated as critical by the Secretary  
8 under section 7002(c) of the Energy Act of 2020.

9 “(2) MATERIALS.—The term”.

10 (c) CRITICAL MINERAL DESIGNATIONS.—

11 (1) DRAFT METHODOLOGY AND LIST.—The  
12 Secretary, acting through the Director of the United  
13 States Geological Survey (referred to in this sub-  
14 section as the “Secretary”), shall publish in the Fed-  
15 eral Register for public comment—

16 (A) a description of the draft methodology  
17 used to identify a draft list of critical minerals;

18 (B) a draft list of minerals, elements, sub-  
19 stances, and materials that qualify as critical  
20 minerals; and

21 (C) a draft list of critical minerals recov-  
22 ered as byproducts and their host minerals.

23 (2) AVAILABILITY OF DATA.—If available data  
24 is insufficient to provide a quantitative basis for the

1 methodology developed under this subsection, quali-  
2 tative evidence may be used to the extent necessary.

3 (3) FINAL METHODOLOGY AND LIST.—After re-  
4 viewing public comments on the draft methodology  
5 and the draft lists published under paragraph (1)  
6 and updating the methodology and lists as appro-  
7 priate, not later than 45 days after the date on  
8 which the public comment period with respect to the  
9 draft methodology and draft lists closes, the Sec-  
10 retary shall publish in the Federal Register—

11 (A) a description of the final methodology  
12 for determining which minerals, elements, sub-  
13 stances, and materials qualify as critical min-  
14 erals;

15 (B) the final list of critical minerals; and

16 (C) the final list of critical minerals recov-  
17 ered as byproducts and their host minerals.

18 (4) DESIGNATIONS.—

19 (A) IN GENERAL.—For purposes of car-  
20 rying out this subsection, the Secretary shall  
21 maintain a list of minerals, elements, sub-  
22 stances, and materials designated as critical,  
23 pursuant to the final methodology published  
24 under paragraph (3), that the Secretary deter-  
25 mines—

1 (i) are essential to the economic or  
2 national security of the United States;

3 (ii) the supply chain of which is vul-  
4 nerable to disruption (including restrictions  
5 associated with foreign political risk, ab-  
6 rupt demand growth, military conflict, vio-  
7 lent unrest, anti-competitive or protec-  
8 tionist behaviors, and other risks through-  
9 out the supply chain); and

10 (iii) serve an essential function in the  
11 manufacturing of a product (including en-  
12 ergy technology-, defense-, currency-, agri-  
13 culture-, consumer electronics-, and health  
14 care-related applications), the absence of  
15 which would have significant consequences  
16 for the economic or national security of the  
17 United States.

18 (B) INCLUSIONS.—Notwithstanding the  
19 criteria under paragraph (3), the Secretary may  
20 designate and include on the list any mineral,  
21 element, substance, or material determined by  
22 another Federal agency to be strategic and crit-  
23 ical to the defense or national security of the  
24 United States.

1           (C) REQUIRED CONSULTATION.—The Sec-  
2           retary shall consult with the Secretaries of De-  
3           fense, Commerce, Agriculture, and Energy and  
4           the United States Trade Representative in des-  
5           ignating minerals, elements, substances, and  
6           materials as critical under this paragraph.

7           (5) SUBSEQUENT REVIEW.—

8           (A) IN GENERAL.—The Secretary, in con-  
9           sultation with the Secretaries of Defense, Com-  
10          merce, Agriculture, and Energy and the United  
11          States Trade Representative, shall review the  
12          methodology and list under paragraph (3) and  
13          the designations under paragraph (4) at least  
14          every 3 years, or more frequently as the Sec-  
15          retary considers to be appropriate.

16          (B) REVISIONS.—Subject to paragraph  
17          (4)(A), the Secretary may—

18                 (i) revise the methodology described in  
19                 this subsection;

20                 (ii) determine that minerals, elements,  
21                 substances, and materials previously deter-  
22                 mined to be critical minerals are no longer  
23                 critical minerals; and

1 (iii) designate additional minerals, ele-  
2 ments, substances, or materials as critical  
3 minerals.

4 (6) NOTICE.—On finalization of the method-  
5 ology and the list under paragraph (3), or any revi-  
6 sion to the methodology or list under paragraph (5),  
7 the Secretary shall submit to Congress written no-  
8 tice of the action.

9 (d) RESOURCE ASSESSMENT.—

10 (1) IN GENERAL.—Not later than 4 years after  
11 the date of enactment of this Act, in consultation  
12 with applicable State (including geological surveys),  
13 local, academic, industry, and other entities, the Sec-  
14 retary (acting through the Director of the United  
15 States Geological Survey) or a designee of the Sec-  
16 retary, shall complete a comprehensive national as-  
17 sessment of each critical mineral that—

18 (A) identifies and quantifies known critical  
19 mineral resources, using all available public and  
20 private information and datasets, including ex-  
21 ploration histories; and

22 (B) provides a quantitative and qualitative  
23 assessment of undiscovered critical mineral re-  
24 sources throughout the United States, including  
25 probability estimates of tonnage and grade,



1           using all available public and private informa-  
2           tion and datasets, including exploration his-  
3           tories.

4           (2) SUPPLEMENTARY INFORMATION.—In car-  
5           rying out this subsection, the Secretary may carry  
6           out surveys and field work (including drilling, re-  
7           mote sensing, geophysical surveys, topographical and  
8           geological mapping, and geochemical sampling and  
9           analysis) to supplement existing information and  
10          datasets available for determining the existence of  
11          critical minerals in the United States.

12          (3) PUBLIC ACCESS.—Subject to applicable law,  
13          to the maximum extent practicable, the Secretary  
14          shall make all data and metadata collected from the  
15          comprehensive national assessment carried out  
16          under paragraph (1) publically and electronically ac-  
17          cessible.

18          (4) TECHNICAL ASSISTANCE.—At the request of  
19          the Governor of a State or the head of an Indian  
20          Tribe, the Secretary may provide technical assist-  
21          ance to State governments and Indian Tribes con-  
22          ducting critical mineral resource assessments on  
23          non-Federal land.

24          (5) PRIORITIZATION.—

1           (A) IN GENERAL.—The Secretary may se-  
2           quence the completion of resource assessments  
3           for each critical mineral such that critical min-  
4           erals considered to be most critical under the  
5           methodology established under subsection (c)  
6           are completed first.

7           (B) REPORTING.—During the period be-  
8           ginning not later than 1 year after the date of  
9           enactment of this Act and ending on the date  
10          of completion of all of the assessments required  
11          under this subsection, the Secretary shall sub-  
12          mit to Congress on an annual basis an interim  
13          report that—

14                 (i) identifies the sequence and sched-  
15                 ule for completion of the assessments if the  
16                 Secretary sequences the assessments; or

17                 (ii) describes the progress of the as-  
18                 sessments if the Secretary does not se-  
19                 quence the assessments.

20          (6) UPDATES.—The Secretary may periodically  
21          update the assessments conducted under this sub-  
22          section based on—

23                 (A) the generation of new information or  
24                 datasets by the Federal Government; or

1 (B) the receipt of new information or  
2 datasets from critical mineral producers, State  
3 geological surveys, academic institutions, trade  
4 associations, or other persons.

5 (7) ADDITIONAL SURVEYS.—The Secretary  
6 shall complete a resource assessment for each addi-  
7 tional mineral or element subsequently designated as  
8 a critical mineral under subsection (e)(5)(B) not  
9 later than 2 years after the designation of the min-  
10 eral or element.

11 (8) REPORT.—Not later than 2 years after the  
12 date of enactment of this Act, the Secretary shall  
13 submit to Congress a report describing the status of  
14 geological surveying of Federal land for any mineral  
15 commodity—

16 (A) for which the United States was de-  
17 pendent on a foreign country for more than 25  
18 percent of the United States supply, as depicted  
19 in the report issued by the United States Geo-  
20 logical Survey entitled “Mineral Commodity  
21 Summaries 2021”; but

22 (B) that is not designated as a critical  
23 mineral under subsection (e).

24 (e) REPORT OF SMALL BUSINESS ADMINISTRA-  
25 TION.—Not later than 1 year and 300 days after the date

1 of enactment of this Act, the Administrator of the Small  
2 Business Administration shall submit to the applicable  
3 committees of Congress a report that assesses the per-  
4 formance of Federal agencies with respect to—

5 (1) complying with chapter 6 of title 5, United  
6 States Code (commonly known as the “Regulatory  
7 Flexibility Act”), in promulgating regulations appli-  
8 cable to the critical minerals industry; and

9 (2) performing an analysis of the efficiency of  
10 regulations applicable to the critical minerals indus-  
11 try, including those that are disproportionately bur-  
12 densome to small businesses.

13 (f) FEDERAL REGISTER PROCESS.—

14 (1) DEPARTMENTAL REVIEW.—Absent any ex-  
15 traordinary circumstance, and except as otherwise  
16 required by law, the Secretary and the Secretary of  
17 Agriculture shall ensure that each Federal Register  
18 notice described in paragraph (2) shall be—

19 (A) subject to any required reviews within  
20 the Department of the Interior or the Depart-  
21 ment of Agriculture; and

22 (B) published in final form in the Federal  
23 Register not later than 45 days after the date  
24 of initial preparation of the notice.

1           (2) PREPARATION.—The preparation of Federal  
2 Register notices required by law associated with the  
3 issuance of a critical mineral exploration or mine  
4 permit shall be delegated to the organizational level  
5 within the agency responsible for issuing the critical  
6 mineral exploration or mine permit.

7           (3) TRANSMISSION.—All Federal Register no-  
8 tices regarding official document availability, an-  
9 nouncements of meetings, or notices of intent to un-  
10 dertake an action shall be originated in, and trans-  
11 mitted to the Federal Register from, the office in  
12 which, as applicable—

13                 (A) the documents or meetings are held; or

14                 (B) the activity is initiated.

15           (4) APPLICATION OF CERTAIN PROVISIONS.—

16                 (A) IN GENERAL.—Subsection (f) shall  
17 also apply to—

18                         (i) an exploration project in which the  
19 presence of a byproduct is reasonably ex-  
20 pected, based on known mineral  
21 companionship, geologic formation, min-  
22 eralogy, or other factors; and

23                         (ii) a project that demonstrates that a  
24 byproduct is of sufficient grade that, when  
25 combined with the production of a host

1 mineral, the byproduct is economic to re-  
2 cover, as determined by the applicable Sec-  
3 retary in accordance with subparagraph  
4 (B), and that the byproduct will be recov-  
5 ered in commercial quantities.

6 (B) REQUIREMENT.—In making the deter-  
7 mination under subparagraph (A)(ii), the appli-  
8 cable Secretary shall consider the cost effective-  
9 ness of the byproducts recovery.

10 (g) RECYCLING, INNOVATION, EFFICIENCY, AND AL-  
11 TERNATIVES.—

12 (1) ESTABLISHMENT.—The Secretary of En-  
13 ergy (referred to in this subsection as the “Sec-  
14 retary”) shall conduct a program (referred to in this  
15 subsection as the “program”) of research, develop-  
16 ment, demonstration, and commercialization—

17 (A) to develop alternatives to critical mate-  
18 rials that do not occur in significant abundance  
19 in the United States;

20 (B) to promote the efficient production,  
21 use, and recycling of critical materials, with  
22 special consideration for domestic critical mate-  
23 rials, throughout the supply chain;

24 (C) to ensure the long-term, secure, and  
25 sustainable supply of critical materials; and

1 (D) to prioritize work in areas that the pri-  
2 vate sector by itself is not likely to undertake  
3 due to financial or technical limitations.

4 (2) COOPERATION.—In carrying out the pro-  
5 gram, the Secretary shall cooperate with appro-  
6 priate—

7 (A) Federal agencies, including the De-  
8 partment of the Interior;

9 (B) the National Laboratories;

10 (C) critical material producers, processors,  
11 and manufacturers;

12 (D) trade associations;

13 (E) academic institutions (including stu-  
14 dents and postdoctoral staff at institutions of  
15 higher education);

16 (F) small businesses;

17 (G) nongovernmental organizations; and

18 (H) other relevant entities or individuals.

19 (3) ENERGY INNOVATION HUB.—In carrying  
20 out the program, the Secretary may use an Energy  
21 Innovation Hub authorized under section 206 of the  
22 Department of Energy Research Coordination Act  
23 (42 U.S.C. 18632).

1           (4) ACTIVITIES.—Under the program, the Sec-  
2           retary shall carry out activities that include the iden-  
3           tification and development of—

4                   (A) alternative materials, particularly ma-  
5                   terials available in abundance within the United  
6                   States and not subject to potential supply re-  
7                   strictions, that lessen the need for critical mate-  
8                   rials;

9                   (B) alternative energy technologies or al-  
10                  ternative designs of existing energy tech-  
11                  nologies, particularly technologies or designs  
12                  that use materials that—

13                          (i) occur in abundance in the United  
14                          States; and

15                          (ii) are not subject to potential supply  
16                          restrictions;

17                   (C) technologies or process improvements  
18                   that minimize the use and content, or lead to  
19                   more efficient use, of critical materials across  
20                   the full supply chain;

21                   (D) innovative technologies and practices  
22                   to diversify commercially viable and sustainable  
23                   domestic sources of critical materials, including  
24                   technologies for recovery from waste streams;



1 (E) technologies, process improvements, or  
2 design optimizations that facilitate the recycling  
3 of critical materials, and options for improving  
4 the rates of collection of products and scrap  
5 containing critical materials from post-con-  
6 sumer, industrial, or other waste streams;

7 (F) advanced critical material extraction,  
8 production, separation, alloying, or processing  
9 technologies that decrease the energy consump-  
10 tion, environmental impact, and costs of those  
11 activities, including—

12 (i) efficient water and wastewater  
13 management strategies;

14 (ii) technologies and management  
15 strategies to control the environmental im-  
16 pacts of radionuclides in ore tailings;

17 (iii) technologies for separation and  
18 processing; and

19 (iv) technologies for increasing the re-  
20 covery rates of coproducts and byproducts  
21 from host metal ores;

22 (G) commercial markets, advanced storage  
23 methods, energy applications, and other bene-  
24 ficial uses of critical materials; and

1           (H) advanced theoretical, computational,  
2           and experimental tools necessary to support the  
3           crosscutting research and development needs of  
4           diverse critical minerals stakeholders.

5           (5) PLAN.—

6           (A) IN GENERAL.—Not later than 1 year  
7           after the date of enactment of this Act, the Sec-  
8           retary shall submit to Congress a plan to carry  
9           out the program.

10          (B) INCLUSIONS.—The plan under sub-  
11          paragraph (A) shall include a description of—

12                 (i) the research and development ac-  
13                 tivities to be carried out under the pro-  
14                 gram during the subsequent 2 years;

15                 (ii) the expected contributions under  
16                 the program to the creation of innovative  
17                 methods and technologies for the efficient  
18                 and sustainable provision of critical mate-  
19                 rials to the domestic economy;

20                 (iii) the expected activities under the  
21                 program to mitigate the environmental and  
22                 health impacts of the extraction, proc-  
23                 essing, manufacturing, use, recovery, and  
24                 recycling of critical materials; and

1 (iv) how the program will promote the  
2 broadest possible participation by aca-  
3 demic, industrial, and other contributors  
4 and the public.

5 (6) COORDINATION AND NONDUPLICATION.—To  
6 the maximum extent practicable, the Secretary shall  
7 ensure that the activities carried out under this sub-  
8 section are coordinated with, and do not duplicate  
9 the efforts of, other programs within the Federal  
10 Government, including the work underway by the  
11 Critical Materials Institute and the National Min-  
12 erals Information Center.

13 (7) STANDARD OF REVIEW.—Not later than 2  
14 years after the date of enactment of this Act, the  
15 Secretary shall conduct a review of activities carried  
16 out under the program to determine the achievement  
17 of the technical milestones identified under para-  
18 graph (8)(D)(i)(I).

19 (8) CRITICAL MATERIALS CONSORTIUM.—

20 (A) IN GENERAL.—Not later than 1 year  
21 after the date of enactment of this Act, the Sec-  
22 retary shall establish and operate a Critical Ma-  
23 terials Consortium (referred to in this para-  
24 graph as the “Consortium”) for the purpose of  
25 supporting the program by providing, to the

1 maximum extent practicable, a centralized enti-  
2 ty for multidisciplinary, collaborative, critical  
3 materials research and development.

4 (B) LEADERSHIP.—If an Energy Innova-  
5 tion Hub authorized under section 206 of the  
6 Department of Energy Research Coordination  
7 Act (42 U.S.C. 18632) that is focused on crit-  
8 ical materials exists on the date of enactment of  
9 this Act, the Secretary shall leverage the per-  
10 sonnel and expertise of the Energy Innovation  
11 Hub to manage the Consortium for not less  
12 than 3 years following the date on which the  
13 Consortium is established.

14 (C) MEMBERSHIP.—The members of the  
15 Consortium shall be representatives from rel-  
16 evant Federal agencies, the National Labora-  
17 tories, the National Minerals Information Cen-  
18 ter, institutions of higher education, private sec-  
19 tor entities, multiinstitutional collaborations,  
20 and other appropriate entities.

21 (D) RESPONSIBILITIES.—The Consortium  
22 shall—

23 (i) develop and implement a multiyear  
24 plan that—

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1 (I) identifies technical goals and  
2 milestones for the program;

3 (II) utilizes the high performance  
4 computing capabilities of the Depart-  
5 ment; and

6 (III) leverages the expertise of  
7 the National Laboratories and the  
8 United States Geological Survey; and

9 (ii) submit an annual report to the  
10 Secretary summarizing the activities of the  
11 Consortium, including an evaluation of the  
12 role of the Consortium in the achievement  
13 of the technical milestones identified under  
14 clause (i)(I).

15 (E) SUNSET; TERMINATION.—

16 (i) IN GENERAL.—The Secretary may  
17 provide support to the Consortium for a  
18 period of not more than 10 years, subject  
19 to the availability of appropriations.

20 (ii) MERIT REVIEW.—Not later than 5  
21 years after the date on which the Consor-  
22 tium is established, the Secretary shall  
23 conduct a rigorous merit review to deter-  
24 mine whether the Consortium helped the

1 program achieve the technical milestones  
2 identified under subparagraph (D)(i)(I).

3 (iii) TERMINATION.—If the Secretary  
4 determines that the Consortium has not  
5 helped the program achieve the technical  
6 milestones identified under subparagraph  
7 (D)(i)(I), the Secretary may terminate any  
8 financial or technical support that the De-  
9 partment provides to the Consortium.

10 (9) REPORTS.—Not later than 2 years after the  
11 date of enactment of this Act, and annually there-  
12 after, the Secretary shall submit to Congress a re-  
13 port summarizing the activities, findings, and  
14 progress of the program.

