

In the Senate of the United States,

July 27, 2022.

Resolved, That the Senate agree to the amendment of the House to the amendment of the Senate to the bill (H.R. 4346) entitled “An Act making appropriations for Legislative Branch for the fiscal year ending September 30, 2022, and for other purposes.”, do pass with the following

**SENATE AMENDMENT TO HOUSE AMENDMENT TO
SENATE AMENDMENT:**

In lieu of the matter proposed to be inserted by the amendment of the House to the amendment of the Senate, insert the following:

1 SECTION 1. TABLE OF CONTENTS.

2 *The table of contents for this Act is as follows:*

Sec. 1. Table of contents.

Sec. 2. References.

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Sec. 102. Creating helpful incentives to produce semiconductors (CHIPS) for America fund.

Sec. 103. Semiconductor incentives.

Sec. 104. Opportunity and inclusion.

Sec. 105. Additional GAO reporting requirements.

Sec. 106. Appropriations for wireless supply chain innovation.

Sec. 107. Advanced manufacturing investment credit.

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Sec. 10002. Definitions.
Sec. 10003. Budgetary effects.

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Sec. 10103. Biological and environmental research.
Sec. 10104. Advanced scientific computing research program.
Sec. 10105. Fusion energy research.
Sec. 10106. High energy physics program.
Sec. 10107. Nuclear physics program.
Sec. 10108. Science laboratories infrastructure program.
Sec. 10109. Accelerator research and development.
Sec. 10110. Isotope research, development, and production.
Sec. 10111. Increased collaboration with teachers and scientists.
Sec. 10112. High intensity laser research initiative; helium conservation program; Office of Science emerging biological threat preparedness research initiative; midscale instrumentation and research equipment program; authorization of appropriations.
Sec. 10113. Established program to stimulate competitive research.
Sec. 10114. Research security.

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- Sec. 10211. Authorization of appropriations.*

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Sec. 10222. Greenhouse gas measurement research.
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THREATS TO THE SUPREME COURT OF THE UNITED STATES***1 SEC. 2. REFERENCES.**

2 *Except as expressly provided otherwise, any reference*
 3 *to “this Act” contained in any division of this Act shall*
 4 *be treated as referring only to the provisions of that divi-*
 5 *sion.*

6 DIVISION A—CHIPS ACT OF 2022**7 SEC. 101. SHORT TITLE.**

8 *This division may be cited as the “CHIPS Act of*
 9 *2022”.*

10 SEC. 102. CREATING HELPFUL INCENTIVES TO PRODUCE
11 SEMICONDUCTORS (CHIPS) FOR AMERICA
12 FUND.

13 *(a) CHIPS FOR AMERICA FUND.—*

14 *(1) ESTABLISHMENT.—There is established in*
 15 *the Treasury of the United States a fund to be known*
 16 *as the “Creating Helpful Incentives to Produce Semi-*

1 *conductors (CHIPS) for America Fund” (referred to*
2 *in this subsection as the “Fund”) for the Secretary of*
3 *Commerce to carry out sections 9902, 9904, and 9906*
4 *of the William M. (Mac) Thornberry National Defense*
5 *Authorization Act for Fiscal Year 2021 (15 U.S.C.*
6 *4652, 4654, and 4656; Public Law 116–283).*
7 *Amounts in the Fund to carry out sections 9904 and*
8 *9906 of Public Law 116–283 shall be transferred to*
9 *and merged with accounts within the Department of*
10 *Commerce to be used for such purposes, except that*
11 *amounts transferred to carry out section 9904 of Pub-*
12 *lic Law 116–283 shall remain available until Sep-*
13 *tember 30, 2025.*

14 (2) *APPROPRIATION.—*

15 (A) *In addition to amounts otherwise avail-*
16 *able for such purposes, there is appropriated to*
17 *the Fund established in subsection (a)(1), out of*
18 *amounts in the Treasury not otherwise appro-*
19 *priated—*

20 (i) *for fiscal year 2022,*
21 *\$24,000,000,000, to remain available until*
22 *expended, of which \$19,000,000,000 shall be*
23 *for section 9902 of Public Law 116–283,*
24 *\$2,000,000,000 shall be for subsection (c) of*
25 *section 9906 of Public Law 116–283,*

1 \$2,500,000,000 shall be for subsection (d) of
2 section 9906 of Public Law 116–283, and
3 \$500,000,000 shall be for subsections (e) and
4 (f) of section 9906 of Public Law 116–283;
5 (ii) for fiscal year 2023,
6 \$7,000,000,000 to remain available until
7 expended, of which \$5,000,000,000 shall be
8 for section 9902 of Public Law 116–283 and
9 \$2,000,000,000 shall be for subsections (c),
10 (d), (e), and (f) of section 9906 of Public
11 Law 116–283;
12 (iii) for fiscal year 2024,
13 \$6,300,000,000, to remain available until
14 expended, of which \$5,000,000,000 shall be
15 for section 9902 of Public Law 116–283 and
16 \$1,300,000,000 shall be for subsections (c),
17 (d), (e), and (f) of section 9906 of Public
18 Law 116–283;
19 (iv) for fiscal year 2025,
20 \$6,100,000,000, to remain available until
21 expended, of which \$5,000,000,000 shall be
22 for section 9902 of Public Law 116–283 and
23 \$1,100,000,000 shall be for subsections (c),
24 (d), (e), and (f) of section 9906 of Public
25 Law 116–283; and

1 (v) for fiscal year 2026,
2 \$6,600,000,000, to remain available until
3 expended, of which \$5,000,000,000 shall be
4 for section 9902 of Public Law 116– 283
5 and \$1,600,000,000 shall be for subsections
6 (c), (d), (e), and (f) of section 9906 of Pub-
7 lic Law 116–283.