15 (10) AUTHORIZATION OF APPROPRIATIONS.—  
16 There are authorized to be appropriated to the Sec-  
17 retary to carry out this subsection—

18 (A) \$125,000,000 for fiscal year 2021;

19 (B) \$105,000,000 for fiscal year 2022;

20 (C) \$100,000,000 for fiscal year 2023;

21 (D) \$135,000,000 for fiscal year 2024;

22 and

23 (E) \$135,000,000 for fiscal year 2025.

24 (h) CRITICAL MATERIALS SUPPLY CHAIN RESEARCH  
25 FACILITY.—

1           (1) IN GENERAL.—The Secretary of Energy  
2           (referred to in this subsection as the “Secretary”)  
3           shall support construction of a Critical Materials  
4           Supply Chain Research Facility (referred to in this  
5           subsection as the “facility”).

6           (2) REQUIREMENTS.—The facility—

7                   (A) shall be used to further enable re-  
8                   search, development, demonstration, and com-  
9                   mercialization activities throughout the supply  
10                  chain for critical materials; and

11                  (B) shall provide an integrated, rapidly  
12                  reconfigurable research platform.

13           (3) AUTHORIZATION OF APPROPRIATIONS.—

14           There are authorized to be appropriated to the Sec-  
15           retary to fund the design and construction of the fa-  
16           cility, to remain available until expended—

17                   (A) \$10,000,000 for fiscal year 2021;

18                   (B) \$30,000,000 for fiscal year 2022; and

19                   (C) \$35,000,000 for fiscal year 2023.

20           (i) CRITICAL MATERIALS RESEARCH DATABASE AND  
21           INFORMATION PORTAL.—

22                   (1) IN GENERAL.—In carrying out the program  
23                   established under subsection (g)(1), the Secretary  
24                   and the Secretary of Energy (referred to in this sub-  
25                   section as the “Secretaries”), in consultation with

1 the Director of the National Science Foundation,  
2 shall establish and operate a Critical Materials In-  
3 formation Portal (referred to in this subsection as  
4 the “Portal”) to collect, catalogue, disseminate, and  
5 archive information on critical materials.

6 (2) COOPERATION.—In carrying out paragraph  
7 (1), the Secretaries shall leverage the expertise of  
8 the National Minerals Information Center, the Of-  
9 fice of Scientific and Technical Information, and the  
10 Critical Materials Consortium established under sub-  
11 section (g)(8)(A).

12 (3) PURPOSE.—The purpose of the Portal is to  
13 support the development of a web-based platform to  
14 provide public access to a database of computed in-  
15 formation on known and predicted critical materials  
16 and related material properties and computational  
17 tools in order—

18 (A) to accelerate breakthroughs in critical  
19 materials identification and design;

20 (B) to strengthen the foundation for tech-  
21 nologies that will enable more sustainable recy-  
22 cling, substitution, use, and recovery and mini-  
23 mize the environmental impacts of methods for  
24 extraction, processing, and manufacturing of  
25 critical materials; and



1           (C) to drive the development of advanced  
2 materials for applications that span the mis-  
3 sions of the Department of Energy and the De-  
4 partment of the Interior (referred to in this  
5 subsection as the “Departments”) in energy,  
6 environment, and national security.

7           (4) ACTIVITIES.—In carrying out this sub-  
8 section, the Secretaries shall—

9           (A) conduct cooperative research with in-  
10 dustry, academia, and other research institu-  
11 tions to facilitate the design of novel materials,  
12 including critical materials and substitutes for  
13 critical materials;

14           (B) leverage existing high-performance  
15 computing systems to conduct high throughput  
16 calculations and develop computing and data  
17 mining algorithms for the prediction of material  
18 properties, including a focus on critical mate-  
19 rials;

20           (C) leverage and support research in min-  
21 eralogy and mineral chemistry to enhance the  
22 understanding, prediction, and manipulation of  
23 critical materials;

24           (D) assist scientists and engineers in mak-  
25 ing the fullest possible use of the relevant data

1           holdings of the Departments, including the sci-  
2           entific and technical data generated by the re-  
3           search and development activities funded under  
4           subsection (g);

5           (E) seek and incorporate other information  
6           on critical materials to enhance the Depart-  
7           ments' utility for program participants and  
8           other users; and

9           (F) manage and make available to re-  
10          searchers and the public accessible, curated,  
11          standardized, secure, and privacy-protected  
12          data sets from the public and private sectors  
13          for the purposes of critical materials research  
14          and development activities.

15          (5) PROPRIETARY INFORMATION.—In carrying  
16          out this subsection, the Secretaries shall ensure, con-  
17          sistent with section 5(f) of the National Materials  
18          and Minerals Policy, Research and Development Act  
19          of 1980 (30 U.S.C. 1604(f)), that—

20                 (A) no person uses the information and  
21                 data collected for the Portal for a purpose other  
22                 than the development of, or reporting of, aggre-  
23                 gate data in a manner such that the identity of  
24                 the person or firm who supplied the information

1 is not discernible and is not material to the in-  
2 tended uses of the information;

3 (B) no person discloses any information or  
4 data collected for the Portal unless the informa-  
5 tion or data has been transformed into a statis-  
6 tical or aggregate form that does not allow the  
7 identification of the person or firm who sup-  
8 plied particular information; and

9 (C) procedures are established to require  
10 the withholding of any information or data col-  
11 lected for the Portal if at least 1 of the Secre-  
12 taries determines that the withholding is nec-  
13 essary to protect proprietary information, in-  
14 cluding any trade secrets or other confidential  
15 information.

16 (j) ANALYSIS AND FORECASTING.—

17 (1) CAPABILITIES.—In order to evaluate exist-  
18 ing critical mineral policies and inform future ac-  
19 tions that may be taken to avoid supply shortages,  
20 mitigate price volatility, and prepare for demand  
21 growth and other market shifts, the Secretary (act-  
22 ing through the Director of the United States Geo-  
23 logical Survey) or a designee of the Secretary, in  
24 consultation with the Energy Information Adminis-  
25 tration, academic institutions, and others in order to

1 maximize the application of existing competencies re-  
2 lated to developing and maintaining computer-mod-  
3 els and similar analytical tools, shall conduct and  
4 publish the results of an annual report that in-  
5 cludes—

6 (A) as part of the annually published Min-  
7 eral Commodity Summaries from the United  
8 States Geological Survey, a comprehensive re-  
9 view of critical mineral production, consump-  
10 tion, and recycling patterns, including—

11 (i) the quantity of each critical min-  
12 eral domestically produced during the pre-  
13 ceding year;

14 (ii) the quantity of each critical min-  
15 eral domestically consumed during the pre-  
16 ceding year;

17 (iii) market price data or other price  
18 data for each critical mineral;

19 (iv) an assessment of—

20 (I) critical mineral requirements  
21 to meet the national security, energy,  
22 economic, industrial, technological,  
23 and other needs of the United States  
24 during the preceding year;

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1 (II) the reliance of the United  
2 States on foreign sources to meet  
3 those needs during the preceding year;  
4 and

5 (III) the implications of any sup-  
6 ply shortages, restrictions, or disrup-  
7 tions during the preceding year;

8 (v) the quantity of each critical min-  
9 eral domestically recycled during the pre-  
10 ceding year;

11 (vi) the market penetration during the  
12 preceding year of alternatives to each crit-  
13 ical mineral;

14 (vii) a discussion of international  
15 trends associated with the discovery, pro-  
16 duction, consumption, use, costs of produc-  
17 tion, prices, and recycling of each critical  
18 mineral as well as the development of al-  
19 ternatives to critical minerals; and

20 (viii) such other data, analyses, and  
21 evaluations as the Secretary finds are nec-  
22 essary to achieve the purposes of this sub-  
23 section; and

24 (B) a comprehensive forecast, entitled the  
25 “Annual Critical Minerals Outlook”, of pro-

1           jected critical mineral production, consumption,  
2           and recycling patterns, including—

3                   (i) the quantity of each critical min-  
4                   eral projected to be domestically produced  
5                   over the subsequent 1-year, 5-year, and  
6                   10-year periods;

7                   (ii) the quantity of each critical min-  
8                   eral projected to be domestically consumed  
9                   over the subsequent 1-year, 5-year, and  
10                  10-year periods;

11                  (iii) an assessment of—

12                           (I) critical mineral requirements  
13                           to meet projected national security,  
14                           energy, economic, industrial, techno-  
15                           logical, and other needs of the United  
16                           States;

17                           (II) the projected reliance of the  
18                           United States on foreign sources to  
19                           meet those needs; and

20                           (III) the projected implications of  
21                           potential supply shortages, restric-  
22                           tions, or disruptions;

23                   (iv) the quantity of each critical min-  
24                   eral projected to be domestically recycled

1 over the subsequent 1-year, 5-year, and  
2 10-year periods;

3 (v) the market penetration of alter-  
4 natives to each critical mineral projected to  
5 take place over the subsequent 1-year, 5-  
6 year, and 10-year periods;

7 (vi) a discussion of reasonably foresee-  
8 able international trends associated with  
9 the discovery, production, consumption,  
10 use, costs of production, and recycling of  
11 each critical mineral as well as the develop-  
12 ment of alternatives to critical minerals;  
13 and

14 (vii) such other projections relating to  
15 each critical mineral as the Secretary de-  
16 termines to be necessary to achieve the  
17 purposes of this subsection.

18 (2) PROPRIETARY INFORMATION.—In preparing  
19 a report described in paragraph (1), the Secretary  
20 shall ensure, consistent with section 5(f) of the Na-  
21 tional Materials and Minerals Policy, Research and  
22 Development Act of 1980 (30 U.S.C. 1604(f)),  
23 that—

24 (A) no person uses the information and  
25 data collected for the report for a purpose other

1 than the development of or reporting of aggregate  
2 data in a manner such that the identity of  
3 the person or firm who supplied the information  
4 is not discernible and is not material to the intended  
5 uses of the information;

6 (B) no person discloses any information or  
7 data collected for the report unless the information  
8 or data has been transformed into a statistical  
9 or aggregate form that does not allow the  
10 identification of the person or firm who supplied  
11 particular information; and

12 (C) procedures are established to require  
13 the withholding of any information or data collected  
14 for the report if the Secretary determines  
15 that withholding is necessary to protect proprietary  
16 information, including any trade secrets  
17 or other confidential information.

18 (k) EDUCATION AND WORKFORCE.—

19 (1) WORKFORCE ASSESSMENT.—Not later than  
20 1 year and 300 days after the date of enactment of  
21 this Act, the Secretary of Labor (in consultation  
22 with the Secretary, the Director of the National  
23 Science Foundation, institutions of higher education  
24 with substantial expertise in mining, institutions of  
25 higher education with significant expertise in min-



1       erals research, including fundamental research into  
2       alternatives, and employers in the critical minerals  
3       sector) shall submit to Congress an assessment of  
4       the domestic availability of technically trained per-  
5       sonnel necessary for critical mineral exploration, de-  
6       velopment, assessment, production, manufacturing,  
7       recycling, analysis, forecasting, education, and re-  
8       search, including an analysis of—

9               (A) skills that are in the shortest supply as  
10              of the date of the assessment;

11             (B) skills that are projected to be in short  
12              supply in the future;

13             (C) the demographics of the critical min-  
14              erals industry and how the demographics will  
15              evolve under the influence of factors such as an  
16              aging workforce;

17             (D) the effectiveness of training and edu-  
18              cation programs in addressing skills shortages;

19             (E) opportunities to hire locally for new  
20              and existing critical mineral activities;

21             (F) the sufficiency of personnel within rel-  
22              evant areas of the Federal Government for  
23              achieving the policies described in section 3 of  
24              the National Materials and Minerals Policy, Re-

1 search and Development Act of 1980 (30  
2 U.S.C. 1602); and

3 (G) the potential need for new training  
4 programs to have a measurable effect on the  
5 supply of trained workers in the critical min-  
6 erals industry.

7 (2) CURRICULUM STUDY.—

8 (A) IN GENERAL.—The Secretary and the  
9 Secretary of Labor shall jointly enter into an  
10 arrangement with the National Academy of  
11 Sciences and the National Academy of Engi-  
12 neering under which the Academies shall co-  
13 ordinate with the National Science Foundation  
14 on conducting a study—

15 (i) to design an interdisciplinary pro-  
16 gram on critical minerals that will support  
17 the critical mineral supply chain and im-  
18 prove the ability of the United States to  
19 increase domestic, critical mineral explo-  
20 ration, development, production, manufac-  
21 turing, research, including fundamental re-  
22 search into alternatives, and recycling;

23 (ii) to address undergraduate and  
24 graduate education, especially to assist in  
25 the development of graduate level pro-

1           grams of research and instruction that  
2           lead to advanced degrees with an emphasis  
3           on the critical mineral supply chain or  
4           other positions that will increase domestic,  
5           critical mineral exploration, development,  
6           production, manufacturing, research, in-  
7           cluding fundamental research into alter-  
8           natives, and recycling;

9           (iii) to develop guidelines for pro-  
10          posals from institutions of higher edu-  
11          cation with substantial capabilities in the  
12          required disciplines for activities to im-  
13          prove the critical mineral supply chain and  
14          advance the capacity of the United States  
15          to increase domestic, critical mineral explo-  
16          ration, research, development, production,  
17          manufacturing, and recycling; and

18          (iv) to outline criteria for evaluating  
19          performance and recommendations for the  
20          amount of funding that will be necessary  
21          to establish and carry out the program de-  
22          scribed in paragraph (3).

23          (B) REPORT.—Not later than 2 years after  
24          the date of enactment of this Act, the Secretary  
25          shall submit to Congress a description of the re-

1           sults of the study required under subparagraph  
2           (A).

3           (3) PROGRAM.—

4           (A) ESTABLISHMENT.—The Secretary and  
5           the Secretary of Labor shall jointly conduct a  
6           competitive grant program under which institu-  
7           tions of higher education may apply for and re-  
8           ceive 4-year grants for—

9                   (i) startup costs for newly designated  
10                  faculty positions in integrated critical min-  
11                  eral education, research, innovation, train-  
12                  ing, and workforce development programs  
13                  consistent with paragraph (2);

14                  (ii) internships, scholarships, and fel-  
15                  lowships for students enrolled in programs  
16                  related to critical minerals;

17                  (iii) equipment necessary for inte-  
18                  grated critical mineral innovation, training,  
19                  and workforce development programs; and

20                  (iv) research of critical minerals and  
21                  their applications, particularly concerning  
22                  the manufacture of critical components  
23                  vital to national security.

24           (B) RENEWAL.—A grant under this para-  
25           graph shall be renewable for up to 2 additional

1           3-year terms based on performance criteria out-  
2           lined under paragraph (2)(A)(iv).

3           (l) NATIONAL GEOLOGICAL AND GEOPHYSICAL DATA  
4   PRESERVATION PROGRAM.—Section 351(k) of the Energy  
5   Policy Act of 2005 (42 U.S.C. 15908(k)) is amended by  
6   striking “ \$30,000,000 for each of fiscal years 2006  
7   through 2010” and inserting “ \$5,000,000 for each of fis-  
8   cal years 2021 through 2029, to remain available until ex-  
9   ended”.

10          (m) AMENDMENTS TO THE NATIONAL MATERIALS  
11   AND MINERALS, POLICY, RESEARCH AND DEVELOPMENT  
12   ACT OF 1980.—

13           (1) PROGRAM PLAN.—Section 5 of the National  
14   Materials and Minerals Policy, Research and Devel-  
15   opment Act of 1980 (30 U.S.C. 1604) is amended—

16           (A) by striking “date of enactment of this  
17           Act” each place it appears and inserting “date  
18           of enactment of the Energy Act of 2020”;

19           (B) in subsection (b)(1), by striking “Fed-  
20           eral Coordinating Council for Science, Engi-  
21           neering, and Technology” and inserting “Na-  
22           tional Science and Technology Council”;

23           (C) in subsection (c)—

24           (i) in the matter preceding paragraph

25           (1)—

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1 (I) by striking “the Federal  
2 Emergency” and all that follows  
3 through “Agency, and”; and

4 (II) by striking “appropriate  
5 shall” and inserting “appropriate,  
6 shall”;

7 (ii) by striking paragraphs (1) and  
8 (3);

9 (iii) by redesignating paragraph (2) as  
10 paragraph (1);

11 (iv) in paragraph (1) (as so redesign-  
12 nated)—

13 (I) by striking “within 1 year  
14 after October 21, 1980” and inserting  
15 “not later than 1 year after the date  
16 of the enactment of the Energy Act of  
17 2020”;

18 (II) by striking “which assesses”  
19 and inserting “that assesses”; and

20 (III) by striking “in the case”  
21 and all that follows through “sub-  
22 section, and which” and inserting  
23 “and that”; and

24 (v) by adding at the end the following:

1           “(2) assess the adequacy and stability of the  
2 supply of materials necessary to maintain national  
3 security, economic well-being, public health, and in-  
4 dustrial production.”; and

5           (D) in subsection (e), by striking “Bureau  
6 of Mines” each place it appears and inserting  
7 “United States Geological Survey”.

8           (2) POLICY.—Section 3 of the National Mate-  
9 rials and Minerals Policy, Research and Develop-  
10 ment Act of 1980 (30 U.S.C. 1602) is amended, in  
11 the matter preceding paragraph (1)—

12           (A) in the first sentence, by striking “The  
13 Congress declares that it” and inserting “It”;  
14 and

15           (B) in the second sentence, by striking  
16 “The Congress further declares that implemen-  
17 tation” and inserting “Implementation”.

18           (3) IMPLEMENTATION.—Section 4 of the Na-  
19 tional Materials and Minerals Policy, Research and  
20 Development Act of 1980 (30 U.S.C. 1603) is  
21 amended, in the matter preceding paragraph (1)—

22           (A) by striking “For the purpose” and all  
23 that follows through “declares that the” and in-  
24 serting “The”; and

1 (B) by striking “departments and agen-  
2 cies,” and inserting “departments and agencies  
3 to implement the policy described in section 3”.

4 (n) ADMINISTRATION.—

5 (1) IN GENERAL.—The National Critical Mate-  
6 rials Act of 1984 (30 U.S.C. 1801 et seq.) is re-  
7 pealed.

8 (2) CONFORMING AMENDMENT.—Section 3(d)  
9 of the National Superconductivity and Competitive-  
10 ness Act of 1988 (15 U.S.C. 5202(d)) is amended  
11 in the first sentence by striking “, with the assist-  
12 ance of the National Critical Materials Council as  
13 specified in the National Critical Materials Act of  
14 1984 (30 U.S.C. 1801 et seq.),”.