8 (B) *DIRECT LOANS AND LOAN GUARAN-*
9 *TEES.—The Secretary of Commerce may use—*

10 (i) up to \$6,000,000,000 of the
11 amounts made available for fiscal year 2022
12 for section 9902 of Public Law 116–283 for
13 the cost of direct loans and loan guarantees,
14 as authorized by section 9902 of Public Law
15 116–283, provided that—

16 (I) such costs, including the cost
17 of modifying such loans and loan guar-
18 antees shall be as defined in section
19 502 of the Congressional Budget Act of
20 1974; and

21 (II) these funds are available to
22 subsidize gross obligations for the prin-
23 cipal amount of direct loans and total
24 loan principal, any part of which is to

1 *be guaranteed, not to exceed*
2 *\$75,000,000,000;*

3 *(ii) up to 2 percent of the amounts*
4 *made available in each fiscal year for sala-*
5 *ries and expenses, administration, and over-*
6 *sight purposes to carry out sections 9902*
7 *and 9906 of Public Law 116–283, of which*
8 *\$5,000,000 in each of fiscal years 2022*
9 *through 2026 shall be transferred to the Of-*
10 *fice of Inspector General of the Department*
11 *of Commerce to oversee expenditures from*
12 *the Fund; and*

13 *(iii) up to \$2,300,000 of the amounts*
14 *made available in fiscal year 2022 to carry*
15 *out section 9904 of Public Law 116–283.*

16 (3) *ASSISTANCE FOR MATURE TECHNOLOGY*
17 *NODES.—Of the amount available in fiscal year 2022*
18 *to implement section 9902 of the William M. (Mac)*
19 *Thornberry National Defense Authorization Act for*
20 *Fiscal Year 2021 (15 U.S.C. 4652), \$2,000,000,000*
21 *shall be to provide Federal financial assistance to cov-*
22 *ered entities to incentivize investment in facilities*
23 *and equipment in the United States for the fabrica-*
24 *tion, assembly, testing, or packaging of semiconduc-*

1 *tors at mature technology nodes under subsection (e)*
2 *of that section, as added by section 103 of this Act.*

3 (4) *ALLOCATION AUTHORITY.—*

4 (A) *SUBMISSION OF COST ESTIMATES.—The*
5 *President shall submit to Congress detailed ac-*
6 *count, program, and project allocations of the*
7 *full amount made available under subsection*
8 *(a)(2)—*

9 (i) *for fiscal years 2022 and 2023, not*
10 *later than 60 days after the date of enact-*
11 *ment of this Act; and*

12 (ii) *for each subsequent fiscal year*
13 *through 2026, as part of the annual budget*
14 *submission of the President under section*
15 *1105(a) of title 31, United States Code.*

16 (B) *ALTERNATE ALLOCATION.—*

17 (i) *IN GENERAL.—The Committees on*
18 *Appropriations of the House of Representa-*
19 *tives and the Senate may provide for alter-*
20 *nate allocation of amounts made available*
21 *under subsection (a)(2), including by ac-*
22 *count, program, and project.*

23 (ii) *ALLOCATION BY PRESIDENT.—*

24 (I) *NO ALTERNATE ALLOCA-*
25 *TIONS.—If Congress has not enacted*

1 *legislation establishing alternate allo-*
2 *cations, including by account, pro-*
3 *gram, and project, by the date on*
4 *which the Act making full-year appro-*
5 *priations for the Departments of Com-*
6 *merce and Justice, Science, and Re-*
7 *lated Agencies for the applicable fiscal*
8 *year is enacted into law, only then*
9 *shall amounts made available under*
10 *subsection (a)(2) be allocated by the*
11 *President or apportioned or allotted by*
12 *account, program, and project pursu-*
13 *ant to title 31, United States Code.*

14 (II) *INSUFFICIENT ALTERNATE*
15 *ALLOCATION.—If Congress enacts legis-*
16 *lation establishing alternate alloca-*
17 *tions, including by account, program,*
18 *and project, for amounts made avail-*
19 *able under subsection (a)(2) that are*
20 *less than the full amount appropriated*
21 *under that subsection, the difference be-*
22 *tween the amount appropriated and*
23 *the alternate allocation shall be allo-*
24 *cated by the President and apportioned*
25 *and allotted by account, program, and*

1 *project pursuant to title 31, United*
2 *States Code.*

3 *(b) CHIPS FOR AMERICA DEFENSE FUND.—*

4 *(1) ESTABLISHMENT.—There is established in*
5 *the Treasury of the United States a fund to be known*
6 *as the “Creating Helpful Incentives to Produce Semi-*
7 *conductors (CHIPS) for America Defense Fund” (re-*
8 *ferred to in this subsection as the “Fund”)* *to provide*
9 *for those requirements that are necessary to carry out*
10 *section 9903(b) of the William M. (Mac) Thornberry*
11 *National Defense Authorization Act for Fiscal Year*
12 *2021 (15 U.S.C. 4653(b)). Amounts in the Fund shall*
13 *be transferred to and merged with accounts within the*
14 *Department of Defense to be used for such purposes.*
15 *Amounts in the Fund or transferred to and merged*
16 *with accounts within the Department of Defense may*
17 *not be used for construction of facilities.*

18 *(2) APPROPRIATION.—In addition to amounts*
19 *otherwise available for such purposes, there is appro-*
20 *priated to the Fund established in subsection (b)(1),*
21 *out of amounts in the Treasury not otherwise appro-*
22 *priated—*

23 *(A) for fiscal year 2023, \$400,000,000, to*
24 *remain available until September 30, 2023;*

1 (B) for fiscal year 2024, \$400,000,000, to
2 remain available until September 30, 2024;

3 (C) for fiscal year 2025, \$400,000,000, to
4 remain available until September 30, 2025;

5 (D) for fiscal year 2026, \$400,000,000, to
6 remain available until September 30, 2026; and

7 (E) for fiscal year 2027, \$400,000,000, to
8 remain available until September 30, 2027.

9 (3) ALLOCATION AUTHORITY.—

10 (A) SUBMISSION OF COST ESTIMATES.—The
11 President shall submit to Congress detailed ac-
12 count, program element, and project allocations
13 of the full amount made available under sub-
14 section (b)(2)—

15 (i) for fiscal year 2023, not later than
16 60 days after the date of enactment of this
17 Act; and

18 (ii) for each subsequent fiscal year
19 through 2027, as part of the annual budget
20 submission of the President under section
21 1105(a) of title 31, United States Code.

22 (B) ALTERNATE ALLOCATION.—

23 (i) IN GENERAL.—The Committees on
24 Appropriations of the House of Representa-
25 tives and the Senate may provide for alter-

1 *nate allocation of amounts made available*
2 *under subsection (b)(2), including by ac-*
3 *count, program element, and project.*

4 *(ii) ALLOCATION BY PRESIDENT.—*

5 *(I) NO ALTERNATE ALLOCA-*
6 *TIONS.—If Congress has not enacted*
7 *legislation establishing alternate allo-*
8 *cations, including by account, program*
9 *element, and project, by the date on*
10 *which the Act making full-year appro-*
11 *priations for the Department of De-*
12 *fense for the applicable fiscal year is*
13 *enacted into law, only then shall*
14 *amounts made available under sub-*
15 *section (b)(2) be allocated by the Presi-*
16 *dent or apportioned or allotted by ac-*
17 *count, program element, and project*
18 *pursuant to title 31, United States*
19 *Code.*

20 *(II) INSUFFICIENT ALTERNATE*
21 *ALLOCATION.—If Congress enacts legis-*
22 *lation establishing alternate alloca-*
23 *tions, including by account, program*
24 *element, and project, for amounts made*
25 *available under subsection (b)(2) that*

1 are less than the full amount appro-
2 priated under that subsection, the dif-
3 ference between the amount appro-
4 priated and the alternate allocation
5 shall be allocated by the President and
6 apportioned and allotted by account,
7 program element, and project pursuant
8 to title 31, United States Code.