15 (3) SAVINGS CLAUSES.—

16 (A) IN GENERAL.—Nothing in this section  
17 or an amendment made by this section modifies  
18 any requirement or authority provided by—

19 (i) the matter under the heading “**GE-**  
20 **OLOGICAL SURVEY**” of the first section  
21 of the Act of March 3, 1879 (43 U.S.C.  
22 31(a)); or

23 (ii) the first section of Public Law  
24 87–626 (43 U.S.C. 31(b)).



1 (B) EFFECT ON DEPARTMENT OF DE-  
2 FENSE.—Nothing in this section or an amend-  
3 ment made by this section affects the authority  
4 of the Secretary of Defense with respect to the  
5 work of the Department of Defense on critical  
6 material supplies in furtherance of the national  
7 defense mission of the Department of Defense.

8 (C) SECRETARIAL ORDER NOT AF-  
9 FECTED.—This section shall not apply to any  
10 mineral described in Secretarial Order No.  
11 3324, issued by the Secretary on December 3,  
12 2012, in any area to which the order applies.

13 (o) AUTHORIZATION OF APPROPRIATIONS.—There is  
14 authorized to be appropriated to the Secretary to carry  
15 out this section \$50,000,000 for each of fiscal years 2021  
16 through 2029.

17 **SEC. 7003. MONITORING MINERAL INVESTMENTS UNDER**  
18 **BELT AND ROAD INITIATIVE OF PEOPLE'S RE-**  
19 **PUBLIC OF CHINA.**

20 (a) REPORT REQUIRED.—Not later than 1 year after  
21 the date of the enactment of this Act, the Director of Na-  
22 tional Intelligence (referred to in this section as the “Di-  
23 rector”), in consultation with the Secretary of the Interior,  
24 the Secretary of Energy, the Secretary of Commerce, the  
25 Secretary of State, the Secretary of Defense, and the

1 United States Trade Representative, shall submit to the  
2 appropriate congressional committees a report on invest-  
3 ments in minerals under the Belt and Road Initiative of  
4 the People's Republic of China that includes an assess-  
5 ment of—

6 (1) notable past mineral investments;

7 (2) whether and how such investments have in-  
8 creased the extent of control of minerals by the Peo-  
9 ple's Republic of China;

10 (3) any efforts by the People's Republic of  
11 China to counter or interfere with the goals of the  
12 Energy Resource Governance Initiative of the De-  
13 partment of State; and

14 (4) the strategy of the People's Republic of  
15 China with respect to mineral investments.

16 (b) MONITORING MECHANISM.—In conjunction with  
17 each report required by subsection (a), the Director shall  
18 submit to the appropriate congressional committees a list  
19 of any minerals with respect to which—

20 (1) the People's Republic of China, directly or  
21 through the Belt and Road Initiative—

22 (A) is increasing its concentration of ex-  
23 traction and processing;

24 (B) is acquiring significant mining and  
25 processing facilities;

1 (C) is maintaining or increasing export re-  
2 strictions; or

3 (D) has achieved substantial control of the  
4 supply of minerals used within an industry or  
5 related minerals;

6 (2) there is a significant difference between do-  
7 mestic prices in the People's Republic of China as  
8 compared to prices on international markets; or

9 (3) there is a significant increase or volatility in  
10 price as a result of the Belt and Road Initiative of  
11 the People's Republic of China.

12 (c) CRITICAL MINERAL EVALUATION.—For any min-  
13 eral included on the list required by subsection (b) that  
14 is not already designated as critical by the Secretary of  
15 the Interior pursuant to section 7002(c), the Director  
16 shall—

17 (1) determine, in consultation with the Sec-  
18 retary of the Interior, the Secretary of Energy, the  
19 Secretary of Commerce, the Secretary of State, the  
20 Secretary of Defense, and the United States Trade  
21 Representative, whether the mineral is strategic and  
22 critical to the defense or national security of the  
23 United States; and

1           (2) make a recommendation to the Secretary of  
2           the Interior regarding the designation of the mineral  
3           under section 7002(c).

4           (d) ANNUAL UPDATES.—The Director shall update  
5           the report required by subsection (a) and list required by  
6           subsection (b) not less frequently than annually.

7           (e) FORM.—Each report or list required by this sec-  
8           tion shall be submitted in unclassified form but may in-  
9           clude a classified annex.

10          (f) APPROPRIATE CONGRESSIONAL COMMITTEES DE-  
11          FINED.—In this section, the term “appropriate congres-  
12          sional committees” means—

13               (1) the Committee on Energy and Natural Re-  
14               sources, the Committee on Foreign Relations, the  
15               Committee on Armed Services, the Committee on Fi-  
16               nance, the Committee on Homeland Security and  
17               Governmental Affairs, the Committee on Commerce,  
18               Science, and Transportation, and the Committee on  
19               Appropriations of the Senate; and

20               (2) the Committee on Energy and Commerce,  
21               the Committee on Foreign Affairs, the Committee  
22               on Armed Services, the Committee on Ways and  
23               Means, the Committee on Homeland Security, and  
24               the Committee on Appropriations of the House of  
25               Representatives.

1                   **TITLE VIII—GRID**  
2                   **MODERNIZATION**

3   **SEC. 8001. SMART GRID REGIONAL DEMONSTRATION INI-**  
4                   **TIATIVE.**

5           Section 1304 of the Energy Independence and Secu-  
6 rity Act of 2007 (42 U.S.C. 17384) is amended—

7                   (1) in subsection (a), by inserting “research,  
8                   development, and demonstration” before “program”;

9                   (2) in subsection (b)—

10                           (A) by amending paragraph (1) to read as  
11                   follows:

12                           “(1) IN GENERAL.—The Secretary shall estab-  
13                   lish a smart grid regional demonstration initiative  
14                   (referred to in this subsection as the ‘Initiative’)  
15                   composed of demonstration projects focused on cost-  
16                   effective, advanced technologies for use in power grid  
17                   sensing, communications, analysis, power flow con-  
18                   trol, visualization, distribution automation, industrial  
19                   control systems, dynamic line rating systems, grid  
20                   redesign, and the integration of distributed energy  
21                   resources.”; and

22                           (B) in paragraph (2)—

23                                   (i) in subparagraph (D), by striking

24                                   “and” at the end;

1 (ii) in subparagraph (E), by striking  
2 the period and inserting “; and”; and

3 (iii) by inserting at the end the fol-  
4 lowing:

5 “(F) to encourage the commercial applica-  
6 tion of advanced distribution automation tech-  
7 nologies that exert intelligent control over elec-  
8 trical grid functions at the distribution level to  
9 improve system resilience.”.

10 **SEC. 8002. SMART GRID MODELING, VISUALIZATION, ARCHI-**  
11 **TECTURE, AND CONTROLS.**

12 Title XIII of the Energy Independence and Security  
13 Act of 2007 (42 U.S.C. 17381 et seq.) is amended by in-  
14 serting after section 1304 the following:

15 **“SEC. 1304A. SMART GRID MODELING, VISUALIZATION, AR-**  
16 **CHITECTURE, AND CONTROLS.**

17 “(a) IN GENERAL.—Not later than 180 days after  
18 the enactment of this section, the Secretary shall establish  
19 a program of research, development, demonstration, and  
20 commercial application on electric grid modeling, sensing,  
21 visualization, architecture development, and advanced op-  
22 eration and controls.

23 “(b) MODELING RESEARCH AND DEVELOPMENT.—  
24 The Secretary shall support development of models of  
25 emerging technologies and systems to facilitate the secure

1 and reliable design, planning, and operation of the electric  
2 grid for use by industry stakeholders. In particular, the  
3 Secretary shall support development of—

4 “(1) models to analyze and predict the effects  
5 of adverse physical and cyber events on the electric  
6 grid;

7 “(2) coupled models of electrical, physical, and  
8 cyber systems;

9 “(3) models of existing and emerging tech-  
10 nologies being deployed on the electric grid due to  
11 projected changes in the electric generation mix and  
12 loads, for a variety of regional characteristics; and

13 “(4) integrated models of the communications,  
14 transmission, distribution, and other interdependent  
15 systems for existing, new, and emerging tech-  
16 nologies.

17 “(c) SITUATIONAL AWARENESS RESEARCH AND DE-  
18 VELOPMENT.—

19 “(1) IN GENERAL.—The Secretary shall sup-  
20 port development of computational tools and tech-  
21 nologies to improve sensing, monitoring, and visual-  
22 ization of the electric grid for real-time situational  
23 awareness and decision support tools that enable im-  
24 proved operation of the power system, including util-

1       ity, non-utility, and customer grid-connected assets,  
2       for use by industry partners.

3           “(2) DATA USE.—In developing visualization  
4       capabilities under this section, the Secretary shall  
5       develop tools for industry stakeholders to use to ana-  
6       lyze data collected from advanced measurement and  
7       monitoring technologies, including data from phasor  
8       measurement units and advanced metering units.

9           “(3) SEVERE EVENTS.—The Secretary shall  
10      prioritize enhancing cyber and physical situational  
11      awareness of the electric grid during adverse man-  
12      made and naturally-occurring events.

13          “(d) OPERATION AND CONTROLS RESEARCH AND  
14      DEVELOPMENT.—The Secretary shall conduct research to  
15      develop improvements to the operation and controls of the  
16      electric grid, in coordination with industry partners. Such  
17      activities shall include—

18           “(1) a training facility or facilities to allow grid  
19      operators to gain operational experience with ad-  
20      vanced grid control concepts and technologies;

21           “(2) development of cost-effective advanced op-  
22      eration and control concepts and technologies, such  
23      as adaptive islanding, dynamic line rating systems,  
24      power flow controllers, network topology optimiza-



1       tion, smart circuit breakers, intelligent load shed-  
2       ding, and fault-tolerant control system architectures;

3           “(3) development of real-time control concepts  
4       using artificial intelligence and machine learning for  
5       improved electric grid resilience; and

6           “(4) utilization of advanced data analytics in-  
7       cluding load forecasting, power flow modeling, equip-  
8       ment failure prediction, resource optimization, risk  
9       analysis, and decision analysis.

10       “(e) INTEROPERABILITY RESEARCH AND DEVELOP-  
11       MENT.—The Secretary shall conduct research and devel-  
12       opment on tools and technologies that improve the inter-  
13       operability and compatibility of new and emerging compo-  
14       nents, technologies, and systems with existing electric grid  
15       infrastructure.

16       “(f) UNDERGROUND TRANSMISSION AND DISTRIBUTION  
17       LINES.—In carrying out the program under sub-  
18       section (a), the Secretary shall support research and devel-  
19       opment on underground transmission and distribution  
20       lines. This shall include research on—

21           “(1) methods for lowering the costs of under-  
22       ground transmission and distribution lines, including  
23       through novel installation techniques and materials  
24       considerations;

1           “(2) techniques to improve the lifespan of un-  
2           derground transmission and distribution lines;

3           “(3) wireless sensors to improve safety of un-  
4           derground transmission and distribution lines and to  
5           predict, identify, detect, and transmit information  
6           about degradation and faults; and

7           “(4) methods for improving the resilience and  
8           reliability of underground transmission and distribu-  
9           tion lines, including technologies and techniques that  
10          can mitigate the impact of flooding, storm surge,  
11          and seasonal climate cycles on degradation of and  
12          damage to underground transmission and distribu-  
13          tion lines.

14          “(g) GRID ARCHITECTURE AND SCENARIO DEVELOP-  
15          MENT.—

16                 “(1) IN GENERAL.—Subject to paragraph (3),  
17                 the Secretary shall establish and facilitate a collabo-  
18                 rative process to develop model grid architecture and  
19                 a set of future scenarios for the electric grid to ex-  
20                 amine the impacts of different combinations of re-  
21                 sources (including different quantities of distributed  
22                 energy resources and large-scale, central generation)  
23                 on the electric grid.

1           “(2) ARCHITECTURE.—In supporting the devel-  
2           opment of model grid architectures, the Secretary  
3           shall—

4                   “(A) analyze a variety of grid architecture  
5                   scenarios that range from minor upgrades to  
6                   existing transmission grid infrastructure to sce-  
7                   narios that involve the replacement of signifi-  
8                   cant portions of existing transmission grid in-  
9                   frastructure;

10                   “(B) analyze the effects of the increasing  
11                   proliferation of renewable and other zero emis-  
12                   sions energy generation sources, increasing use  
13                   of distributed resources owned by non-utility  
14                   entities, and the use of digital and automated  
15                   controls not managed by grid operators;

16                   “(C) include a variety of new and emerging  
17                   distribution grid technologies, including distrib-  
18                   uted energy resources, electric vehicle charging  
19                   stations, distribution automation technologies,  
20                   energy storage, and renewable energy sources;

21                   “(D) analyze the effects of local load bal-  
22                   ancing and other forms of decentralized control;

23                   “(E) analyze the effects of changes to grid  
24                   architectures resulting from modernizing elec-  
25                   tric grid systems, including communications,

1 controls, markets, consumer choice, emergency  
2 response, electrification, and cybersecurity con-  
3 cerns; and

4 “(F) develop integrated grid architectures  
5 that incorporate system resilience for cyber,  
6 physical, and communications systems.

7 “(3) MARKET STRUCTURE.—The grid architec-  
8 ture and scenarios developed under paragraph (1)  
9 shall, to the extent practicable, account for dif-  
10 ferences in market structure, including an examina-  
11 tion of the potential for stranded costs in each type  
12 of market structure.

13 “(h) COMPUTING RESOURCES AND DATA COORDINA-  
14 TION RESEARCH AND DEVELOPMENT.—In carrying out  
15 this section, the Secretary shall—

16 “(1) leverage existing computing resources at  
17 the National Laboratories; and

18 “(2) develop voluntary standards for data  
19 taxonomies and communication protocols in coordi-  
20 nation with public and private sector stakeholders.

21 “(i) INFORMATION SHARING.—None of the activities  
22 authorized in this section shall require private entities to  
23 share information or data with the Secretary.

24 “(j) RESILIENCE.—In this section, the term ‘resil-  
25 ience’ means the ability to withstand and reduce the mag-

1 nitude or duration of disruptive events, which includes the  
2 capability to anticipate, absorb, adapt to, or rapidly re-  
3 cover from such an event, including from deliberate at-  
4 tacks, accidents, and naturally occurring threats or inci-  
5 dents.”.

6 **SEC. 8003. INTEGRATED ENERGY SYSTEMS.**

7 Title XIII of the Energy Independence and Security  
8 Act of 2007 (42 U.S.C. 17381 et seq.) is amended by add-  
9 ing after section 1309 the following:

10 **“SEC. 1310. INTEGRATED ENERGY SYSTEMS.**

11 “(a) IN GENERAL.—Not later than 180 days after  
12 the enactment of this section, the Secretary shall establish  
13 a research, development, and demonstration program to  
14 develop cost-effective integrated energy systems, includ-  
15 ing—

16 “(1) development of computer modeling to de-  
17 sign different configurations of integrated energy  
18 systems and to optimize system operation;

19 “(2) research on system integration needed to  
20 plan, design, build, and operate integrated energy  
21 systems, including interconnection requirements with  
22 the electric grid;

23 “(3) development of integrated energy systems  
24 for various applications, including—

1           “(A) thermal energy generation and stor-  
2           age for buildings and manufacturing;

3           “(B) electricity storage coupled with en-  
4           ergy generation;

5           “(C) desalination;

6           “(D) production of liquid and gaseous  
7           fuels; and

8           “(E) production of chemicals such as am-  
9           monia and ethylene;

10          “(4) development of testing facilities for inte-  
11          grated energy systems; and

12          “(5) research on incorporation of various tech-  
13          nologies for integrated energy systems, including nu-  
14          clear energy, renewable energy, storage, and carbon  
15          capture, utilization, and sequestration technologies.

16          “(b) STRATEGIC PLAN.—

17                 “(1) IN GENERAL.—Not later than 1 year after  
18                 the date of the enactment of this section, the Sec-  
19                 retary shall submit to the Committee on Science,  
20                 Space, and Technology of the House of Representa-  
21                 tives and the Committee on Energy and Natural Re-  
22                 sources of the Senate a strategic plan that identifies  
23                 opportunities, challenges, and standards needed for  
24                 the development and commercial application of inte-

1       grated energy systems. The strategic plan shall in-  
2       clude—

3               “(A) analysis of the potential benefits of  
4       development of integrated electric systems on  
5       the electric grid;

6               “(B) analysis of the potential contributions  
7       of integrated energy systems to different grid  
8       architecture scenarios;

9               “(C) research and development goals for  
10      various integrated energy systems, including  
11      those identified in subsection (a);

12              “(D) assessment of policy and market bar-  
13      riers to the adoption of integrated energy sys-  
14      tems;

15              “(E) analysis of the technical and eco-  
16      nomic feasibility of adoption of different inte-  
17      grated energy systems; and

18              “(F) a 10-year roadmap to guide the pro-  
19      gram established under subsection (a).

20              “(2) UPDATES.—Not less than once every 3  
21      years for the duration of this research program, the  
22      Secretary shall submit an updated version of the  
23      strategic plan to the Committee on Science, Space,  
24      and Technology of the House of Representatives and

1 the Committee on Energy and Natural Resources of  
2 the Senate.

3 “(c) PROGRAM IMPLEMENTATION.—In carrying out  
4 the research, development, demonstration, and commercial  
5 application aims of subsection (a), the Secretary shall—

6 “(1) implement the recommendations set forth  
7 in the strategic plan in subsection (b);

8 “(2) coordinate across all relevant program of-  
9 fices at the Department, including—

10 “(A) the Office of Energy Efficiency and  
11 Renewable Energy;

12 “(B) the Office of Nuclear Energy; and

13 “(C) the Office of Fossil Energy;

14 “(3) leverage existing programs and resources  
15 of the Department; and

16 “(4) prioritize activities that accelerate the de-  
17 velopment of integrated electricity generation, stor-  
18 age, and distribution systems with net zero green-  
19 house gas emissions.

20 “(d) INTEGRATED ENERGY SYSTEM DEFINED.—The  
21 term ‘integrated energy system’ means a system composed  
22 of 2 or more co-located or jointly operated sub-systems  
23 of energy generation, energy storage, or other energy tech-  
24 nologies.”.



1 **SEC. 8004. GRID INTEGRATION RESEARCH AND DEVELOP-**  
2 **MENT.**

3 (a) INTEGRATING DISTRIBUTED ENERGY RE-  
4 SOURCES ONTO THE ELECTRIC GRID.—Section 925(a) of  
5 the Energy Policy Act of 2005 (42 U.S.C. 16215) is  
6 amended—

7 (1) by redesignating paragraphs (10) and (11)  
8 as paragraphs (12) and (13), respectively; and

9 (2) by inserting after paragraph (9) the fol-  
10 lowing:

11 “(10) the development of cost-effective tech-  
12 nologies that enable two-way information and power  
13 flow between distributed energy resources and the  
14 electric grid;

15 “(11) the development of technologies and con-  
16 cepts that enable interoperability between distributed  
17 energy resources and other behind-the-meter devices  
18 and the electric grid;”.

19 (b) INTEGRATING RENEWABLE ENERGY ONTO THE  
20 ELECTRIC GRID.—Subtitle C of title IX of the Energy  
21 Policy Act of 2005 (42 U.S.C. 16231 et seq.) is amended  
22 by adding at the end the following:

1 **“SEC. 936. RESEARCH AND DEVELOPMENT INTO INTE-**  
2 **GRATING RENEWABLE ENERGY ONTO THE**  
3 **ELECTRIC GRID.**

4 “(a) IN GENERAL.—Not later than 180 days after  
5 the enactment of this section, the Secretary shall establish  
6 a research, development, and demonstration program on  
7 technologies that enable integration of renewable energy  
8 generation sources onto the electric grid across multiple  
9 program offices of the Department. The program shall in-  
10 clude—

11 “(1) forecasting for predicting generation from  
12 variable renewable energy sources;

13 “(2) development of cost-effective low-loss, long-  
14 distance transmission lines; and

15 “(3) development of cost-effective advanced  
16 technologies for variable renewable generation  
17 sources to provide grid services.

18 “(b) COORDINATION.—In carrying out this program,  
19 the Secretary shall coordinate across all relevant program  
20 offices at the Department to achieve the goals established  
21 in this section, including the Office of Electricity.

22 “(c) ADOPTION OF TECHNOLOGIES.—In carrying out  
23 this section, the Secretary shall consider barriers to adop-  
24 tion and commercial application of technologies that en-  
25 able integration of renewable energy sources onto the elec-  
26 tric grid, including cost and other economic barriers, and

1 shall coordinate with relevant entities to reduce these bar-  
2 riers.”.

3 (c) INTEGRATING ELECTRIC VEHICLES ONTO THE  
4 ELECTRIC GRID.—Subtitle B of title I of the Energy Inde-  
5 pendence and Security Act of 2007 (42 U.S.C. 17011 et  
6 seq.) is amended by adding at the end the following:

7 **“SEC. 137. RESEARCH AND DEVELOPMENT INTO INTE-**  
8 **GRATING ELECTRIC VEHICLES ONTO THE**  
9 **ELECTRIC GRID.**

10 “(a) IN GENERAL.—The Secretary shall establish a  
11 research, development, and demonstration program to ad-  
12 vance the integration of electric vehicles, including plug-  
13 in hybrid electric vehicles, onto the electric grid.

14 “(b) VEHICLES-TO-GRID INTEGRATION ASSESSMENT  
15 REPORT.—Not later than 1 year after the enactment of  
16 this section, the Secretary shall submit to the Committee  
17 on Science, Space, and Technology of the House of Rep-  
18 resentatives and the Committee on Energy and Natural  
19 Resources of the Senate a report on the results of a study  
20 that examines the research, development, and demonstra-  
21 tion opportunities, challenges, and standards needed for  
22 integrating electric vehicles onto the electric grid.

23 “(1) REPORT REQUIREMENTS.—The report  
24 shall include—

1           “(A) an evaluation of the use of electric ve-  
2           hicles to maintain the reliability of the electric  
3           grid, including—

4                   “(i) the use of electric vehicles for de-  
5                   mand response, load shaping, emergency  
6                   power, and frequency regulation; and

7                   “(ii) the potential for the reuse of  
8                   spent electric vehicle batteries for sta-  
9                   tionary grid storage;

10           “(B) the impact of grid integration on  
11           electric vehicles, including—

12                   “(i) the impact of bi-directional elec-  
13                   tricity flow on battery degradation; and

14                   “(ii) the implications of the use of  
15                   electric vehicles for grid services on origi-  
16                   nal equipment manufacturer warranties;

17           “(C) the impacts to the electric grid of in-  
18           creased penetration of electric vehicles, includ-  
19           ing—

20                   “(i) the distribution grid infrastruc-  
21                   ture needed to support an increase in  
22                   charging capacity;

23                   “(ii) strategies for integrating electric  
24                   vehicles onto the distribution grid while  
25                   limiting infrastructure upgrades;

1           “(iii) the changes in electricity de-  
2           mand over a 24-hour cycle due to electric  
3           vehicle charging behavior;

4           “(iv) the load increases expected from  
5           electrifying the transportation sector;

6           “(v) the potential for customer incen-  
7           tives and other managed charging stations  
8           strategies to shift charging off-peak;

9           “(vi) the technology needed to achieve  
10          bi-directional power flow on the distribu-  
11          tion grid; and

12          “(vii) the implementation of smart  
13          charging techniques;

14          “(D) research on the standards needed to  
15          integrate electric vehicles with the grid, includ-  
16          ing communications systems, protocols, and  
17          charging stations, in collaboration with the Na-  
18          tional Institute for Standards and Technology;

19          “(E) the cybersecurity challenges and  
20          needs associated with electrifying the transpor-  
21          tation sector; and

22          “(F) an assessment of the feasibility of  
23          adopting technologies developed under the pro-  
24          gram established under subsection (a) at De-  
25          partment facilities.

1           “(2) RECOMMENDATIONS.—As part of the Ve-  
2           hicles-to-Grid Integration Assessment Report, the  
3           Secretary shall develop a 10-year roadmap to guide  
4           the research, development, and demonstration pro-  
5           gram to integrate electric vehicles onto the electric  
6           grid.

7           “(3) CONSULTATION.—In developing this re-  
8           port, the Secretary shall consult with relevant stake-  
9           holders, including—

10                   “(A) electric vehicle manufacturers;

11                   “(B) electric utilities;

12                   “(C) public utility commissions;

13                   “(D) vehicle battery manufacturers;

14                   “(E) electric vehicle supply equipment  
15           manufacturers;

16                   “(F) charging infrastructure manufactur-  
17           ers;

18                   “(G) the National Laboratories; and

19                   “(H) other Federal agencies, as the Sec-  
20           retary determines appropriate.

21           “(4) UPDATES.—The Secretary shall update  
22           the report required under this section every 3 years  
23           for the duration of the program under section (a)  
24           and shall submit the updated report to the Com-  
25           mittee on Science, Space, and Technology of the

1 House of Representatives and the Committee on En-  
2 ergy and Natural Resources of the Senate.

3 “(c) PROGRAM IMPLEMENTATION.—In carrying out  
4 the research, development, demonstration, and commercial  
5 application aims of section, the Secretary shall—

6 “(1) implement the recommendations set forth  
7 in the report in subsection (b); and

8 “(2) coordinate across all relevant program of-  
9 fices at the Department to achieve the goals estab-  
10 lished in this section, including the Office of Elec-  
11 tricity.

12 “(d) TESTING CAPABILITIES.—The Secretary shall  
13 coordinate with the National Laboratories to develop test-  
14 ing capabilities for the evaluation, rapid prototyping, and  
15 optimization of technologies enabling integration of elec-  
16 tric vehicles onto the electric grid.”.

17 **SEC. 8005. ADVISORY COMMITTEE.**

18 Title XIII of the Energy Independence and Security  
19 Act of 2007 (42 U.S.C. 17381 et seq.) is amended by add-  
20 ing after section 1310 (as added by section 8003 of this  
21 Act) the following:

22 **“SEC. 1311. ADVISORY COMMITTEE.**

23 “(a) IN GENERAL.—Not later than 180 days after  
24 the enactment of this section, the Secretary shall des-  
25 ignate an existing advisory committee to advise the Sec-

1 retary on the authorization of research, development, and  
2 demonstration projects under sections 1304 and 1304A.

3 “(b) RESPONSIBILITY.—The Secretary shall annually  
4 solicit from the advisory committee—

5 “(1) comments to identify grid modernization  
6 technology needs;

7 “(2) an assessment of the progress of the re-  
8 search activities on grid modernization; and

9 “(3) assistance in annually updating grid mod-  
10 ernization technology roadmaps.”.

11 **SEC. 8006. COORDINATION OF EFFORTS.**

12 In carrying out the amendments made by this title,  
13 the Secretary shall coordinate with relevant entities to the  
14 maximum extent practicable, including—

15 (1) electric utilities;

16 (2) private sector entities;

17 (3) representatives of all sectors of the electric  
18 power industry;

19 (4) transmission organizations;

20 (5) transmission owners and operators;

21 (6) distribution organizations;

22 (7) distribution asset owners and operators;

23 (8) State, Tribal, local, and territorial govern-  
24 ments and regulatory authorities;

25 (9) academic institutions;



- 1           (10) the National Laboratories;
- 2           (11) other Federal agencies;
- 3           (12) nonprofit organizations;
- 4           (13) the Federal Energy Regulatory Commis-
- 5           sion;
- 6           (14) the North American Reliability Corpora-
- 7           tion;
- 8           (15) independent system operators; and
- 9           (16) programs and program offices at the De-
- 10          partment.

11 **SEC. 8007. TECHNOLOGY DEMONSTRATION ON THE DIS-**

12 **TRIBUTION GRID.**

13          (a) **IN GENERAL.**—The Secretary shall establish a

14 grant program to carry out eligible projects related to the

15 modernization of the electric grid, including the applica-

16 tion of technologies to improve observability, advanced

17 controls, and prediction of system performance on the dis-

18 tribution system.

19          (b) **ELIGIBLE PROJECTS.**—To be eligible for a grant

20 under subsection (a), a project shall—

21           (1) be designed to improve the performance and

22 efficiency of the future electric grid, while ensuring

23 the continued provision of safe, secure, reliable, and

24 affordable power; and

25           (2) demonstrate—

1 (A) secure integration and management of  
2 two or more energy resources, including distrib-  
3 uted energy generation, combined heat and  
4 power, micro-grids, energy storage, electric ve-  
5 hicles, energy efficiency, demand response, and  
6 intelligent loads; and

7 (B) secure integration and interoperability  
8 of communications and information tech-  
9 nologies.

10 **SEC. 8008. VOLUNTARY MODEL PATHWAYS.**

11 (a) ESTABLISHMENT OF VOLUNTARY MODEL PATH-  
12 WAYS.—

13 (1) ESTABLISHMENT.—Not later than 90 days  
14 after the date of enactment of this Act, the Sec-  
15 retary of Energy (in this section referred to as the  
16 “Secretary”), in consultation with the steering com-  
17 mittee established under paragraph (3), shall initiate  
18 the development of voluntary model pathways for  
19 modernizing the electric grid through a collaborative,  
20 public-private effort that—

21 (A) produces illustrative policy pathways  
22 encompassing a diverse range of technologies  
23 that can be adapted for State and regional ap-  
24 plications by regulators and policymakers;

1 (B) facilitates the modernization of the  
2 electric grid and associated communications  
3 networks to achieve the objectives described in  
4 paragraph (2);

5 (C) ensures a reliable, resilient, affordable,  
6 safe, and secure electric grid; and

7 (D) acknowledges and accounts for dif-  
8 ferent priorities, electric systems, and rate  
9 structures across States and regions.

10 (2) OBJECTIVES.—The pathways established  
11 under paragraph (1) shall facilitate achievement of  
12 as many of the following objectives as practicable:

13 (A) Near real-time situational awareness of  
14 the electric system.

15 (B) Data visualization.

16 (C) Advanced monitoring and control of  
17 the advanced electric grid.

18 (D) Enhanced certainty of policies for in-  
19 vestment in the electric grid.

20 (E) Increased innovation.

21 (F) Greater consumer empowerment.

22 (G) Enhanced grid resilience, reliability,  
23 and robustness.

24 (H) Improved—

1 (i) integration of distributed energy  
2 resources;

3 (ii) interoperability of the electric sys-  
4 tem; and

5 (iii) predictive modeling and capacity  
6 forecasting.

7 (I) Reduced cost of service for consumers.

8 (J) Diversification of generation sources.

9 (3) STEERING COMMITTEE.—Not later than 90  
10 days after the date of enactment of this Act, the  
11 Secretary shall establish a steering committee to  
12 help develop the pathways under paragraph (1), to  
13 be composed of members appointed by the Secretary,  
14 consisting of persons with appropriate expertise rep-  
15 resenting a diverse range of interests in the public,  
16 private, and academic sectors, including representa-  
17 tives of—

18 (A) the Federal Energy Regulatory Com-  
19 mission;

20 (B) the National Laboratories;

21 (C) States;

22 (D) State regulatory authorities;

23 (E) transmission organizations;

24 (F) representatives of all sectors of the  
25 electric power industry;

- 1 (G) institutions of higher education;  
2 (H) independent research institutes; and  
3 (I) other entities.

4 (b) TECHNICAL ASSISTANCE.—The Secretary may  
5 provide technical assistance to States, Indian Tribes, or  
6 units of local government to adopt or implement one or  
7 more elements of the pathways developed under subsection  
8 (a)(1), including on a pilot basis.

9 **SEC. 8009. PERFORMANCE METRICS FOR ELECTRICITY IN-**  
10 **FRASTRUCTURE PROVIDERS.**

11 (a) IN GENERAL.—Not later than 2 years after the  
12 date of enactment of this Act, the Secretary of Energy,  
13 in consultation with the steering committee established  
14 under section 8008(a)(3), shall submit to the Committee  
15 on Energy and Natural Resources of the Senate and the  
16 Committee on Energy and Commerce of the House of  
17 Representatives a report that includes—

18 (1) an evaluation of the performance of the  
19 electric grid as of the date of the report; and

20 (2) a description of the projected range of  
21 measurable costs and benefits associated with the  
22 changes evaluated under the scenarios developed  
23 under section 1304A of the Energy Independence  
24 and Security Act of 2007.

1 (b) CONSIDERATIONS FOR DEVELOPMENT OF  
2 METRICS.—In developing metrics for the evaluation and  
3 projections under subsection (a), the Secretary of Energy  
4 shall consider—

5 (1) standard methodologies for calculating im-  
6 provements or deteriorations in the performance  
7 metrics, such as reliability, grid efficiency, power  
8 quality, consumer satisfaction, sustainability, and fi-  
9 nancial incentives;

10 (2) standard methodologies for calculating po-  
11 tential costs and measurable benefits value to rate-  
12 payers, applying the performance metrics developed  
13 under paragraph (1);

14 (3) identification of tools, resources, and de-  
15 ployment models that may enable improved perform-  
16 ance through the adoption of emerging, commer-  
17 cially available or advanced grid technologies or solu-  
18 tions, including—

19 (A) multicustomer micro-grids;

20 (B) distributed energy resources;

21 (C) energy storage;

22 (D) electric vehicles;

23 (E) electric vehicle charging infrastructure;

24 (F) integrated information and commu-  
25 nications systems;

1 (G) transactive energy systems; and

2 (H) advanced demand management sys-  
3 tems; and

4 (4) the role of States and local regulatory au-  
5 thorities in enabling a robust future electric grid to  
6 ensure that—

7 (A) electric utilities remain financially via-  
8 ble;

9 (B) electric utilities make the needed in-  
10 vestments that ensure a reliable, secure, and re-  
11 siliant grid; and

12 (C) costs incurred to transform to an inte-  
13 grated grid are allocated and recovered respon-  
14 sibly, efficiently, and equitably.

15 **SEC. 8010. VOLUNTARY STATE, REGIONAL, AND LOCAL**  
16 **ELECTRICITY DISTRIBUTION PLANNING.**

17 (a) IN GENERAL.—On the request of a State, re-  
18 gional organization, or electric utility, the Secretary of En-  
19 ergy shall provide assistance to States, regional organiza-  
20 tions, and electric utilities to facilitate the development of  
21 State, regional, and local electricity distribution plans  
22 by—

23 (1) conducting a resource assessment and anal-  
24 ysis of future demand and distribution requirements;  
25 and

1           (2) developing open source tools for State, re-  
2           gional, and local planning and operations.

3           (b) RISK AND SECURITY ANALYSIS.—The assessment  
4           under subsection (a)(1) shall include—

5           (1) the evaluation of the physical security, cy-  
6           bersecurity, and associated communications needs of  
7           an advanced distribution management system and  
8           the integration of distributed energy resources; and

9           (2) advanced use of grid architecture to analyze  
10          risks in an all-hazards approach that includes com-  
11          munications infrastructure, control systems architec-  
12          ture, and power systems architecture.

13          (c) DESIGNATION.—The information collected for the  
14          assessment and analysis under subsection (a)(1)—

15          (1) shall be considered to be critical electric in-  
16          frastructure information under section 215A of the  
17          Federal Power Act (16 U.S.C. 824o–1); and

18          (2) shall only be released in compliance with  
19          regulations implementing that section.

20          (d) TECHNICAL ASSISTANCE.—For the purpose of  
21          assisting in the development of State and regional elec-  
22          tricity distribution plans, the Secretary shall provide tech-  
23          nical assistance to—

24          (1) States;

25          (2) regional reliability entities; and



1           (3) other distribution asset owners and opera-  
2           tors.

3           (e) WITHDRAWAL.—A State or any entity that has  
4 requested technical assistance under this section may  
5 withdraw the request for technical assistance at any time,  
6 and on such withdrawal, the Secretary shall terminate all  
7 assistance efforts.

8           (f) EFFECT.—Nothing in this section authorizes the  
9 Secretary to require any State, regional organization, re-  
10 gional reliability entity, asset owner, or asset operator to  
11 adopt any model, tool, plan, analysis, or assessment.

12 **SEC. 8011. MICRO-GRID AND INTEGRATED MICRO-GRID SYS-**  
13 **TEMS PROGRAM.**

14           (a) DEFINITIONS.—In this section:

15           (1) INTEGRATED MICRO-GRID SYSTEM.—The  
16 term “integrated micro-grid system” means a micro-  
17 grid system that—

18                   (A) comprises generation from both con-  
19 ventional and renewable energy resources; and

20                   (B) may use grid-scale energy storage.

21           (2) ISOLATED COMMUNITY.—The term “iso-  
22 lated community” means a community that is pow-  
23 ered by a stand-alone electric generation and dis-  
24 tribution system without the economic and reliability  
25 benefits of connection to a regional electric grid.

1           (3) MICRO-GRID SYSTEM.—The term “micro-  
2           grid system” means a localized grid that operates  
3           autonomously, regardless of whether the grid can  
4           operate in connection with another grid.

5           (4) RURAL ELECTRIC COOPERATIVE.—The term  
6           “rural electric cooperative” means an electric coop-  
7           erative (as defined in section 3 of the Federal Power  
8           Act (16 U.S.C. 796)) that sells electric energy to  
9           persons in rural areas.

10          (5) STRATEGY.—The term “strategy” means  
11          the strategy developed pursuant to subsection  
12          (b)(2)(B).