9 (c) *CHIPS FOR AMERICA INTERNATIONAL TECH-*
10 *NOLOGY SECURITY AND INNOVATION FUND.*—

11 (1) *ESTABLISHMENT.*—*There is established in*
12 *the Treasury of the United States a fund to be known*
13 *as the “Creating Helpful Incentives to Produce Semi-*
14 *conductors (CHIPS) for America International Tech-*
15 *nology Security and Innovation Fund” (referred to in*
16 *this subsection as the “Fund”) to provide for inter-*
17 *national information and communications technology*
18 *security and semiconductor supply chain activities,*
19 *including to support the development and adoption of*
20 *secure and trusted telecommunications technologies,*
21 *secure semiconductors, secure semiconductors supply*
22 *chains, and other emerging technologies and to carry*
23 *out sections 9905 and 9202(a)(2) of the William M.*
24 *(Mac) Thornberry National Defense Authorization Act*
25 *for Fiscal Year 2021 (15 U.S.C. 4655 and 47 U.S.C.*

1 906(a)(2)), as appropriate. Amounts in the Fund
2 shall be transferred by the Secretary of State to ac-
3 counts within the Department of State, the United
4 States Agency for International Development, the Ex-
5 port-Import Bank, and the United States Inter-
6 national Development Finance Corporation, as ap-
7 propriate, to be used for such purposes and under the
8 terms and conditions of the account to which trans-
9 ferred.

10 (2) APPROPRIATION.—

11 (A) In addition to amounts otherwise avail-
12 able for such purposes, there is appropriated to
13 the Fund established in subsection (c)(1), out of
14 amounts in the Treasury not otherwise appro-
15 priated—

16 (i) for fiscal year 2023, \$100,000,000,
17 to remain available until September 30,
18 2027;

19 (ii) for fiscal year 2024, \$100,000,000,
20 to remain available until September 30,
21 2028;

22 (iii) for fiscal year 2025, \$100,000,000,
23 to remain available until September 30,
24 2029;

1 (iv) for fiscal year 2026, \$100,000,000,
2 to remain available until September 30,
3 2030; and

4 (v) for fiscal year 2027, \$100,000,000,
5 to remain available until September 30,
6 2031.

7 (B) *USE.*—In carrying out this subsection,
8 the Secretary of State may use up to \$5,000,000
9 of the amounts made available in each fiscal
10 year for the Fund for salaries and expenses, ad-
11 ministration, and oversight purposes, of which
12 \$500,000 in each of fiscal years 2023 through
13 2027 shall be transferred to the Office of Inspec-
14 tor General of the Department of State to oversee
15 expenditures under the Fund.

16 (3) *ALLOCATION AUTHORITY.*—

17 (A) *SUBMISSION OF COST ESTIMATES.*—The
18 President shall submit to Congress detailed ac-
19 count, program, project, and activity allocations
20 of the full amount made available under sub-
21 section (c)(2)—

22 (i) for fiscal year 2023, not later than
23 90 days after the date of enactment of this
24 Act; and

1 (ii) for each subsequent fiscal year
2 through 2027, as part of the annual budget
3 submission of the President under section
4 1105(a) of title 31, United States Code.

5 (B) ALTERNATE ALLOCATION.—

6 (i) IN GENERAL.—The Committees on
7 Appropriations of the House of Representa-
8 tives and the Senate may provide for alter-
9 nate allocation of amounts made available
10 under subsection (c)(2), including by ac-
11 count, program, project, and activity.

12 (ii) ALLOCATION BY PRESIDENT.—

13 (I) NO ALTERNATE ALLOCA-
14 TIONS.—If Congress has not enacted
15 legislation establishing alternate allo-
16 cations, including by account, pro-
17 gram, project, and activity, by the date
18 on which the Act making full-year ap-
19 propriations for the Department of
20 State, Foreign Operations, and Related
21 Programs for the applicable fiscal year
22 is enacted into law, only then shall
23 amounts made available under sub-
24 section (c)(2) be allocated by the Presi-
25 dent or apportioned or allotted by ac-

1 *count, program, project, and activity*
2 *pursuant to title 31, United States*
3 *Code.*

4 (II) *INSUFFICIENT ALTERNATE*
5 *ALLOCATION.—If Congress enacts legis-*
6 *lation establishing alternate alloca-*
7 *tions, including by account, program,*
8 *project, and activity, for amounts*
9 *made available under subsection (c)(2)*
10 *that are less than the full amount ap-*
11 *propriated under that subsection, the*
12 *difference between the amount appro-*
13 *priated and the alternate allocation*
14 *shall be allocated by the President and*
15 *apportioned and allotted by account,*
16 *program, project, and activity pursu-*
17 *ant to title 31, United States Code.*

18 (d) *CREATING HELPFUL INCENTIVES TO PRODUCE*
19 *SEMICONDUCTORS (CHIPS) FOR AMERICA WORKFORCE*
20 *AND EDUCATION FUND.—*

21 (1) *ESTABLISHMENT.—There is established in*
22 *the Treasury of the United States a fund to be known*
23 *as the “Creating Helpful Incentives to Produce Semi-*
24 *conductors (CHIPS) for America Workforce and Edu-*
25 *cation Fund” (referred to in this subsection as the*

1 “Fund”) for the National Science Foundation for
2 microelectronics workforce development activities to
3 meet the requirements under section 9906 of the Wil-
4 liam M. (Mac) Thornberry National Defense Author-
5 ization Act for Fiscal Year 2021 (15 U.S.C. 4656).

6 (2) *APPROPRIATION.*—In addition to amounts
7 otherwise available for such purposes, there is appro-
8 priated to the Fund established in subsection (d)(1),
9 out of amounts in the Treasury not otherwise appro-
10 priated—

11 (A) for fiscal year 2023, \$25,000,000, to re-
12 main available until expended;

13 (B) for fiscal year 2024, \$25,000,000, to re-
14 main available until expended;

15 (C) for fiscal year 2025, \$50,000,000, to re-
16 main available until expended;

17 (D) for fiscal year 2026, \$50,000,000, to re-
18 main available until expended; and

19 (E) for fiscal year 2027, \$50,000,000, to re-
20 main available until expended.