13          (b) PROGRAM.—

14           (1) ESTABLISHMENT.—The Secretary of En-  
15           ergy (in this section referred to as the “Secretary”)  
16           shall establish a program to promote the develop-  
17           ment of—

18                   (A) integrated micro-grid systems for iso-  
19                   lated communities; and

20                   (B) micro-grid systems to increase the re-  
21                   silience of critical infrastructure.

22          (2) REQUIREMENTS.—The program established  
23          under paragraph (1) shall—

24                   (A) develop a feasibility assessment for—

1 (i) integrated micro-grid systems in  
2 isolated communities; and

3 (ii) micro-grid systems to enhance the  
4 resilience of critical infrastructure;

5 (B) develop an implementation strategy, in  
6 accordance with paragraph (3), to promote the  
7 development of integrated micro-grid systems  
8 for isolated communities, particularly for those  
9 communities exposed to extreme weather condi-  
10 tions and high energy costs, including elec-  
11 tricity, space heating and cooling, and transpor-  
12 tation;

13 (C) develop an implementation strategy to  
14 promote the development of micro-grid systems  
15 that increase the resilience of critical infrastruc-  
16 ture; and

17 (D) carry out cost-shared demonstration  
18 projects, based upon the strategies developed  
19 under subparagraph (B) that include the devel-  
20 opment of physical and cybersecurity plans to  
21 take appropriate measures to protect and se-  
22 cure the electric grid.

23 (3) REQUIREMENTS FOR STRATEGY.—In devel-  
24 oping the strategy under paragraph (2)(B), the Sec-  
25 retary shall consider—

1 (A) opportunities for improving the effi-  
2 ciency of existing integrated micro-grid systems;

3 (B) the capacity of the local workforce to  
4 operate, maintain, and repair a integrated  
5 micro-grid system as well as opportunities to  
6 improve that capacity;

7 (C) leveraging existing capacity within  
8 local or regional research organizations, such as  
9 organizations based at institutions of higher  
10 education, to support development of integrated  
11 micro-grid systems, including by testing novel  
12 components and systems prior to field deploy-  
13 ment;

14 (D) the need for basic infrastructure to de-  
15 velop, deploy, and sustain a integrated micro-  
16 grid system;

17 (E) input of traditional knowledge from  
18 local leaders of isolated communities in the de-  
19 velopment of a integrated micro-grid system;

20 (F) the impact of integrated micro-grid  
21 systems on defense, homeland security, eco-  
22 nomic development, and environmental inter-  
23 ests;

24 (G) opportunities to leverage existing inter-  
25 agency coordination efforts and recommenda-

1           tions for new interagency coordination efforts to  
2           minimize unnecessary overhead, mobilization,  
3           and other project costs; and

4                   (H) any other criteria the Secretary deter-  
5           mines appropriate.

6           (c) COLLABORATION.—The program established  
7           under subsection (b)(1) shall be carried out in collabora-  
8           tion with relevant stakeholders, including, as appro-  
9           priate—

10                   (1) States;

11                   (2) Indian Tribes;

12                   (3) regional entities and regulators;

13                   (4) units of local government;

14                   (5) institutions of higher education; and

15                   (6) private sector entities.

16           (d) REPORT.—Not later than 180 days after the date  
17           of enactment of this Act, and annually thereafter until cal-  
18           endar year 2029, the Secretary shall submit to the Com-  
19           mittee on Energy and Natural Resources of the Senate  
20           and the Committee on Energy and Commerce of the  
21           House of Representatives a report on the efforts to imple-  
22           ment the program established under subsection (b)(1) and  
23           the status of the strategy developed under subsection  
24           (b)(2)(B).

1 (e) BARRIERS AND BENEFITS TO MICRO-GRID SYS-  
2 TEMS.—

3 (1) REPORT.—Not later than 270 days after  
4 the date of enactment of this Act, the Secretary  
5 shall submit to the Committee on Energy and Nat-  
6 ural Resources of the Senate and the Committee on  
7 Energy and Commerce of the House of Representa-  
8 tives a report on the benefits of, and barriers to, im-  
9 plementing resilient micro-grid systems that are—

10 (A)(i) owned or operated by an isolated  
11 community, rural electric cooperative, or munic-  
12 ipal government; or

13 (ii) operated on behalf of a municipal gov-  
14 ernment or rural electric cooperative; and

15 (B) designed to maximize the use of—

16 (i) energy-generation facilities owned  
17 or operated by isolated communities; or

18 (ii) a municipal or rural electric coop-  
19 erative energy-generation facility.

20 (2) GRANTS TO OVERCOME BARRIERS.—The  
21 Secretary shall award grants of not more than  
22 \$500,000 to not fewer than 20 municipal govern-  
23 ments, rural electric cooperatives, or isolated com-  
24 munities, up to a total of \$15,000,000, each year to  
25 assist those municipal governments, rural electric co-

1           operatives, and isolated communities in overcoming  
2           the barriers identified in the report under paragraph  
3           (1).

4   **SEC. 8012. TECHNICAL AMENDMENTS; AUTHORIZATION OF**  
5                                   **APPROPRIATIONS.**

6           (a) TECHNICAL AMENDMENTS.—

7                   (1) ENERGY INDEPENDENCE AND SECURITY  
8           ACT OF 2007.—Section 1(b) of the Energy Inde-  
9           pendence and Security Act of 2007 is amended in  
10          the table of contents—

11                           (A) by inserting the following after the  
12          item related to section 136:

                          “Sec. 137. Research and development into integrating electric vehicles onto the  
  electric grid.”;

13                           (B) by inserting the following after the  
14          item related to section 1304:

                          “Sec. 1304A. Smart grid modeling, visualization, architecture, and controls.”;  
  and

15                           (C) by inserting the following after the  
16          item related to section 1309:

                          “Sec. 1310. Integrated energy systems.

                          “Sec. 1311. Advisory committee.”.

17                   (2) ENERGY POLICY ACT OF 2005.—Section  
18          1(b) of the Energy Policy Act of 2005 is amended  
19          in the table of contents by inserting the following  
20          after the item related to section 935:

                          “Sec. 936. Research and development into integrating renewable energy onto  
  the electric grid.”.

1 (b) AUTHORIZATION OF APPROPRIATIONS.—There  
2 are authorized to be appropriated—

3 (1) to carry out section 8006 and the amend-  
4 ments made by sections 8001, 8002, and 8005 of  
5 this title—

6 (A) \$175,000,000 for fiscal year 2021;

7 (B) \$180,000,000 for fiscal year 2022;

8 (C) \$185,000,000 for fiscal year 2023;

9 (D) \$190,000,000 for fiscal year 2024;

10 and

11 (E) \$199,500,000 for fiscal year 2025;

12 (2) to carry out sections 8007, 8008, 8009,  
13 8010, and 8011 of this title \$175,000,000 for each  
14 of fiscal years 2021 through 2025;

15 (3) to carry out section 8003 of this title—

16 (A) \$21,000,000 for fiscal year 2021;

17 (B) \$22,050,000 for fiscal year 2022;

18 (C) \$23,153,000 for fiscal year 2023;

19 (D) \$24,310,000 for fiscal year 2024; and

20 (E) \$25,525,000 for fiscal year 2025; and

21 (4) to carry out section 8004 of this title—

22 (A) \$52,500,000 for fiscal year 2021;

23 (B) \$55,152,000 for fiscal year 2022;

24 (C) \$57,882,000 for fiscal year 2023;

25 (D) \$60,775,000 for fiscal year 2024; and



1 (E) \$63,814,000 for fiscal year 2025.

2 **SEC. 8013. INDIAN ENERGY.**

3 (a) DEFINITION OF INDIAN LAND.—Section 2601(2)  
4 of the Energy Policy Act of 1992 (25 U.S.C. 3501(2))  
5 is amended—

6 (1) in subparagraph (B)(iii), by striking “and”;

7 (2) in subparagraph (C), by striking “land.”  
8 and inserting “land;” and

9 (3) by adding at the end the following subpara-  
10 graphs:

11 “(D) any land located in a census tract in  
12 which the majority of residents are Natives (as  
13 defined in section 3(b) of the Alaska Native  
14 Claims Settlement Act (43 U.S.C. 1602(b)));  
15 and

16 “(E) any land located in a census tract in  
17 which the majority of residents are persons who  
18 are enrolled members of a federally recognized  
19 Tribe or village.”.

20 (b) REDUCTION OF COST SHARE.—Section  
21 2602(b)(5) of the Energy Policy Act of 1992 (25 U.S.C.  
22 3502(b)(5)) is amended by adding at the end the following  
23 subparagraphs:

24 “(D) The Secretary of Energy may reduce any  
25 applicable cost share required of an Indian tribe,

1 intertribal organization, or tribal energy development  
2 organization in order to receive a grant under this  
3 subsection to not less than 10 percent if the Indian  
4 tribe, intertribal organization, or tribal energy devel-  
5 opment organization meets criteria developed by the  
6 Secretary of Energy, including financial need.

7 “(E) Section 988 of the Energy Policy Act of  
8 2005 (42 U.S.C. 16352) shall not apply to assist-  
9 ance provided under this subsection.”.

10 (c) AUTHORIZATION OF APPROPRIATIONS.—Section  
11 2602(b)(7) of the Energy Policy Act of 1992 (25 U.S.C.  
12 3502(b)(7)) is amended by striking “ \$20,000,000 for  
13 each of fiscal years 2006 through 2016” and inserting “  
14 \$30,000,000 for each of fiscal years 2021 through 2025”.

15 **SEC. 8014. REPORT ON ELECTRICITY ACCESS AND RELI-**  
16 **ABILITY.**

17 (a) ASSESSMENT.—The Secretary of Energy shall  
18 conduct an assessment of the status of access to electricity  
19 by households residing in Tribal communities or on Indian  
20 land, and the reliability of electric service available to  
21 households residing in Tribal communities or on Indian  
22 land, as compared to the status of access to and reliability  
23 of electricity within neighboring States or within the State  
24 in which Indian land is located.

1           (b) CONSULTATION.—The Secretary of Energy shall  
2 consult with Indian Tribes, Tribal organizations, the  
3 North American Electricity Reliability Corporation, and  
4 the Federal Energy Regulatory Commission in the devel-  
5 opment and conduct of the assessment under subsection  
6 (a). Indian Tribes and Tribal organizations shall have the  
7 opportunity to review and make recommendations regard-  
8 ing the development of the assessment and the findings  
9 of the assessment, prior to the submission of the report  
10 under subsection (c).

11           (c) REPORT.—Not later than 18 months after the  
12 date of enactment of this Act, the Secretary of Energy  
13 shall submit to the Committee on Energy and Commerce  
14 of the House of Representatives and the Committee on  
15 Energy and Natural Resources of the Senate a report on  
16 the results of the assessment conducted under subsection  
17 (a), which shall include—

18                   (1) a description of generation, transmission,  
19 and distribution assets available to provide electricity  
20 to households residing in Tribal communities or on  
21 Indian land;

22                   (2) a survey of the retail and wholesale prices  
23 of electricity available to households residing in  
24 Tribal communities or on Indian land;

1           (3) a description of participation of Tribal  
2 members in the electric utility workforce, including  
3 the workforce for construction and maintenance of  
4 renewable energy resources and distributed energy  
5 resources;

6           (4) the percentage of households residing in  
7 Tribal communities or on Indian land that do not  
8 have access to electricity;

9           (5) the potential of distributed energy resources  
10 to provide electricity to households residing in Tribal  
11 communities or on Indian land;

12           (6) the potential for tribally-owned electric utili-  
13 ties or electric utility assets to participate in or ben-  
14 efit from regional electricity markets;

15           (7) a description of the barriers to providing ac-  
16 cess to electric service to households residing in  
17 Tribal communities or on Indian land; and

18           (8) recommendations to improve access to and  
19 reliability of electric service for households residing  
20 in Tribal communities or on Indian land.

21 (d) DEFINITIONS.—In this section:

22           (1) TRIBAL MEMBER.—The term “Tribal mem-  
23 ber” means a person who is an enrolled member of  
24 a federally recognized Tribe or village.

1           (2) TRIBAL COMMUNITY.—The term “Tribal  
2           community” means a community in a United States  
3           census tract in which the majority of residents are  
4           persons who are enrolled members of a federally rec-  
5           ognized Tribe or village.

6   **SEC. 8015. NET METERING STUDY AND EVALUATION.**

7           (a) IN GENERAL.—Not later than 180 days after the  
8           date of enactment of this Act, the Secretary of Energy  
9           shall seek to enter into an agreement with the National  
10          Academies of Sciences, Engineering, and Medicine (re-  
11          ferred to in this section as the “National Academies”)  
12          under which the National Academies shall—

13                  (1) study the opportunities and challenges asso-  
14                  ciated with net metering; and

15                  (2) evaluate the expected medium- and long-  
16                  term impacts of net metering.

17          (b) ELEMENTS.—The study and evaluation con-  
18          ducted pursuant to the agreement entered into under sub-  
19          section (a) shall address—

20                  (1) developments in net metering, including the  
21                  emergence of new technologies;

22                  (2) alternatives to existing metering systems  
23                  that—

24                          (A) provide for transactions that—

1 (i) measure electric energy consump-  
2 tion by an electric consumer at the home  
3 or facility of that electric consumer; and

4 (ii) are capable of sending electric en-  
5 ergy usage information through a commu-  
6 nications network to an electric utility;

7 (B) promote equitable distribution of re-  
8 sources and costs; and

9 (C) provide incentives for the use of dis-  
10 tributed renewable generation;

11 (3) net metering planning and operating tech-  
12 niques;

13 (4) effective architecture for net metering;

14 (5) successful net metering business models;

15 (6) consumer and industry incentives for net  
16 metering;

17 (7) the role of renewable resources in the elec-  
18 tric grid;

19 (8) the role of net metering in developing future  
20 models for renewable infrastructure; and

21 (9) the use of battery storage with net meter-  
22 ing.

23 (c) REPORT.—

24 (1) IN GENERAL.—The agreement entered into  
25 under subsection (a) shall require the National

1 Academies to submit to the Secretary of Energy, not  
2 later than 2 years after entering into the agreement,  
3 a report that describes the results of the study and  
4 evaluation conducted pursuant to the agreement.

5 (2) PUBLIC AVAILABILITY.—The report sub-  
6 mitted under paragraph (1) shall be made available  
7 to the public through electronic means, including the  
8 internet.

9 **TITLE IX—DEPARTMENT OF**  
10 **ENERGY INNOVATION**

11 **SEC. 9001. OFFICE OF TECHNOLOGY TRANSITIONS.**

12 Section 1001 of the Energy Policy Act of 2005 (42  
13 U.S.C. 16391) is amended—

14 (1) by striking subsection (a) and all that fol-  
15 lows through “The Coordinator” in subsection (b)  
16 and inserting the following:

17 “(a) OFFICE OF TECHNOLOGY TRANSITIONS.—

18 “(1) ESTABLISHMENT.—There is established  
19 within the Department an Office of Technology  
20 Transitions (referred to in this section as the ‘Of-  
21 fice’).

22 “(2) MISSION.—The mission of the Office shall  
23 be—

1           “(A) to expand the commercial impact of  
2 the research investments of the Department;  
3 and

4           “(B) to focus on commercializing tech-  
5 nologies that support the missions of the De-  
6 partment, including reducing greenhouse gas  
7 emissions and other pollutants.

8           “(3) GOALS.—

9           “(A) IN GENERAL.—In carrying out the  
10 mission and activities of the Office, the Chief  
11 Commercialization Officer appointed under  
12 paragraph (4) shall, with respect to commer-  
13 cialization activities, meet all of the goals de-  
14 scribed in subparagraph (B).

15           “(B) GOALS DESCRIBED.—The goals re-  
16 ferred to in subparagraph (A) are the following:

17           “(i) Reduction of greenhouse gas  
18 emissions and other pollutants.

19           “(ii) Ensuring economic competitive-  
20 ness.

21           “(iii) Enhancement of domestic en-  
22 ergy security and national security.

23           “(iv) Enhancement of domestic jobs.

24           “(v) Improvement of energy efficiency.



1           “(vi) Any other goals to support the  
2           transfer of technology developed by De-  
3           partment-funded programs to the private  
4           sector, as consistent with missions of the  
5           Department.

6           “(4) CHIEF COMMERCIALIZATION OFFICER.—

7           “(A) IN GENERAL.—The Office shall be  
8           headed by an officer, who shall be known as the  
9           ‘Chief Commercialization Officer’, and who  
10          shall report directly to, and be appointed by,  
11          the Secretary.

12          “(B) PRINCIPAL ADVISOR.—The Chief  
13          Commercialization Officer shall be the principal  
14          advisor to the Secretary on all matters relating  
15          to technology transfer and commercialization.

16          “(C) QUALIFICATIONS.—The Chief Com-  
17          mercialization Officer”;

18          (2) in subsection (c)—

19                  (A) in paragraph (1), by striking “sub-  
20                  section (d)” and inserting “subsection (b)”;

21                  (B) by redesignating paragraphs (1)  
22                  through (4) as clauses (i) through (iv), respec-  
23                  tively, and indenting appropriately; and

24                  (C) by striking the subsection designation  
25                  and heading and all that follows through “The

1 Coordinator” in the matter preceding clause (i)  
2 (as so redesignated) and inserting the following:

3 “(D) DUTIES.—The Chief Commercializa-  
4 tion Officer”;

5 (3) by adding at the end of subsection (a) (as  
6 amended by paragraph (2)(C)) the following:

7 “(5) COORDINATION.—In carrying out the mis-  
8 sion and activities of the Office, the Chief Commer-  
9 cialization Officer shall coordinate with the senior  
10 leadership of the Department, other relevant pro-  
11 gram offices of the Department, National Labora-  
12 tories, the Technology Transfer Working Group es-  
13 tablished under subsection (b), the Technology  
14 Transfer Policy Board, and other stakeholders (in-  
15 cluding private industry).”;

16 (4) by redesignating subsections (d) through (h)  
17 as subsections (b) through (f), respectively;

18 (5) in subsection (f) (as so redesignated), by  
19 striking “subsection (e)” and inserting “subsection  
20 (e)”;

21 (6) by adding at the end the following:

22 “(g) ADDITIONAL TECHNOLOGY TRANSFER PRO-  
23 GRAMS.—The Secretary may develop additional programs  
24 to—

1           “(1) support regional energy innovation sys-  
2           tems;

3           “(2) support clean energy incubators;

4           “(3) provide small business vouchers;

5           “(4) provide financial and technical assistance  
6           for entrepreneurial fellowships at national labora-  
7           tories;

8           “(5) encourage students, energy researchers,  
9           and national laboratory employees to develop entre-  
10          preneurial skillsets and engage in entrepreneurial  
11          opportunities;

12          “(6) support private companies and individuals  
13          in partnering with National Laboratories; and

14          “(7) further support the mission and goals of  
15          the Office.”.

16 **SEC. 9002. LAB PARTNERING SERVICE PILOT PROGRAM.**

17         (a) **PILOT PROGRAM.**—

18           (1) **IN GENERAL.**—The Secretary of Energy (in  
19           this section referred to as the “Secretary”), acting  
20           through the Chief Commercialization Officer estab-  
21           lished in section 1001(a) of the Energy Policy Act  
22           of 2005 (42 U.S.C. 16391(a)), shall establish a Lab  
23           Partnering Service Pilot Program (hereinafter in  
24           this section referred to as the “pilot program”).

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1           (2) PURPOSES.—The purposes of the pilot pro-  
2           gram are to provide services that encourage and  
3           support partnerships between the National Labora-  
4           tories and public and private sector entities, and to  
5           improve communication of research, development,  
6           demonstration, and commercial application projects  
7           and opportunities at the National Laboratories to  
8           potential partners through the development of a  
9           website and the provision of services, in collaboration  
10          with relevant external entities, and to identify and  
11          develop metrics regarding the effectiveness of such  
12          partnerships.

13          (3) ACTIVITIES.—In carrying out this pilot pro-  
14          gram, the Secretary shall—

15                 (A) conduct outreach to and engage with  
16                 relevant public and private entities;

17                 (B) identify and disseminate best practices  
18                 for strengthening connections between the Na-  
19                 tional Laboratories and public and private sec-  
20                 tor entities; and

21                 (C) develop a website to disseminate infor-  
22                 mation on—

23                         (i) different partnering mechanisms  
24                         for working with the National Labora-  
25                         tories;

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1 (ii) National Laboratory experts and  
2 research areas; and

3 (iii) National Laboratory facilities and  
4 user facilities.

5 (b) METRICS.—The Secretary shall support the de-  
6 velopment of metrics, including conversion metrics, to de-  
7 termine the effectiveness of the pilot program in achieving  
8 the purposes in subsection (a) and the number and types  
9 of partnerships established between public and private sec-  
10 tor entities and the National Laboratories compared to  
11 baseline data.

12 (c) COORDINATION.—In carrying out the activities  
13 authorized in this section, the Secretary shall coordinate  
14 with the Directors of (and dedicated technology transfer  
15 staff at) the National Laboratories, in particular for  
16 matchmaking services for individual projects, which should  
17 be led by the National Laboratories.

18 (d) FUNDING EMPLOYEE PARTNERING ACTIVI-  
19 TIES.—The Secretary shall delegate to the Directors of  
20 each National Laboratory and single-purpose research fa-  
21 cility of the Department the authority to compensate Na-  
22 tional Laboratory employees providing services under this  
23 section.

24 (e) DURATION.—Subject to the availability of appro-  
25 priations, the pilot program established in this section

1 shall operate for not less than 3 years and may be built  
2 off an existing program.

3 (f) EVALUATION.—Not later than 6 months after the  
4 completion of this pilot program, the Secretary shall sup-  
5 port the evaluation of the success of the pilot program in  
6 achieving the purposes in subsection (a) and shall submit  
7 the evaluation to the Committee on Science, Space, and  
8 Technology of the House of Representatives and the Com-  
9 mittee on Energy and Natural Resources of the Senate.  
10 The assessment shall include analyses of the performance  
11 of the pilot program based on the metrics developed under  
12 subsection (b).

13 (g) DEFINITION.—In this section, the term “National  
14 Laboratory” has the meaning given such term in section  
15 2(3) of the Energy Policy Act of 2005 (42 U.S.C.  
16 15801(3)).

17 **SEC. 9003. TECHNOLOGY COMMERCIALIZATION FUND.**

18 Section 1001(e) of the Energy Policy Act of 2005 (42  
19 U.S.C. 16391(e)) is amended to read as follows:

20 “(e) TECHNOLOGY COMMERCIALIZATION FUND.—

21 “(1) ESTABLISHMENT.—The Secretary, acting  
22 through the Chief Commercialization Officer estab-  
23 lished in section 1001(a) of the Energy Policy Act  
24 of 2005 (42 U.S.C. 16391(a)), shall establish a  
25 Technology Commercialization Fund (hereafter re-

1       ferred to as the ‘Fund’), using nine-tenths of one  
2       percent of the amount of appropriations made avail-  
3       able to the Department for applied energy research,  
4       development, demonstration, and commercial appli-  
5       cation for each fiscal year, to be used to provide, in  
6       accordance with the cost-sharing requirements under  
7       section 988, funds to private partners, including na-  
8       tional laboratories, to promote promising energy  
9       technologies for commercial purposes.

10           “(2) APPLICATIONS.—

11                   “(A) CONSIDERATIONS.—The Secretary  
12           shall develop criteria for evaluating applications  
13           for funding under this section, which may in-  
14           clude—

15                           “(i) the potential that a proposed  
16                           technology will result in a commercially  
17                           successful product within a reasonable  
18                           timeframe; and

19                           “(ii) the relative maturity of a pro-  
20                           posed technology for commercial applica-  
21                           tion.

22                   “(B) SELECTIONS.—In awarding funds  
23           under this section, the Secretary may give spe-  
24           cial consideration to applications that involve at  
25           least one applicant that has participated in an

1           entrepreneurial or commercialization training  
2           program, such as Energy Innovation Corps.

3           “(f) ANNUAL REPORT.—The Secretary shall include  
4 in the annual report required under section 9007(a) of the  
5 Energy Act of 2020—

6           “(1) description of the projects carried out with  
7 awards from the Fund for that fiscal year;

8           “(2) each project’s cost-share for that fiscal  
9 year; and

10           “(3) each project’s partners for that fiscal year.

11           “(g) TECHNOLOGY COMMERCIALIZATION FUND RE-  
12 PORT.—

13           “(1) IN GENERAL.—Not later than 1 year after  
14 the date of enactment of the Energy Act of 2020,  
15 the Secretary shall submit to the Committee on  
16 Science, Space, and Technology and Committee on  
17 Appropriations of the House of Representatives and  
18 the Committee on Energy and Natural Resources  
19 and Committee on Appropriations of the Senate a  
20 report on the current and recommended implementa-  
21 tion of the Fund.

22           “(2) CONTENTS.—The report under subpara-  
23 graph (A) shall include—

24           “(A) a summary, with supporting data, of  
25 how much Department program offices con-



1           tribute to and use the Fund each year, includ-  
2           ing a list of current funding restrictions;

3                   “(B) recommendations on how to improve  
4           implementation and administration of the  
5           Fund; and

6                   “(C) an analysis on how to spend funds  
7           optimally on technology areas that have the  
8           greatest need and opportunity for commercial  
9           application, rather than spending funds at the  
10          programmatic level or under current funding  
11          restrictions.”.

12 **SEC. 9004. STREAMLINING PRIZE COMPETITIONS.**

13          Section 1008 of the Energy Policy Act of 2005 (42  
14 U.S.C. 16396) is amended by inserting after subsection  
15 (d) the following (and redesignating subsections (f) and  
16 (g) as subsections (g) and (h), respectively):

17          “(e) COORDINATION.—In carrying out subsection (a),  
18 and for any prize competitions under section 105 of the  
19 America Creating Opportunities to Meaningfully Promote  
20 Excellence in Technology, Education, and Science Reau-  
21 thorization Act of 2010, the Secretary shall—

22                   “(1) issue Department-wide guidance on the de-  
23          sign, development, and implementation of prize com-  
24          petitions;

1           “(2) collect and disseminate best practices on  
2           the design and administration of prize competitions;

3           “(3) streamline contracting mechanisms for the  
4           implementation of prize competitions; and

5           “(4) provide training and prize competition de-  
6           sign support, as necessary, to Department staff to  
7           develop prize competitions and challenges.”.

8   **SEC. 9005. MILESTONE-BASED DEMONSTRATION PROJECTS.**

9           (a) IN GENERAL.—Acting under section 646(g) of  
10          the Department of Energy Organization Act (42 U.S.C.  
11          7256(g)), notwithstanding paragraph (10) of such section,  
12          the Secretary of Energy (in this section referred to as the  
13          “Secretary”) may carry out demonstration projects as a  
14          milestone-based demonstration project that requires par-  
15          ticular technical and financial milestones to be met before  
16          a participant is awarded grants by the Department  
17          through a competitive award process.

18          (b) REQUIREMENTS.—In carrying out milestone-  
19          based demonstration projects under the authority in para-  
20          graph (1), the Secretary shall, for each relevant project—

21                 (1) request proposals from eligible entities, as  
22                 determined by the Secretary, including—

23                         (A) a business plan, that may include a  
24                         plan for scalable manufacturing and a plan for  
25                         addressing supply chain gaps;

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1 (B) a plan for raising private sector invest-  
2 ment; and

3 (C) proposed technical and financial mile-  
4 stones, including estimated project timelines  
5 and total costs; and

6 (2) award funding of a predetermined amount  
7 to projects that successfully meet proposed mile-  
8 stones under paragraph (1)(C) or for expenses  
9 deemed reimbursable by the Secretary, in accordance  
10 with terms negotiated for an individual award;

11 (3) require cost sharing in accordance with sec-  
12 tion 988 of the Energy Policy Act of 2005; and

13 (4) communicate regularly with selected eligible  
14 entities and, if the Secretary deems appropriate, ex-  
15 ercise small amounts of flexibility for technical and  
16 financial milestones as projects mature.

17 (c) AWARDS.—For the program established under  
18 subsection (a)—

19 (1) an award recipient shall be responsible for  
20 all costs until milestones are achieved, or reimburs-  
21 able expenses are reviewed and verified by the De-  
22 partment; and

23 (2) should an awardee not meet the milestones  
24 described in subsection (a), the Secretary or their  
25 designee may end the partnership with an award re-

1        cipient and use the remaining funds in the ended  
2        agreement for new or existing projects carried out  
3        under this section.

4        (d) **PROJECT MANAGEMENT.**—In carrying out  
5        projects under this program and assessing the completion  
6        of their milestones in accordance with subsection (b), the  
7        Secretary shall consult with experts that represent diverse  
8        perspectives and professional experiences, including those  
9        from the private sector, to ensure a complete and thorough  
10       review.

11       (e) **REPORT.**—In accordance with section 9007(a),  
12       the Secretary shall report annually on any demonstration  
13       projects carried out using the authorities under this sec-  
14       tion.

15       **SEC. 9006. OTHER TRANSACTION AUTHORITY EXTENSION.**

16       (a) Subsection 646(g)(10) of the Department of En-  
17       ergy Organization Act (42 U.S.C. 7256(g)(10)) is amend-  
18       ed by striking “September 30, 2020” and inserting “Sep-  
19       tember 30, 2030”.

20       (b) The provisions of section 602 of the Public Works  
21       and Economic Development Act of 1965 (42 U.S.C. 3212)  
22       shall apply with respect to construction, alteration, or re-  
23       pair work of demonstration projects funded by grants or  
24       contracts authorized under sections 3001, 3003, 3004,

1 5001, and 8007 and the amendments made by such sec-  
2 tions.

3 **SEC. 9007. TECHNOLOGY TRANSFER REPORTS AND EVAL-**  
4 **UATION.**

5 (a) ANNUAL REPORT.—As part of the updated tech-  
6 nology transfer execution plan required each year under  
7 section 1001(h)(2) of the Energy Policy Act of 2005 (42  
8 U.S.C. 16391(g)(2)), the Secretary of Energy (in this sec-  
9 tion referred to as the “Secretary”) shall submit to the  
10 Committee on Science, Space, and Technology of the  
11 House of Representatives and the Committee on Energy  
12 and Natural Resources of the Senate a report on the  
13 progress and implementation of programs established  
14 under sections 9001, 9002, 9003, 9004, and 9005 of this  
15 Act.

16 (b) EVALUATION.—Not later than 3 years after the  
17 enactment of this Act and every 3 years thereafter the  
18 Secretary shall submit to the Committee on Science,  
19 Space, and Technology of the House of Representatives  
20 and the Committee on Energy and Natural Resources of  
21 the Senate an evaluation on the extent to which programs  
22 established under sections 9001, 9002, 9003, 9004, and  
23 9005 of this Act are achieving success based on relevant  
24 short-term and long-term metrics.

1 (c) REPORT ON TECHNOLOGY TRANSFER GAPS.—  
2 Not later than 3 years after the enactment of this Act,  
3 the Secretary shall enter into an agreement with the Na-  
4 tional Academies of Science, Engineering, and Medicine  
5 to submit to the Committee on Science, Space, and Tech-  
6 nology of the House of Representatives and the Committee  
7 on Energy and Natural Resources of the Senate a report  
8 on programmatic gaps that exist to advance the commer-  
9 cial application of technologies developed at the National  
10 Laboratories (as defined in section 2(3) of the Energy Pol-  
11 icy Act of 2005 (42 U.S.C. 15801(3))).

12 **SEC. 9008. VETERANS' HEALTH INITIATIVE.**

13 (a) PURPOSES.—The purposes of this section are to  
14 advance Department of Energy expertise in artificial intel-  
15 ligence and high-performance computing in order to im-  
16 prove health outcomes for veteran populations by—

17 (1) supporting basic research through the appli-  
18 cation of artificial intelligence, high-performance  
19 computing, modeling and simulation, machine learn-  
20 ing, and large-scale data analytics to identify and  
21 solve outcome-defined challenges in the health  
22 sciences;

23 (2) maximizing the impact of the Department  
24 of Veterans Affairs' health and genomics data  
25 housed at the National Laboratories, as well as data

1 from other sources, on science, innovation, and  
2 health care outcomes through the use and advance-  
3 ment of artificial intelligence and high-performance  
4 computing capabilities of the Department;

5 (3) promoting collaborative research through  
6 the establishment of partnerships to improve data  
7 sharing between Federal agencies, National Labora-  
8 tories, institutions of higher education, and non-  
9 profit institutions;

10 (4) establishing multiple scientific computing  
11 user facilities to house and provision available data  
12 to foster transformational outcomes; and

13 (5) driving the development of technology to im-  
14 prove artificial intelligence, high-performance com-  
15 puting, and networking relevant to mission applica-  
16 tions of the Department, including modeling, simula-  
17 tion, machine learning, and advanced data analytics.

18 (b) VETERANS HEALTH RESEARCH AND DEVELOP-  
19 MENT.—

20 (1) IN GENERAL.—The Secretary of Energy (in  
21 this section referred to as the “Secretary”) shall es-  
22 tablish and carry out a research program in artificial  
23 intelligence and high-performance computing, fo-  
24 cused on the development of tools to solve large-scale  
25 data analytics and management challenges associ-

1       ated with veteran’s healthcare, and to support the  
2       efforts of the Department of Veterans Affairs to  
3       identify potential health risks and challenges uti-  
4       lizing data on long-term healthcare, health risks,  
5       and genomic data collected from veteran popu-  
6       lations. The Secretary shall carry out this program  
7       through a competitive, merit-reviewed process, and  
8       consider applications from National Laboratories, in-  
9       stitutions of higher education, multi-institutional col-  
10      laborations, and other appropriate entities.

11           (2) PROGRAM COMPONENTS.—In carrying out  
12      the program established under paragraph (1), the  
13      Secretary may—

14           (A) conduct basic research in modeling and  
15           simulation, machine learning, large-scale data  
16           analytics, and predictive analysis in order to de-  
17           velop novel or optimized algorithms for pre-  
18           diction of disease treatment and recovery;

19           (B) develop methods to accommodate large  
20           data sets with variable quality and scale, and to  
21           provide insight and models for complex systems;

22           (C) develop new approaches and maximize  
23           the use of algorithms developed through artifi-  
24           cial intelligence, machine learning, data ana-  
25           lytics, natural language processing, modeling



1 and simulation, and develop new algorithms  
2 suitable for high-performance computing sys-  
3 tems and large biomedical data sets;

4 (D) advance existing and construct new  
5 data enclaves capable of securely storing data  
6 sets provided by the Department of Veterans  
7 Affairs, Department of Defense, and other  
8 sources; and

9 (E) promote collaboration and data shar-  
10 ing between National Laboratories, research en-  
11 tities, and user facilities of the Department by  
12 providing the necessary access and secure data  
13 transfer capabilities.

14 (3) COORDINATION.—In carrying out the pro-  
15 gram established under paragraph (1), the Secretary  
16 is authorized—

17 (A) to enter into memoranda of under-  
18 standing in order to carry out reimbursable  
19 agreements with the Department of Veterans  
20 Affairs and other entities in order to maximize  
21 the effectiveness of Department research and  
22 development to improve veterans' healthcare;

23 (B) to consult with the Department of Vet-  
24 erans Affairs and other Federal agencies as ap-  
25 propriate; and

1 (C) to ensure that data storage meets all  
2 privacy and security requirements established  
3 by the Department of Veterans Affairs, and  
4 that access to data is provided in accordance  
5 with relevant Department of Veterans Affairs  
6 data access policies, including informed consent.

7 (4) REPORT.—Not later than 2 years after the  
8 date of enactment of this Act, the Secretary shall  
9 submit to the Committee on Energy and Natural  
10 Resources and the Committee on Veterans' Affairs  
11 of the Senate, and the Committee on Science, Space,  
12 and Technology and the Committee on Veterans' Af-  
13 fairs of the House of Representatives, a report de-  
14 tailing the effectiveness of—

15 (A) the interagency coordination between  
16 each Federal agency involved in the research  
17 program carried out under this subsection;

18 (B) collaborative research achievements of  
19 the program; and

20 (C) potential opportunities to expand the  
21 technical capabilities of the Department.

22 (5) FUNDING.—There is authorized to be ap-  
23 propriated to the Secretary of Veterans Affairs to  
24 carry out this subsection \$27,000,000 for fiscal year  
25 2021.

1 (c) INTERAGENCY COLLABORATION.—

2 (1) IN GENERAL.—The Secretary is authorized  
3 to carry out research, development, and demonstra-  
4 tion activities to develop tools to apply to big data  
5 that enable Federal agencies, institutions of higher  
6 education, nonprofit research organizations, and in-  
7 dustry to better leverage the capabilities of the De-  
8 partment to solve complex, big data challenges. The  
9 Secretary shall carry out these activities through a  
10 competitive, merit-reviewed process, and consider ap-  
11 plications from National Laboratories, institutions of  
12 higher education, multi-institutional collaborations,  
13 and other appropriate entities.