21 (3) *ALLOCATION AUTHORITY.*—

22 (A) *SUBMISSION OF COST ESTIMATES.*—The
23 President shall submit to Congress detailed ac-
24 count, program, and project allocations of the

1 *full amount made available under paragraph*
2 *(2)—*

3 *(i) for fiscal year 2023, not later than*
4 *60 days after the date of enactment of this*
5 *Act; and*

6 *(ii) for each subsequent fiscal year*
7 *through 2027, as part of the annual budget*
8 *submission of the President under section*
9 *1105(a) of title 31, United States Code.*

10 *(B) ALTERNATE ALLOCATION.—*

11 *(i) IN GENERAL.—The Committees on*
12 *Appropriations of the House of Representa-*
13 *tives and the Senate may provide for alter-*
14 *nate allocation of amounts made available*
15 *under paragraph (2), including by account,*
16 *program, and project.*

17 *(ii) ALLOCATION BY PRESIDENT.—*

18 *(I) NO ALTERNATE ALLOCA-*
19 *TIONS.—If Congress has not enacted*
20 *legislation establishing alternate allo-*
21 *cations, including by account, pro-*
22 *gram, and project, by the date on*
23 *which the Act making full-year appro-*
24 *priations for the Departments of Com-*
25 *merce and Justice, Science, and Re-*

1 *lated Agencies for the applicable fiscal*
2 *year is enacted into law, only then*
3 *shall amounts made available under*
4 *subsection (d)(2) be allocated by the*
5 *President or apportioned or allotted by*
6 *account, program, and project pursu-*
7 *ant to title 31, United States Code.*

8 (II) *INSUFFICIENT ALTERNATE*
9 *ALLOCATION.—If Congress enacts legis-*
10 *lation establishing alternate alloca-*
11 *tions, including by account, program,*
12 *and project, for amounts made avail-*
13 *able under subsection (d)(2) that are*
14 *less than the full amount appropriated*
15 *under that subsection, the difference be-*
16 *tween the amount appropriated and*
17 *the alternate allocation shall be allo-*
18 *cated by the President and apportioned*
19 *and allotted by account, program, and*
20 *project pursuant to title 31, United*
21 *States Code.*

22 (e) *SEQUESTRATION.—Section 255(g)(1)(A) of the Bal-*
23 *anced Budget and Emergency Deficit Control Act of 1985*
24 *(2 U.S.C. 905(g)(1)(A)) is amended by inserting after*

1 “Continuing Fund, Southwestern Power Administration
2 (89–5649–0–2–271).” the following:

3 “Creating Helpful Incentives to Produce
4 Semiconductors (CHIPS) for America Fund.

5 “Creating Helpful Incentives to Produce
6 Semiconductors (CHIPS) for America Defense
7 Fund.

8 “Creating Helpful Incentives to Produce
9 Semiconductors (CHIPS) for America Inter-
10 national Technology Security and Innovation
11 Fund.

12 “Creating Helpful Incentives to Produce
13 Semiconductors (CHIPS) for America Workforce
14 and Education Fund”.

15 (f) BUDGETARY EFFECTS.—

16 (1) STATUTORY PAYGO SCORECARDS.—The budg-
17 etary effects of this section shall not be entered on ei-
18 ther PAYGO scorecard maintained pursuant to sec-
19 tion 4(d) of the Statutory Pay-As-You-Go Act of 2010
20 (2 U.S.C. 933(d)).

21 (2) SENATE PAYGO SCORECARDS.—The budg-
22 etary effects of this section shall not be entered on any
23 PAYGO scorecard maintained for purposes of section
24 4106 of H. Con. Res. 71 (115th Congress).

1 (3) *CLASSIFICATION OF BUDGETARY EFFECTS.*—
2 *Notwithstanding Rule 3 of the Budget Scorekeeping*
3 *Guidelines set forth in the joint explanatory statement*
4 *of the committee of conference accompanying Con-*
5 *ference Report 105–217 and section 250(c)(8) of the*
6 *Balanced Budget and Emergency Deficit Control Act*
7 *of 1985, the budgetary effects of this section shall not*
8 *be estimated—*

9 (A) *for purposes of section 251 of such Act;*

10 (B) *for purposes of an allocation to the*
11 *Committee on Appropriations pursuant to sec-*
12 *tion 302(a) of the Congressional Budget Act of*
13 *1974; and*

14 (C) *for purposes of paragraph (4)(C) of sec-*
15 *tion 3 of the Statutory Pay-As-You-Go Act of*
16 *2010 as being included in an appropriation Act.*

17 (g) *LIMITATION ON USING AMOUNTS FOR STOCK*
18 *BUYBACKS OR THE PAYMENT OF DIVIDENDS.*—

19 (1) *IN GENERAL.*—*A person receiving amounts*
20 *appropriated under this section or from a covered*
21 *fund may not use such amounts, as determined using*
22 *the criteria for eligible uses of amounts under sections*
23 *9902(a)(4) and 9905(a)(4) of the William M. (Mac)*
24 *Thornberry National Defense Authorization Act for*
25 *Fiscal Year 2021 (15 U.S.C. 4652(a)(4), 15 U.S.C.*

1 4655(a)(4)), the activities under section 9903(b) of
2 such Act (15 U.S.C. 4653(b)), and the functions under
3 9906(c)(2) of such Act (15 U.S.C. 4656(c)(2)) —

4 (A) to purchase an equity security that is
5 listed on a national securities exchange of such
6 person or any parent company of such person; or

7 (B) to pay dividends or make other capital
8 distributions with respect to the common stock
9 (or equivalent interest) of the person.

10 (2) COVERED FUND.—In this subsection, the
11 term “covered fund” means—

12 (A) the Creating Helpful Incentives to
13 Produce Semiconductors (CHIPS) for America
14 Fund;

15 (B) the Creating Helpful Incentives to
16 Produce Semiconductors (CHIPS) for America
17 Defense Fund;

18 (C) the Creating Helpful Incentives to
19 Produce Semiconductors (CHIPS) for America
20 International Technology Security and Innova-
21 tion Fund; and

22 (D) the Creating Helpful Incentives to
23 Produce Semiconductors (CHIPS) for America
24 Workforce and Education Fund.

1 **SEC. 103. SEMICONDUCTOR INCENTIVES.**

2 (a) *DEFINITIONS.*—Section 9901 of the William M.
3 (Mac) Thornberry National Defense Authorization Act for
4 Fiscal Year 2021 (15 U.S.C. 4651) is amended—

5 (1) in paragraph (2)—

6 (A) by striking “a private entity, a consor-
7 tium of private entities, or a consortium of pub-
8 lic and private entities” and inserting “a non-
9 profit entity, a private entity, a consortium of
10 private entities, or a consortium of nonprofit,
11 public, and private entities”;

12 (B) by inserting “production,” before “or
13 research and development”; and

14 (C) by striking “of semiconductors.” and
15 inserting “of semiconductors, materials used to
16 manufacture semiconductors, or semiconductor
17 manufacturing equipment.”;

18 (2) by redesignating paragraphs (5), (6), (7),
19 (8), and (9) as paragraphs (6), (8), (9), (12), and
20 (13), respectively;

21 (3) by inserting after paragraph (4), the fol-
22 lowing:

23 “(5) The term ‘critical manufacturing indus-
24 try’—

1 “(A) means an industry, industry group, or
2 a set of related industries or related industry
3 groups—

4 “(i) assigned a North American Indus-
5 try Classification System code beginning
6 with 31, 32, or 33; and

7 “(ii) for which the applicable industry
8 group or groups in the North American In-
9 dustry Classification System code cumula-
10 tively—

11 “(I) manufacture primary prod-
12 ucts and parts, the sum of which ac-
13 count for not less than 5 percent of the
14 manufacturing value added by indus-
15 try gross domestic product of the
16 United States; and

17 “(II) employ individuals for pri-
18 mary products and parts manufac-
19 turing activities that, combined, ac-
20 count for not less than 5 percent of
21 manufacturing employment in the
22 United States; and

23 “(B) may include any other manufacturing
24 industry designated by the Secretary based on
25 the relevance of the manufacturing industry to

1 *the national and economic security of the United*
2 *States, including the impacts of job losses.”; and*
3 *(4) by inserting after paragraph (6), as so redesi-*
4 *gnated, the following:*

5 “(7) *The term ‘foreign country of concern’*
6 *means—*

7 “(A) *a country that is a covered nation (as*
8 *defined in section 4872(d) of title 10 United*
9 *States Code); and*

10 “(B) *any country that the Secretary, in*
11 *consultation with the Secretary of Defense, the*
12 *Secretary of State, and the Director of National*
13 *Intelligence, determines to be engaged in conduct*
14 *that is detrimental to the national security or*
15 *foreign policy of the United States.”; and*

16 *(5) by inserting after paragraph (9), as so redesi-*
17 *gnated, the following:*

18 “(10) *The term ‘mature technology node’ has the*
19 *meaning given the term by the Secretary.*

20 “(11) *The term ‘nonprofit entity’ means an enti-*
21 *ty described in section 501(c)(3) of the Internal Rev-*
22 *enue Code of 1986 and exempt from taxation under*
23 *section 501(a) of such Code.”.*

24 *(b) SEMICONDUCTOR PROGRAM.—Section 9902 of the*
25 *William M. (Mac) Thornberry National Defense Authoriza-*

1 *tion Act for Fiscal Year 2021 (15 U.S.C. 4652) is amend-*
2 *ed—*

3 *(1) in subsection (a)(1)—*

4 *(A) by striking “for semiconductor fabrica-*
5 *tion” and inserting “for the fabrication”;*

6 *(B) by inserting “production,” before “or*
7 *research and development”; and*

8 *(C) by striking the period at the end and*
9 *inserting “of semiconductors, materials used to*
10 *manufacture semiconductors, or semiconductor*
11 *manufacturing equipment.”; and*

12 *(2) in subsection (a)(2)—*

13 *(A) in subparagraph (B)(i), by striking “;*
14 *and” at the end;*

15 *(B) in subparagraph (B)(ii)—*

16 *(i) in subclause (III), by striking*
17 *“and” at the end;*

18 *(ii) in subclause (IV), by striking the*
19 *period at the end and inserting a semicolon;*
20 *and*

21 *(iii) by adding at the end the fol-*
22 *lowing:*

23 *“(V) determined—*

24 *“(aa) the type of semicon-*
25 *ductor technology, equipment, ma-*

1 *materials, or research and develop-*
2 *ment the covered entity will*
3 *produce at the facility described*
4 *in clause (i); and*

5 *“(bb) the customers, or cat-*
6 *egories of customers, to which the*
7 *covered entity plans to sell the*
8 *semiconductor technology, equip-*
9 *ment, materials, or research and*
10 *development described in item*
11 *(aa); and*

12 *“(VI) documented, to the extent*
13 *practicable, workforce needs and devel-*
14 *oped a strategy to meet such workforce*
15 *needs consistent with the commitments*
16 *described in subclauses (II) and*
17 *(III);”;* and

18 *(C) by inserting after subparagraph (B)(ii)*

19 *the following—*

20 *“(iii) with respect to the project de-*
21 *scribed in clause (i), the covered entity has*
22 *an executable plan to identify and mitigate*
23 *relevant semiconductor supply chain secu-*
24 *rity risks, such as risks associated with ac-*
25 *cess, availability, confidentiality, integrity,*

1 *and a lack of geographic diversification in*
2 *the covered entity’s supply chain; and*

3 *“(iv) with respect to any project for the*
4 *production, assembly, or packaging of semi-*
5 *conductors, the covered entity has imple-*
6 *mented policies and procedures to combat*
7 *cloning, counterfeiting, and relabeling of*
8 *semiconductors, as applicable.”;*

9 *(D) in subparagraph (C)—*

10 *(i) in clause (i)—*

11 *(I) in subclause (II), by striking*
12 *“is in the interest of the United*
13 *States” and inserting “is in the eco-*
14 *nomical and national security interests*
15 *of the United States”; and*

16 *(II) in subclause (III), by striking*

17 *“and” at the end;*

18 *(ii) in clause (ii)(IV), by striking*
19 *“and” at the end;*

20 *(iii) by redesignating clause (iii) as*
21 *clause (v); and*

22 *(iv) by inserting after clause (ii) the*
23 *following:*

24 *“(iii) the Secretary shall consider the*
25 *type of semiconductor technology produced*

1 *by the covered entity and whether that semi-*
2 *conductor technology advances the economic*
3 *and national security interests of the*
4 *United States;*

5 *“(iv) the Secretary may not approve*
6 *an application, unless the covered entity*
7 *provides a plan that does not use Federal fi-*
8 *nancial assistance to assist efforts to phys-*
9 *ically relocate existing facility infrastruc-*
10 *ture to another jurisdiction within the*
11 *United States, unless the project is in the*
12 *interest of the United States; and”;*

13 *(E) by redesignating subparagraph (D) as*
14 *subparagraph (E); and*

15 *(F) by inserting after subparagraph (C) the*
16 *following:*

17 *“(D) PRIORITY.—In awarding Federal fi-*
18 *nancial assistance to covered entities under this*
19 *subsection, the Secretary shall—*

20 *“(i) give priority to ensuring that a*
21 *covered entity receiving financial assistance*
22 *will—*

23 *“(I) manufacture semiconductors*
24 *necessary to address gaps and*
25 *vulnerabilities in the domestic supply*