14 (2) ACTIVITIES.—In carrying out the research,  
15 development, and demonstration activities authorized  
16 under paragraph (1), the Secretary may—

17 (A) utilize all available mechanisms to pre-  
18 vent duplication and coordinate research efforts  
19 across the Department;

20 (B) establish multiple user facilities to  
21 serve as data enclaves capable of securely stor-  
22 ing data sets created by Federal agencies, insti-  
23 tutions of higher education, nonprofit organiza-  
24 tions, or industry at National Laboratories; and

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1 (C) promote collaboration and data sharing  
2 between National Laboratories, research enti-  
3 ties, and user facilities of the Department by  
4 providing the necessary access and secure data  
5 transfer capabilities.

6 (3) REPORT.—Not later than 2 years after the  
7 date of enactment of this Act, the Secretary shall  
8 submit to the Committee on Energy and Natural  
9 Resources of the Senate and the Committee on  
10 Science, Space, and Technology of the House of  
11 Representatives a report evaluating the effectiveness  
12 of the activities authorized under paragraph (1).

13 (4) FUNDING.—There are authorized to be ap-  
14 propriated to the Secretary to carry out this sub-  
15 section \$15,000,000 for each of fiscal years 2021  
16 through 2025.

17 (d) DEFINITION.—In this section, the term “National  
18 Laboratory” has the meaning given such term in section  
19 2(3) of the Energy Policy Act of 2005 (42 U.S.C.  
20 15801(3)).

21 **SEC. 9009. SUSTAINABLE TRANSPORTATION RESEARCH**  
22 **AND DEVELOPMENT.**

23 There are authorized to be appropriated to carry out  
24 research, development, demonstration, and commercial ap-  
25 plication activities within the Department of Energy’s Of-

1 fices of Hydrogen and Fuel Cell Technologies, Vehicle  
2 Technologies, and Bioenergy Technologies—

3 (1) \$830,000,000 for fiscal year 2021;

4 (2) \$855,000,000 for fiscal year 2022; and

5 (3) \$880,000,000 for fiscal year 2023.

6 **SEC. 9010. LOAN PROGRAM OFFICE TITLE XVII REFORM.**

7 (a) TERMS AND CONDITIONS.—Section 1702 of the  
8 Energy Policy Act of 2005 (42 U.S.C. 16512) is amend-  
9 ed—

10 (1) by amending subsection (b) to read as fol-  
11 lows:

12 “(b) SPECIFIC APPROPRIATION OR CONTRIBU-  
13 TION.—

14 “(1) IN GENERAL.—Except as provided in para-  
15 graph (2), the cost of a guarantee shall be paid by  
16 the Secretary using an appropriation made for the  
17 cost of the guarantee, subject to the availability of  
18 such an appropriation.

19 “(2) INSUFFICIENT APPROPRIATIONS.—If suffi-  
20 cient appropriated funds to pay the cost of a guar-  
21 antee are not available, then the guarantee shall not  
22 be made unless—

23 “(A) the Secretary has received from the  
24 borrower a payment in full for the cost of the

1           guarantee and deposited the payment into the  
2           Treasury; or

3           “(B) a combination of one or more appro-  
4           priations and one or more payments from the  
5           borrower under this subsection has been made  
6           that is sufficient to cover the cost of the guar-  
7           antee.”;

8           (2) in subsection (d)(3), by striking “is not sub-  
9           ordinate” and inserting “, including any reorganiza-  
10          tion, restructuring, or termination thereof, shall not  
11          at any time be subordinate”;

12          (3) in subsection (h)—

13                 (A) by amending paragraph (1) to read as  
14                 follows:

15                 “(1) IN GENERAL.—The Secretary shall charge,  
16                 and collect on or after the date of the financial close  
17                 of an obligation, a fee for a guarantee in an amount  
18                 that the Secretary determines is sufficient to cover  
19                 applicable administrative expenses (including any  
20                 costs associated with third-party consultants en-  
21                 gaged by the Secretary).”; and

22                 (B) by adding at the following:

23                 “(3) REDUCTION IN FEE AMOUNT.—Notwith-  
24                 standing paragraph (1) and subject to the avail-  
25                 ability of appropriations, the Secretary may reduce

1 the amount of a fee for a guarantee under this sub-  
2 section.”; and

3 (4) by adding at the end the following:

4 “(1) RESTRUCTURING OF LOAN GUARANTEES.—The  
5 Secretary shall consult with the Secretary of the Treasury  
6 regarding any restructuring of the terms or conditions of  
7 a guarantee issued pursuant to this title, including with  
8 respect to any deviations from the financial terms of the  
9 guarantee.

10 “(m) WRITTEN ANALYSIS.—

11 “(1) REQUIREMENT.—The Secretary may not  
12 make a guarantee under this title until the Secretary  
13 of the Treasury has transmitted to the Secretary,  
14 and the Secretary has taken into consideration, a  
15 written analysis of the financial terms and condi-  
16 tions of the proposed guarantee.

17 “(2) TRANSMISSION.—Not later than 30 days  
18 after receiving information on a proposed guarantee  
19 from the Secretary, the Secretary of the Treasury  
20 shall transmit the written analysis of the financial  
21 terms and conditions of the proposed guarantee re-  
22 quired under paragraph (1) to the Secretary.

23 “(3) EXPLANATION.—If the Secretary makes a  
24 guarantee the financial terms and conditions of  
25 which are not consistent with the written analysis

1 required under this subsection, not later than 30  
2 days after making such guarantee, the Secretary  
3 shall submit to the Committee on Energy and Com-  
4 merce and the Committee on Science, Space, and  
5 Technology of the House of Representatives, and the  
6 Committee on Energy and Natural Resources of the  
7 Senate, a written explanation of any material incon-  
8 sistencies.

9 “(n) APPLICATION STATUS.—

10 “(1) REQUEST.—If the Secretary does not  
11 make a final decision on an application for a guar-  
12 antee under this title by the date that is 180 days  
13 after receipt of the application by the Secretary, the  
14 applicant may request, on or after that date and not  
15 more than once every 60 days thereafter until a final  
16 decision is made, that the Secretary provide to the  
17 applicant a response described in paragraph (2).

18 “(2) RESPONSE.—Not later than 10 days after  
19 receiving a request from an applicant under para-  
20 graph (1), the Secretary shall provide to the appli-  
21 cant a response that includes—

22 “(A) a description of the current status of  
23 review of the application;

24 “(B) a summary of any factors that are  
25 delaying a final decision on the application, a



1 list of what items are required in order to reach  
2 a final decision, citations to authorities stating  
3 the reasons why such items are required, and a  
4 list of actions the applicant can take to expedite  
5 the process; and

6 “(C) an estimate of when a final decision  
7 on the application will be made.

8 “(o) OUTREACH.—In carrying out this title, the Sec-  
9 retary shall—

10 “(1) provide assistance with the completion of  
11 applications for a guarantee under this title;

12 “(2) conduct outreach, including through con-  
13 ferences and online programs, to disseminate infor-  
14 mation to potential applicants;

15 “(3) conduct outreach to encourage participa-  
16 tion of supporting finance institutions and private  
17 lenders in eligible projects.

18 “(p) COORDINATION.—In carrying out this title, the  
19 Secretary shall coordinate activities under this title with  
20 activities of other relevant offices with the Department.

21 “(q) REPORT.—Not later than 2 years after the date  
22 of the enactment of this subsection and every 3 years  
23 thereafter, the Secretary shall submit to Congress a report  
24 on the status of applications for, and projects receiving,  
25 guarantees under this title, including—

1           “(1) a list of such projects, including the guar-  
2           antee amount, construction status, and financing  
3           partners of each such project;

4           “(2) the status of each such project’s loan re-  
5           payment, including interest paid and future repay-  
6           ment projections;

7           “(3) an estimate of the air pollutant or green-  
8           house gas emissions avoided or reduced from each  
9           such project;

10           “(4) data regarding the number of direct and  
11           indirect jobs retained, restored, or created by such  
12           projects;

13           “(5) identification of—

14           “(A) technologies deployed by projects that  
15           have received guarantees that have subse-  
16           quently been deployed commercially without  
17           guarantees; and

18           “(B) novel technologies that have been de-  
19           ployed by such projects and deployed in the  
20           commercial energy market;

21           “(6) the number of new projects projected to  
22           receive a guarantee under this title during the next  
23           2 years and the aggregate guarantee amount;

24           “(7) the number of outreach engagements con-  
25           ducted with potential applicants;

1           “(8) the number of applications received and  
2           currently pending for each open solicitation; and

3           “(9) any other metrics the Secretary finds ap-  
4           propriate.”.

5           (b) PROJECT ELIGIBILITY EXPANSION.—Section  
6 1703 of the Energy Policy Act of 2005 (42 U.S.C. 16513)  
7 is amended—

8           (1) in subsection (a)—

9           (A) in paragraph (1), by inserting “, uti-  
10           lize” after “reduce”; and

11           (B) in paragraph (2), by striking “.” and  
12           inserting “, including projects that employ ele-  
13           ments of commercial technologies in combina-  
14           tion with new or significantly improved tech-  
15           nologies.”;

16           (2) in subsection (b)—

17           (A) in paragraph (4), by inserting “, in-  
18           cluding manufacturing of nuclear supply com-  
19           ponents for advanced nuclear reactors” after  
20           “facilities”;

21           (B) by amending paragraph (5) to read as  
22           follows:

23           “(5) Carbon capture, utilization, and sequestra-  
24           tion practices and technologies, including—

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1           “(A) agricultural and forestry practices  
2           that store and sequester carbon; and

3           “(B) synthetic technologies to remove car-  
4           bon from the air and oceans.”; and

5           (C) by adding at the end the following:

6           “(11) Energy storage technologies for residen-  
7           tial, industrial, transportation, and power generation  
8           applications.

9           “(12) Technologies or processes for reducing  
10          greenhouse gas emissions from industrial applica-  
11          tions, including iron, steel, cement, and ammonia  
12          production, hydrogen production, and the generation  
13          of high-temperature heat.”; and

14          (3) by adding at the end the following new sub-  
15          section:

16          “(f) REGIONAL VARIATION.—Notwithstanding sub-  
17          section (a)(2), the Secretary may, if regional variation sig-  
18          nificantly affects the deployment of a technology, make  
19          guarantees under this title for up to 6 projects that em-  
20          ploy the same or similar technology as another project,  
21          provided no more than 2 projects that use the same or  
22          a similar technology are located in the same region of the  
23          United States.”.

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1 (c) AUTHORIZATION OF APPROPRIATIONS.—Section  
2 1704 of the Energy Policy Act of 2005 (42 U.S.C. 16514)  
3 is amended by adding at the end the following:

4 “(c) ADMINISTRATIVE AND OTHER EXPENSES.—  
5 There are authorized to be appropriated—

6 “(1) \$32,000,000 for each of fiscal years 2021  
7 through 2025 to carry out this title; and

8 “(2) for fiscal year 2021, in addition to  
9 amounts authorized under paragraph (1),  
10 \$25,000,000, to remain available until expended, for  
11 administrative expenses described in section  
12 1702(h)(1) that are not covered by fees collected  
13 pursuant to section 1702(h).”.

14 **SEC. 9011. ESTABLISHED PROGRAM TO STIMULATE COM-**  
15 **PETITIVE RESEARCH.**

16 Section 2203(b) of the Energy Policy Act of 1992  
17 (42 U.S.C. 13503(b)) is amended by striking paragraph  
18 (3) and inserting the following:

19 “(3) ESTABLISHED PROGRAM TO STIMULATE  
20 COMPETITIVE RESEARCH.—

21 “(A) DEFINITIONS.—In this paragraph:

22 “(i) ELIGIBLE ENTITY.—The term ‘el-  
23 ible entity’ means an institution of higher  
24 education located in an eligible jurisdiction.

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1                   “(ii) ELIGIBLE JURISDICTION.—The  
2                   term ‘eligible jurisdiction’ means a State  
3                   that, as determined by the Secretary—

4                               “(I)(aa) historically has received  
5                               relatively little Federal research and  
6                               development funding; and

7                               “(bb) has demonstrated a com-  
8                               mitment—

9                                       “(AA) to develop the re-  
10                                      search bases in the State; and

11                                     “(BB) to improve science  
12                                     and engineering research and  
13                                     education programs at institu-  
14                                     tions of higher education in the  
15                                     State; and

16                                   “(II) is an eligible jurisdiction  
17                                   under the criteria used by the Sec-  
18                                   retary to make awards under this  
19                                   paragraph on the day before the date  
20                                   of enactment of the Energy Act of  
21                                   2020.

22                                   “(iii) EPSCoR.—The term ‘EPSCoR’  
23                                   means the Established Program to Stimu-  
24                                   late Competitive Research operated under  
25                                   subparagraph (B).

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1           “(iv) NATIONAL LABORATORY.—The  
2           term ‘National Laboratory’ has the mean-  
3           ing given the term in section 2 of the En-  
4           ergy Policy Act of 2005 (42 U.S.C.  
5           15801).

6           “(v) STATE.—The term ‘State’  
7           means—

8                   “(I) a State;

9                   “(II) the District of Columbia;

10                   “(III) the Commonwealth of  
11                   Puerto Rico;

12                   “(IV) Guam;

13                   “(V) the United States Virgin Is-  
14                   lands;

15                   “(VI) American Samoa; and

16                   “(VII) the Commonwealth of the  
17                   Northern Mariana Islands.

18           “(B) PROGRAM OPERATION.—The Sec-  
19           retary shall operate an Established Program to  
20           Stimulate Competitive Research.

21           “(C) OBJECTIVES.—The objectives of  
22           EPSCoR shall be—

23                   “(i) to increase the number of re-  
24                   searchers at institutions of higher edu-  
25                   cation in eligible jurisdictions capable of

1 performing nationally competitive science  
2 and engineering research in support of the  
3 mission of the Department of Energy in  
4 the areas of applied energy research, envi-  
5 ronmental management, and basic science;

6 “(ii) to enhance the capabilities of in-  
7 stitutions of higher education in eligible ju-  
8 risdictions to develop, plan, and execute re-  
9 search that is competitive in the peer-re-  
10 view process; and

11 “(iii) to increase the probability of  
12 long-term growth of competitive funding to  
13 institutions of higher education in eligible  
14 jurisdictions.

15 “(D) GRANTS IN AREAS OF APPLIED EN-  
16 ERGY RESEARCH, ENVIRONMENTAL MANAGE-  
17 MENT, AND BASIC SCIENCE.—

18 “(i) IN GENERAL.—EPSCoR shall  
19 make grants to eligible entities to carry out  
20 and support applied energy research and  
21 research in all areas of environmental  
22 management and basic science sponsored  
23 by the Department of Energy, including—



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1                   “(I) energy efficiency, fossil en-  
2                   ergy, renewable energy, and other ap-  
3                   plied energy research;

4                   “(II) electricity delivery research;

5                   “(III) cybersecurity, energy secu-  
6                   rity, and emergency response;

7                   “(IV) environmental manage-  
8                   ment; and

9                   “(V) basic science research.

10                  “(ii) ACTIVITIES.—EPSCOR may  
11                  make grants under this subparagraph for  
12                  any activities consistent with the objectives  
13                  described in subparagraph (C) in the areas  
14                  of applied energy research, environmental  
15                  management, and basic science described  
16                  in clause (i), including—

17                         “(I) to support research at eligi-  
18                         ble entities that is carried out in part-  
19                         nership with the National Labora-  
20                         tories;

21                         “(II) to provide for graduate  
22                         traineeships;

23                         “(III) to support research by  
24                         early career faculty; and

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1                   “(IV) to improve research capa-  
2                   bilities at eligible entities through bi-  
3                   ennial implementation grants.

4                   “(iii) NO COST SHARING.—EPSCoR  
5                   shall not impose any cost-sharing require-  
6                   ment with respect to a grant made under  
7                   this subparagraph.

8                   “(E) OTHER ACTIVITIES.—EPSCoR may  
9                   carry out such activities as may be necessary to  
10                  meet the objectives described in subparagraph  
11                  (C) in the areas of applied energy research, en-  
12                  vironmental management, and basic science de-  
13                  scribed in subparagraph (D)(i).

14                  “(F) PROGRAM IMPLEMENTATION.—

15                  “(i) IN GENERAL.—Not later than  
16                  270 days after the date of enactment of  
17                  the Energy Act of 2020, the Secretary  
18                  shall submit to the Committees on Energy  
19                  and Natural Resources and Appropriations  
20                  of the Senate and the Committees on En-  
21                  ergy and Commerce and Appropriations of  
22                  the House of Representatives a plan de-  
23                  scribing how the Secretary shall implement  
24                  EPSCoR.

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1           “(ii) CONTENTS OF PLAN.—The plan  
2 described in clause (i) shall include a de-  
3 scription of—

4           “(I) the management structure of  
5 EPSCoR, which shall ensure that all  
6 research areas and activities described  
7 in this paragraph are incorporated  
8 into EPSCoR;

9           “(II) efforts to conduct outreach  
10 to inform eligible entities and faculty  
11 of changes to, and opportunities  
12 under, EPSCoR;

13           “(III) how EPSCoR plans to in-  
14 crease engagement with eligible enti-  
15 ties, faculty, and State committees,  
16 including by holding regular work-  
17 shops, to increase participation in  
18 EPSCoR; and

19           “(IV) any other issues relating to  
20 EPSCoR that the Secretary deter-  
21 mines appropriate.

22           “(G) PROGRAM EVALUATION.—

23           “(i) IN GENERAL.—Not later than 5  
24 years after the date of enactment of the  
25 Energy Act of 2020, the Secretary shall

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1 contract with a federally funded research  
2 and development center, the National  
3 Academy of Sciences, or a similar organi-  
4 zation to carry out an assessment of the  
5 effectiveness of EPSCoR, including an as-  
6 sessment of—

7 “(I) the tangible progress made  
8 towards achieving the objectives de-  
9 scribed in subparagraph (C);

10 “(II) the impact of research sup-  
11 ported by EPSCoR on the mission of  
12 the Department of Energy; and

13 “(III) any other issues relating to  
14 EPSCoR that the Secretary deter-  
15 mines appropriate.

16 “(ii) LIMITATION.—The organization  
17 with which the Secretary contracts under  
18 clause (i) shall not be a National Labora-  
19 tory.

20 “(iii) REPORT.—Not later than 6  
21 years after the date of enactment of the  
22 Energy Act of 2020, the Secretary shall  
23 submit to the Committees on Energy and  
24 Natural Resources and Appropriations of  
25 the Senate and the Committees on Energy

1 and Commerce and Appropriations of the  
2 House of Representatives a report describ-  
3 ing the results of the assessment carried  
4 out under clause (i), including rec-  
5 ommendations for improvements that  
6 would enable the Secretary to achieve the  
7 objectives described in subparagraph (C).”.