1 *chain across a diverse range of tech-*
2 *nology and process nodes; and*

3 “*(II) provide a secure supply of*
4 *semiconductors necessary for the na-*
5 *tional security, manufacturing, critical*
6 *infrastructure, and technology leader-*
7 *ship of the United States and other es-*
8 *sential elements of the economy of the*
9 *United States; and*

10 “*(i) ensure that the assistance is*
11 *awarded to covered entities for both ad-*
12 *vanced and mature technology nodes to meet*
13 *the priorities described in clause (i).”;*

14 (3) *in subsection (a)(4)(A), by striking “used for*
15 *semiconductors” and inserting “used for the pur-*
16 *poses”;*

17 (4) *in subsection (a)(5)—*

18 (A) *in subparagraph (A), by striking*
19 “*major*”;

20 (B) *in subparagraph (D), by striking*
21 “*major*”; and

22 (C) *in subparagraph (E)(i), by striking*
23 “*major*”;

24 (5) *by inserting after subsection (a)(5) the fol-*
25 *lowing:*

1 “(6) *EXPANSION CLAWBACK.*—

2 “(A) *DEFINITION OF LEGACY SEMICON-*
3 *DUCTOR.*—

4 “(i) *IN GENERAL.*—*In this paragraph,*
5 *the term ‘legacy semiconductor’—*

6 “(I) *includes—*

7 “(aa) *a semiconductor tech-*
8 *nology that is of the 28 nanometer*
9 *generation or older for logic;*

10 “(bb) *with respect to memory*
11 *technology, analog technology,*
12 *packaging technology, and any*
13 *other relevant technology, any leg-*
14 *acy generation of semiconductor*
15 *technology relative to the genera-*
16 *tion described in item (aa), as de-*
17 *termined by the Secretary, in con-*
18 *sultation with the Secretary of*
19 *Defense and the Director of Na-*
20 *tional Intelligence; and*

21 “(cc) *any additional semi-*
22 *conductor technology identified by*
23 *the Secretary in a public notice*
24 *issued under clause (i); and*

1 “(II) does not include a semicon-
2 ductor that is critical to national secu-
3 rity, as determined by the Secretary,
4 in consultation with the Secretary of
5 Defense and the Director of National
6 Intelligence.

7 “(ii) *UPDATES.*—Not later than 2
8 years after the date of enactment of the
9 CHIPS Act of 2022, and not less frequently
10 than once every 2 years thereafter for the 8-
11 year period after the last award under this
12 section is made, the Secretary, after public
13 notice and an opportunity for comment and
14 if applicable and necessary, shall issue a
15 public notice identifying any additional
16 semiconductor technology included in the
17 meaning of the term ‘legacy semiconductor’
18 under clause (i).

19 “(iii) *FUNCTIONS OF THE SEC-*
20 *RETARY.*—The functions of the Secretary
21 under this paragraph shall not be subject to
22 sections 551, 553 through 559, and 701
23 through 706 of title 5, United States Code.

24 “(iv) *CONSULTATION.*—In carrying out
25 clause (ii), the Secretary shall consult with

1 *the Director of National Intelligence and the*
2 *Secretary of Defense.*

3 “(v) *CONSIDERATIONS.—In carrying*
4 *out clause (ii), the Secretary shall con-*
5 *sider—*

6 “(I) *state-of-the-art semiconductor*
7 *technologies in the United States and*
8 *internationally, including in foreign*
9 *countries of concern; and*

10 “(II) *consistency with export con-*
11 *trols relating to semiconductors.*

12 “(B) *DEFINITION OF SEMICONDUCTOR MAN-*
13 *UFACTURING.—In this paragraph, the term*
14 *‘semiconductor manufacturing’—*

15 “(i) *has the meaning given the term by*
16 *the Secretary, in consultation with the Sec-*
17 *retary of Defense and the Director of Na-*
18 *tional Intelligence; and*

19 “(ii) *includes front-end semiconductor*
20 *fabrication.*

21 “(C) *REQUIRED AGREEMENT.—*

22 “(i) *IN GENERAL.—On or before the*
23 *date on which the Secretary awards Federal*
24 *financial assistance to a covered entity*
25 *under this section, the covered entity shall*

1 *enter into an agreement with the Secretary*
2 *specifying that, during the 10-year period*
3 *beginning on the date of the award, subject*
4 *to clause (ii), the covered entity may not*
5 *engage in any significant transaction, as*
6 *defined in the agreement, involving the ma-*
7 *terial expansion of semiconductor manufac-*
8 *turing capacity in the People’s Republic of*
9 *China or any other foreign country of con-*
10 *cern.*

11 *“(ii) EXCEPTIONS.—The prohibition in*
12 *the agreement required under clause (i)*
13 *shall not apply to—*

14 *“(I) existing facilities or equip-*
15 *ment of a covered entity for manufac-*
16 *turing legacy semiconductors; or*

17 *“(II) significant transactions in-*
18 *volving the material expansion of semi-*
19 *conductor manufacturing capacity*
20 *that—*

21 *“(aa) produces legacy semi-*
22 *conductors; and*

23 *“(bb) predominately serves*
24 *the market of a foreign country of*
25 *concern.*

1 “(iii) *AFFILIATED GROUP.*—For the
2 purpose of applying the requirements in an
3 agreement required under clause (i), a cov-
4 ered entity shall include the covered entity
5 receiving financial assistance under this
6 section, as well as any member of the cov-
7 ered entity’s affiliated group under section
8 1504(a) of the Internal Revenue Code of
9 1986, without regard to section 1504(b)(3)
10 of such Code.

11 “(D) *NOTIFICATION REQUIREMENTS.*—Dur-
12 ing the applicable term of the agreement of a
13 covered entity required under subparagraph
14 (C)(i), the covered entity shall notify the Sec-
15 retary of any planned significant transactions of
16 the covered entity involving the material expan-
17 sion of semiconductor manufacturing capacity in
18 the People’s Republic of China or any other for-
19 eign country of concern.