## 8 **TITLE X—ARPA-E AMENDMENTS**

### 9 **SEC. 10001. ARPA-E AMENDMENTS.**

10 (a) ESTABLISHMENT.—Section 5012(b) of the Amer-  
11 ica COMPETES Act (42 U.S.C. 16538(b)) is amended  
12 by striking “development of energy technologies” and in-  
13 serting “development of transformative science and tech-  
14 nology solutions to address the energy and environmental  
15 missions of the Department”.

16 (b) GOALS.—Section 5012(c) of the America COM-  
17 PETES Act (42 U.S.C. 16538(c)) is amended—

18 (1) by striking paragraph (1)(A) and inserting  
19 the following:

20 “(A) to enhance the economic and energy  
21 security of the United States through the devel-  
22 opment of energy technologies that—

23 “(i) reduce imports of energy from  
24 foreign sources;

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1 “(ii) reduce energy-related emissions,  
2 including greenhouse gases;

3 “(iii) improve the energy efficiency of  
4 all economic sectors;

5 “(iv) provide transformative solutions  
6 to improve the management, clean-up, and  
7 disposal of radioactive waste and spent nu-  
8 clear fuel; and

9 “(v) improve the resilience, reliability,  
10 and security of infrastructure to produce,  
11 deliver, and store energy; and”;

12 (2) in paragraph (2), in the matter preceding  
13 subparagraph (A), by striking “energy technology  
14 projects” and inserting “advanced technology  
15 projects”.

16 (c) RESPONSIBILITIES.—Section 5012(e)(3)(A) of  
17 the America COMPETES Act (42 U.S.C.  
18 16538(e)(3)(A)) is amended by striking “energy”.

19 (d) REPORTS AND ROADMAPS.—Section 5012(h) of  
20 the America COMPETES Act (42 U.S.C. 16538(h)) is  
21 amended to read as follows:

22 “(h) REPORTS AND ROADMAPS.—

23 “(1) ANNUAL REPORT.—As part of the annual  
24 budget request submitted for each fiscal year, the  
25 Director shall provide to the relevant authorizing

1 and appropriations committees of Congress a report  
2 that—

3 “(A) describes projects supported by  
4 ARPA–E during the previous fiscal year;

5 “(B) describes projects supported by  
6 ARPA–E during the previous fiscal year that  
7 examine topics and technologies closely related  
8 to other activities funded by the Department,  
9 and includes an analysis of whether in sup-  
10 porting such projects, the Director is in compli-  
11 ance with subsection (i)(1); and

12 “(C) describes current, proposed, and  
13 planned projects to be carried out pursuant to  
14 subsection (e)(3)(D).

15 “(2) STRATEGIC VISION ROADMAP.—Not later  
16 than October 1, 2021, and every four years there-  
17 after, the Director shall provide to the relevant au-  
18 thORIZING and appropriations committees of Congress  
19 a roadmap describing the strategic vision that  
20 ARPA–E will use to guide the choices of ARPA–E  
21 for future technology investments over the following  
22 4 fiscal years.”.

23 (e) COORDINATION AND NONDUPLICATION.—Section  
24 5012(i)(1) of the America COMPETES Act (42 U.S.C.  
25 16538(i)(1)) is amended to read as follows:

1           “(1) IN GENERAL.—To the maximum extent  
2           practicable, the Director shall ensure that—

3                   “(A) the activities of ARPA–E are coordi-  
4                   nated with, and do not duplicate the efforts of,  
5                   programs and laboratories within the Depart-  
6                   ment and other relevant research agencies; and

7                   “(B) ARPA–E does not provide funding  
8                   for a project unless the prospective grantee  
9                   demonstrates sufficient attempts to secure pri-  
10                  vate financing or indicates that the project is  
11                  not independently commercially viable.”.

12           (f) EVALUATION.—Section 5012(l) of the America  
13           COMPETES Act (42 U.S.C. 16538(l)) is amended—

14                   (1) by striking paragraph (1) and inserting the  
15                   following:

16                   “(1) IN GENERAL.—Not later than 3 years  
17                   after the date of enactment of this paragraph, the  
18                   Secretary is authorized to enter into a contract with  
19                   the National Academy of Sciences under which the  
20                   National Academy shall conduct an evaluation of  
21                   how well ARPA–E is achieving the goals and mis-  
22                   sion of ARPA–E.”; and

23                   (2) in paragraph (2)—



1 (A) in the matter preceding subparagraph  
2 (A), by striking “shall” and inserting “may”;  
3 and

4 (B) in subparagraph (A), by striking “the  
5 recommendation of the National Academy of  
6 Sciences” and inserting “a recommendation”.

7 (g) AUTHORIZATION OF APPROPRIATIONS.—Para-  
8 graph (2) of section 5012(o) of the America COMPETES  
9 Act (42 U.S.C. 16538(o)) is amended to read as follows:

10 “(2) AUTHORIZATION OF APPROPRIATIONS.—  
11 Subject to paragraph (4), there are authorized to be  
12 appropriated to the Director for deposit in the  
13 Fund, without fiscal year limitation—

14 “(A) \$435,000,000 for fiscal year 2021;

15 “(B) \$500,000,000 for fiscal year 2022;

16 “(C) \$575,000,000 for fiscal year 2023;

17 “(D) \$662,000,000 for fiscal year 2024;

18 and

19 “(E) \$761,000,000 for fiscal year 2025.”.

20 (h) TECHNICAL AMENDMENTS.—Section 5012 of the  
21 America COMPETES Act (42 U.S.C. 16538) is amend-  
22 ed—

23 (1) in subsection (g)(3)(A)(iii), by striking  
24 “subpart” each place it appears and inserting “sub-  
25 paragraph”; and

1           (2) in subsection (o)(4)(B), by striking  
2           “(c)(2)(D)” and inserting “(c)(2)(C)”.

### 3           **TITLE XI—OTHER MATTERS**

#### 4           **SEC. 11001. LOW-DOSE RADIATION RESEARCH.**

5           (a) LOW-DOSE RADIATION RESEARCH PROGRAM.—  
6           Section 306(c) of the Department of Energy Research and  
7           Innovation Act (42 U.S.C. 18644(c)) is amended to read  
8           as follows:

9           “(c) LOW-DOSE RADIATION RESEARCH PROGRAM.—

10           “(1) IN GENERAL.—The Secretary shall carry  
11           out a research program on low-dose and low dose-  
12           rate radiation to—

13                   “(A) enhance the scientific understanding  
14                   of, and reduce uncertainties associated with, the  
15                   effects of exposure to low-dose and low dose-  
16                   rate radiation; and

17                   “(B) inform improved risk-assessment and  
18                   risk-management methods with respect to such  
19                   radiation.

20           “(2) PROGRAM COMPONENTS.—In carrying out  
21           the program required under paragraph (1), the Sec-  
22           retary shall—

23                   “(A) support and carry out the directives  
24                   under section 106(b) of the American Innova-  
25                   tion and Competitiveness Act (42 U.S.C. 6601

1 note), except that such section shall be treated  
2 for purposes of this subsection as applying to  
3 low dose and low-dose rate radiation research,  
4 in coordination with the Physical Science Sub-  
5 committee of the National Science and Tech-  
6 nology Council;

7 “(B) identify and, to the extent possible,  
8 quantify, potential monetary and health-related  
9 impacts to Federal agencies, the general public,  
10 industry, research communities, and other users  
11 of information produced by such research pro-  
12 gram;

13 “(C) leverage the collective body of knowl-  
14 edge from existing low-dose and low dose-rate  
15 radiation research;

16 “(D) engage with other Federal agencies,  
17 research communities, and potential users of in-  
18 formation produced under this section, includ-  
19 ing institutions performing or utilizing radiation  
20 research, medical physics, radiology, health  
21 physics, and emergency response measures; and

22 “(E) support education and outreach ac-  
23 tivities to disseminate information and promote  
24 public understanding of low-dose radiation, with  
25 a focus on non-emergency situations such as

1           medical physics, space exploration, and natu-  
2           rally occurring radiation.

3           “(3) RESEARCH PLAN.—

4                   “(A) Not later than 90 days after the date  
5           of enactment of the Energy Act of 2020, the  
6           Secretary shall enter into an agreement with  
7           the National Academy of Sciences to develop a  
8           long-term strategic and prioritized research  
9           agenda for the program described in paragraph  
10          (2);

11                   “(B) Not later than one year after the  
12          date of enactment of the Energy Act of 2020,  
13          the Secretary shall transmit this research plan  
14          developed in subparagraph (A) to the Com-  
15          mittee on Science, Space, and Technology of  
16          the House of Representatives and the Com-  
17          mittee on Energy and Natural Resources of the  
18          Senate.

19                   “(4) GAO STUDY.—Not later than 3 years after  
20          the date of enactment of the Energy Act of 2020,  
21          the Comptroller General shall transmit to the Com-  
22          mittee on Science, Space, and Technology of the  
23          House of Representatives and the Committee on En-  
24          ergy and Natural Resources of the Senate, a report  
25          on:

1           “(A) an evaluation of the program activi-  
2           ties carried out under this section;

3           “(B) the effectiveness of the coordination  
4           and management of the program; and

5           “(C) the implementation of the research  
6           plan outlined in paragraph (3).

7           “(6) DEFINITIONS.—In this subsection:

8           “(A) LOW-DOSE RADIATION.—The term  
9           ‘low-dose radiation’ means a radiation dose of  
10          less than 100 millisieverts.

11          “(B) LOW DOSE-RATE RADIATION.—The  
12          term ‘low dose-rate radiation’ means a radiation  
13          dose rate of less than 5 millisieverts per hour.

14          “(7) RULE OF CONSTRUCTION.—Nothing in  
15          this subsection shall be construed to subject any re-  
16          search carried out by the Secretary for the program  
17          under this subsection to any limitations described in  
18          section 977(e) of the Energy Policy Act of 2005 (42  
19          U.S.C. 16317(e)).

20          “(8) FUNDING.—For purposes of carrying out  
21          this subsection, the Secretary is authorized to make  
22          available from funds provided to the Biological and  
23          Environmental Research Program—

24                 “(A) \$20,000,000 for fiscal year 2021;

25                 “(B) \$20,000,000 for fiscal year 2022;

1                   “(C) \$30,000,000 for fiscal year 2023; and  
2                   “(D) \$40,000,000 for fiscal year 2024.”.

3           (b) SPACE RADIATION RESEARCH.—Section 306 of  
4 the Department of Energy Research and Innovation Act  
5 (42 U.S.C. 18644) is amended by adding at the end the  
6 following:

7           “(d) SPACE RADIATION RESEARCH.—The Secretary  
8 of Energy, shall continue and strengthen collaboration  
9 with the Administrator of the National Aeronautics and  
10 Space Administration on basic research to understand the  
11 effects and risks of human exposure to ionizing radiation  
12 in low Earth orbit, and in the space environment.”.

13 **SEC. 11002. AUTHORIZATION.**

14           Section 112(a)(1)(B) of the Uranium Mill Tailings  
15 Radiation Control Act of 1978 (42 U.S.C. 7922(a)(1)(B))  
16 is amended by striking “September 30, 2023” and insert-  
17 ing “September 30, 2031”.

18 **SEC. 11003. SENSE OF CONGRESS.**

19           It is the sense of Congress that in order to reduce  
20 emissions and meet 100 percent of the power demand in  
21 the United States through clean, renewable, or zero emis-  
22 sion energy sources while maintaining United States lead-  
23 ership in science and technology, the Secretary of Energy  
24 must prioritize funding for critical fundamental research

1 infrastructure and for basic research and development ac-  
2 tivities carried out through the Office of Science.

3 **SEC. 11004. ADDRESSING INSUFFICIENT COMPENSATION**  
4 **OF EMPLOYEES AND OTHER PERSONNEL OF**  
5 **THE FEDERAL ENERGY REGULATORY COM-**  
6 **MISSION.**

7 (a) IN GENERAL.—Section 401 of the Department of  
8 Energy Organization Act (42 U.S.C. 7171) is amended  
9 by adding at the end the following:

10 “(k) ADDRESSING INSUFFICIENT COMPENSATION OF  
11 EMPLOYEES AND OTHER PERSONNEL OF THE COMMIS-  
12 SION.—

13 “(1) IN GENERAL.—Notwithstanding any other  
14 provision of law, if the Chairman of the Commission  
15 publicly certifies that compensation for a category of  
16 employees or other personnel of the Commission is  
17 insufficient to retain or attract employees and other  
18 personnel to allow the Commission to carry out the  
19 functions of the Commission in a timely, efficient,  
20 and effective manner, the Chairman may fix the  
21 compensation for the category of employees or other  
22 personnel without regard to chapter 51 and sub-  
23 chapter III of chapter 53 of title 5, United States  
24 Code, or any other civil service law.

1           “(2) CERTIFICATION REQUIREMENTS.—A cer-  
2           tification issued under paragraph (1) shall—

3                   “(A) apply with respect to a category of  
4                   employees or other personnel responsible for  
5                   conducting work of a scientific, technological,  
6                   engineering, or mathematical nature;

7                   “(B) specify a maximum amount of rea-  
8                   sonable compensation for the category of em-  
9                   ployees or other personnel;

10                   “(C) be valid for a 5-year period beginning  
11                   on the date on which the certification is issued;

12                   “(D) be no broader than necessary to  
13                   achieve the objective of retaining or attracting  
14                   employees and other personnel to allow the  
15                   Commission to carry out the functions of the  
16                   Commission in a timely, efficient, and effective  
17                   manner; and

18                   “(E) include an explanation for why the  
19                   other approaches available to the Chairman for  
20                   retaining and attracting employees and other  
21                   personnel are inadequate.

22           “(3) RENEWAL.—

23                   “(A) IN GENERAL.—Not later than 90  
24                   days before the date of expiration of a certifi-  
25                   cation issued under paragraph (1), the Chair-



1 man shall determine whether the certification  
2 should be renewed for a subsequent 5-year pe-  
3 riod.

4 “(B) REQUIREMENT.—If the Chairman de-  
5 termines that a certification should be renewed  
6 under subparagraph (A), the Chairman may  
7 renew the certification, subject to the certifi-  
8 cation requirements under paragraph (2) that  
9 were applicable to the initial certification.

10 “(4) NEW HIRES.—

11 “(A) IN GENERAL.—An employee or other  
12 personnel that is a member of a category of em-  
13 ployees or other personnel that would have been  
14 covered by a certification issued under para-  
15 graph (1), but was hired during a period in  
16 which the certification has expired and has not  
17 been renewed under paragraph (3) shall not be  
18 eligible for compensation at the level that would  
19 have applied to the employee or other personnel  
20 if the certification had been in effect on the  
21 date on which the employee or other personnel  
22 was hired.

23 “(B) COMPENSATION OF NEW HIRES ON  
24 RENEWAL.—On renewal of a certification under  
25 paragraph (3), the Chairman may fix the com-

1           pensation of the employees or other personnel  
2           described in subparagraph (A) at the level es-  
3           tablished for the category of employees or other  
4           personnel in the certification.

5           “(5) RETENTION OF LEVEL OF FIXED COM-  
6           PENSATION.—A category of employees or other per-  
7           sonnel, the compensation of which was fixed by the  
8           Chairman in accordance with paragraph (1), may, at  
9           the discretion of the Chairman, have the level of  
10          fixed compensation for the category of employees or  
11          other personnel retained, regardless of whether a  
12          certification described under that paragraph is in ef-  
13          fect with respect to the compensation of the category  
14          of employees or other personnel.

15          “(6) CONSULTATION REQUIRED.—The Chair-  
16          man shall consult with the Director of the Office of  
17          Personnel Management in implementing this sub-  
18          section, including in the determination of the  
19          amount of compensation with respect to each cat-  
20          egory of employees or other personnel.

21          “(7) EXPERTS AND CONSULTANTS.—

22                  “(A) IN GENERAL.—Subject to subpara-  
23          graph (B), the Chairman may—

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1 “(i) obtain the services of experts and  
2 consultants in accordance with section  
3 3109 of title 5, United States Code;

4 “(ii) compensate those experts and  
5 consultants for each day (including travel  
6 time) at rates not in excess of the rate of  
7 pay for level IV of the Executive Schedule  
8 under section 5315 of that title; and

9 “(iii) pay to the experts and consult-  
10 ants serving away from the homes or reg-  
11 ular places of business of the experts and  
12 consultants travel expenses and per diem  
13 in lieu of subsistence at rates authorized  
14 by sections 5702 and 5703 of that title for  
15 persons in Government service employed  
16 intermittently.

17 “(B) LIMITATIONS.—The Chairman  
18 shall—

19 “(i) to the maximum extent prac-  
20 ticable, limit the use of experts and con-  
21 sultants pursuant to subparagraph (A);  
22 and

23 “(ii) ensure that the employment con-  
24 tract of each expert and consultant em-  
25 ployed pursuant to subparagraph (A) is

1                   subject to renewal not less frequently than  
2                   annually.”.

3           (b) REPORTS.—

4                   (1) IN GENERAL.—Not later than 1 year after  
5           the date of enactment of this Act, and every 2 years  
6           thereafter for 10 years, the Chairman of the Federal  
7           Energy Regulatory Commission shall submit to the  
8           Committee on Energy and Commerce of the House  
9           of Representatives and the Committee on Energy  
10          and Natural Resources of the Senate a report on in-  
11          formation relating to hiring, vacancies, and com-  
12          pensation at the Federal Energy Regulatory Com-  
13          mission.

14                  (2) INCLUSIONS.—Each report under para-  
15          graph (1) shall include—

16                          (A) an analysis of any trends with respect  
17                  to hiring, vacancies, and compensation at the  
18                  Federal Energy Regulatory Commission; and

19                          (B) a description of the efforts to retain  
20                  and attract employees or other personnel re-  
21                  sponsible for conducting work of a scientific,  
22                  technological, engineering, or mathematical na-  
23                  ture at the Federal Energy Regulatory Com-  
24                  mission.

1           (c) APPLICABILITY.—The amendment made by sub-  
2 section (a) shall apply beginning on the date that is 30  
3 days after the date of enactment of this Act.

4 **SEC. 11005. REPORT ON THE AUTHORITY OF THE SEC-**  
5 **RETARY OF ENERGY TO IMPLEMENT FLEXI-**  
6 **BLE COMPENSATION MODELS.**

7           Not later than 180 days after the date of enactment  
8 of this Act, the Secretary of Energy shall submit to Con-  
9 gress a report examining the full scope of the hiring au-  
10 thority made available to the Secretary of Energy by the  
11 Office of Personnel Management to implement flexible  
12 compensation models, including pay for performance and  
13 pay banding, throughout the Department of Energy, in-  
14 cluding at the National Laboratories, for the purposes of  
15 hiring, recruiting, and retaining employees responsible for  
16 conducting work of a scientific, technological, engineering,  
17 or mathematical nature.