20 “(E) *VIOLATION OF AGREEMENT.*—

21 “(i) *NOTIFICATION TO COVERED ENTI-*
22 *TIES.*—Not later than 90 days after the date
23 of receipt of a notification described in sub-
24 paragraph (D) from a covered entity, the
25 Secretary, in consultation with the Sec-

1 *retary of Defense and the Director of Na-*
2 *tional Intelligence, shall—*

3 *“(I) determine whether the signifi-*
4 *cant transaction described in the noti-*
5 *fication would be a violation of the*
6 *agreement of the covered entity re-*
7 *quired under subparagraph (C)(i); and*

8 *“(II) notify the covered entity of*
9 *the Secretary’s decision under sub-*
10 *clause (I).*

11 *“(ii) OPPORTUNITY TO REMEDY.—*
12 *Upon a notification under clause (i)(II)*
13 *that a planned significant transaction of a*
14 *covered entity is a violation of the agree-*
15 *ment of the covered entity required under*
16 *subparagraph (C)(i), the Secretary shall—*

17 *“(I) immediately request from the*
18 *covered entity tangible proof that the*
19 *planned significant transaction has*
20 *ceased or been abandoned; and*

21 *“(II) provide the covered entity 45*
22 *days to produce and provide to the*
23 *Secretary the tangible proof described*
24 *in subclause (I).*

1 “(iii) *FAILURE BY THE COVERED ENTI-*
2 *TY TO CEASE OR REMEDY THE ACTIVITY.—*
3 *Subject to clause (iv), if a covered entity*
4 *fails to remedy a violation as set forth*
5 *under clause (ii), the Secretary shall recover*
6 *the full amount of the Federal financial as-*
7 *sistance provided to the covered entity*
8 *under this section.*

9 “(iv) *MITIGATION.—If the Secretary,*
10 *in consultation with the Secretary of De-*
11 *fense and the Director of National Intel-*
12 *ligence, determines that a covered entity*
13 *planning a significant transaction that*
14 *would violate the agreement required under*
15 *subparagraph (C)(i) could take measures in*
16 *connection with the transaction to mitigate*
17 *any risk to national security, the Sec-*
18 *retary—*

19 “(I) *may negotiate, enter into,*
20 *and enforce any agreement or condi-*
21 *tion for the mitigation; and,*

22 “(II) *waive the recovery require-*
23 *ment under clause (iii).*

24 “(F) *SUBMISSION OF RECORDS.—*

1 “(i) *IN GENERAL.*—*The Secretary may*
2 *request from a covered entity records and*
3 *other necessary information to review the*
4 *compliance of the covered entity with the*
5 *agreement required under subparagraph*
6 *(C)(i).*

7 “(ii) *ELIGIBILITY.*—*In order to be eli-*
8 *gible for Federal financial assistance under*
9 *this section, a covered entity shall agree to*
10 *provide records and other necessary infor-*
11 *mation requested by the Secretary under*
12 *clause (i).*

13 “(G) *CONFIDENTIALITY OF RECORDS.*—

14 “(i) *IN GENERAL.*—*Subject to clause*
15 *(ii), any information derived from records*
16 *or necessary information disclosed by a cov-*
17 *ered entity to the Secretary under this sec-*
18 *tion—*

19 “(I) *shall be exempt from disclo-*
20 *sure under section 552(b)(3) of title 5,*
21 *United States Code; and*

22 “(II) *shall not be made public.*

23 “(ii) *EXCEPTIONS.*—*Clause (i) shall*
24 *not prevent the disclosure of any of the fol-*
25 *lowing by the Secretary:*

1 “(I) Information relevant to any
2 administrative or judicial action or
3 proceeding.

4 “(II) Information that a covered
5 entity has consented to be disclosed to
6 third parties.

7 “(III) Information necessary to
8 fulfill the requirement of the congres-
9 sional notification under subparagraph
10 (H).

11 “(H) CONGRESSIONAL NOTIFICATION.—Not
12 later than 60 days after the date on which the
13 Secretary finds a violation by a covered entity of
14 an agreement required under subparagraph
15 (C)(i), and after providing the covered entity
16 with an opportunity to provide information in
17 response to that finding, the Secretary shall pro-
18 vide to the appropriate Committees of Con-
19 gress—

20 “(i) a notification of the violation;

21 “(ii) a brief description of how the Sec-
22 retary determined the covered entity to be
23 in violation; and

1 “(iii) a summary of any actions or
2 planned actions by the Secretary in re-
3 sponse to the violation.

4 “(I) REGULATIONS.—The Secretary may
5 issue regulations implementing this paragraph.”;
6 and

7 (6) by adding at the end the following:

8 “(d) SENSE OF CONGRESS.—It is the sense of Congress
9 that, in carrying out subsection (a), the Secretary should
10 allocate funds in a manner that—

11 “(1) strengthens the security and resilience of the
12 semiconductor supply chain, including by mitigating
13 gaps and vulnerabilities;

14 “(2) provides a supply of secure semiconductors
15 relevant for national security;

16 “(3) strengthens the leadership of the United
17 States in semiconductor technology;

18 “(4) grows the economy of the United States and
19 supports job creation in the United States;

20 “(5) bolsters the semiconductor and skilled tech-
21 nical workforces in the United States;

22 “(6) promotes the inclusion of economically dis-
23 advantaged individuals and small businesses; and

24 “(7) improves the resiliency of the semiconductor
25 supply chains of critical manufacturing industries.

1 “(e) *ADDITIONAL ASSISTANCE FOR MATURE TECH-*
2 *NOLOGY NODES.*—

3 “(1) *IN GENERAL.*—*The Secretary shall establish*
4 *within the program established under subsection (a)*
5 *an additional program that provides Federal finan-*
6 *cial assistance to covered entities to incentivize invest-*
7 *ment in facilities and equipment in the United States*
8 *for the fabrication, assembly, testing, or packaging of*
9 *semiconductors at mature technology nodes.*

10 “(2) *ELIGIBILITY AND REQUIREMENTS.*—*In*
11 *order for an entity to qualify to receive Federal fi-*
12 *nancial assistance under this subsection, the covered*
13 *entity shall agree to—*

14 “(A) *submit an application under sub-*
15 *section (a)(2)(A);*

16 “(B) *meet the eligibility requirements under*
17 *subsection (a)(2)(B);*

18 “(C)(i) *provide equipment or materials for*
19 *the fabrication, assembly, testing, or packaging*
20 *of semiconductors at mature technology nodes in*
21 *the United States; or*

22 “(ii) *fabricate, assemble using packaging, or*
23 *test semiconductors at mature technology nodes*
24 *in the United States;*

1 “(D) commit to using any Federal financial
2 assistance received under this section to increase
3 the production of semiconductors at mature tech-
4 nology nodes; and

5 “(E) be subject to the considerations de-
6 scribed in subsection (a)(2)(C).

7 “(3) PROCEDURES.—In granting Federal finan-
8 cial assistance to covered entities under this sub-
9 section, the Secretary may use the procedures estab-
10 lished under subsection (a).

11 “(4) CONSIDERATIONS.—In addition to the con-
12 siderations described in subsection (a)(2)(C), in
13 granting Federal financial assistance under this sub-
14 section, the Secretary may consider whether a covered
15 entity produces or supplies equipment or materials
16 used in the fabrication, assembly, testing, or pack-
17 aging of semiconductors at mature technology nodes
18 that are necessary to support a critical manufac-
19 turing industry.

20 “(5) PRIORITY.—In awarding Federal financial
21 assistance to covered entities under this subsection,
22 the Secretary shall give priority to covered entities
23 that support the resiliency of semiconductor supply
24 chains for critical manufacturing industries in the
25 United States.

1 “(6) *AUTHORIZATION OF APPROPRIATIONS.*—

2 *There are authorized to be appropriated to the Sec-*
3 *retary to carry out this subsection \$2,000,000,000,*
4 *which shall remain available until expended.*

5 “(f) *CONSTRUCTION PROJECTS.*—*Section 602 of the*
6 *Public Works and Economic Development Act of 1965 (42*
7 *U.S.C. 3212) shall apply to a construction project that re-*
8 *ceives financial assistance from the Secretary under this*
9 *section.*

10 “(g) *LOANS AND LOAN GUARANTEES.*—

11 “(1) *IN GENERAL.*—*Subject to the requirements*
12 *of subsection (a) and this subsection, the Secretary*
13 *may make or guarantee loans to covered entities as*
14 *financial assistance under this section.*

15 “(2) *CONDITIONS.*—*The Secretary may select eli-*
16 *gible projects to receive loans or loan guarantees*
17 *under this subsection if the Secretary determines*
18 *that—*

19 “(A) *the covered entity—*

20 “(i) *has a reasonable prospect of re-*
21 *paying the principal and interest on the*
22 *loan; and*

23 “(ii) *has met such other criteria as*
24 *may be established and published by the*
25 *Secretary; and*

1 “(B) the amount of the loan (when com-
2 bined with amounts available to the loan recipi-
3 ent from other sources) will be sufficient to carry
4 out the project.

5 “(3) *REASONABLE PROSPECT OF REPAYMENT.*—
6 *The Secretary shall base a determination of whether*
7 *there is a reasonable prospect of repayment of the*
8 *principal and interest on a loan under paragraph*
9 *(2)(A)(i) on a comprehensive evaluation of whether*
10 *the covered entity has a reasonable prospect of repay-*
11 *ing the principal and interest, including, as applica-*
12 *ble, an evaluation of—*

13 “(A) the strength of the contractual terms of
14 the project the covered entity plans to perform (if
15 commercially reasonably available);

16 “(B) the forecast of noncontractual cash
17 flows supported by market projections from rep-
18 utable sources, as determined by the Secretary;

19 “(C) cash sweeps and other structure en-
20 hancements;

21 “(D) the projected financial strength of the
22 covered entity—

23 “(i) at the time of loan close; and

24 “(ii) throughout the loan term after the
25 project is completed;

1 “(E) the financial strength of the investors
2 and strategic partners of the covered entity, if
3 applicable;

4 “(F) other financial metrics and analyses
5 that the private lending community and nation-
6 ally recognized credit rating agencies rely on, as
7 determined appropriate by the Secretary; and

8 “(G) such other criteria the Secretary may
9 determine relevant.

10 “(4) *RATES, TERMS, AND REPAYMENTS OF*
11 *LOANS.—A loan provided under this subsection—*

12 “(A) shall have an interest rate that does
13 not exceed a level that the Secretary determines
14 appropriate, taking into account, as of the date
15 on which the loan is made, the cost of funds to
16 the Department of the Treasury for obligations of
17 comparable maturity; and

18 “(B) shall have a term of not more than 25
19 years.

20 “(5) *ADDITIONAL TERMS.—A loan or guarantee*
21 *provided under this subsection may include any other*
22 *terms and conditions that the Secretary determines to*
23 *be appropriate.*

1 “(6) *RESPONSIBLE LENDER.*—No loan may be
2 *guaranteed under this subsection, unless the Secretary*
3 *determines that—*

4 “(A) *the lender is responsible; and*

5 “(B) *adequate provision is made for serv-*
6 *icing the loan on reasonable terms and pro-*
7 *tecting the financial interest of the United*
8 *States.*

9 “(7) *ADVANCED BUDGET AUTHORITY.*—*New*
10 *loans may not be obligated and new loan guarantees*
11 *may not be committed to under this subsection, unless*
12 *appropriations of budget authority to cover the costs*
13 *of such loans and loan guarantees are made in ad-*
14 *vance in accordance with section 504(b) of the Fed-*
15 *eral Credit Reform Act of 1990 (2 U.S.C. 661c(b)).*

16 “(8) *CONTINUED OVERSIGHT.*—*The loan agree-*
17 *ment for a loan guaranteed under this subsection*
18 *shall provide that no provision of the loan agreement*
19 *may be amended or waived without the consent of the*
20 *Secretary.*

21 “(h) *OVERSIGHT.*—*Not later than 4 years after dis-*
22 *bursement of the first financial award under subsection (a),*
23 *the Inspector General of the Department of Commerce shall*
24 *audit the program under this section to assess—*

1 “(1) whether the eligibility requirements for cov-
2 ered entities receiving financial assistance under the
3 program are met;

4 “(2) whether eligible entities use the financial as-
5 sistance received under the program in accordance
6 with the requirements of this section;

7 “(3) whether the covered entities receiving finan-
8 cial assistance under this program have carried out
9 the commitments made to worker and community in-
10 vestment under subsection (a)(2)(B)(ii)(II) by the tar-
11 get date for completion set by the Secretary under
12 subsection (a)(5)(A);

13 “(4) whether the required agreement entered into
14 by covered entities and the Secretary under subsection
15 (a)(6)(C)(i), including the notification process, has
16 been carried out to provide covered entities sufficient
17 guidance about a violation of the required agreement;

18 “(5) whether the Secretary has provided timely
19 Congressional notification about violations of the re-
20 quired agreement under subsection (a)(6)(C)(i), in-
21 cluding the required information on how the Sec-
22 retary reached a determination of whether a covered
23 entity was in violation under subsection (a)(6)(E);
24 and

1 “(6) whether the Secretary has sufficiently re-
2 viewed any covered entity engaging in a listed excep-
3 tion under subsection (a)(6)(C)(ii).

4 “(i) *PROHIBITION ON USE OF FUNDS.*—No funds
5 made available under this section may be used to construct,
6 modify, or improve a facility outside of the United States.”.

7 (c) *ADVANCED MICROELECTRONICS RESEARCH AND*
8 *DEVELOPMENT.*—Section 9906 of the William M. (Mac)
9 Thornberry National Defense Authorization Act for Fiscal
10 Year 2021 (15 U.S.C. 4656) is amended—

11 (1) in subsection (a)(3)(A)(ii)—

12 (A) in subclause (II), by inserting “, in-
13 cluding for technologies based on organic and in-
14 organic materials” after “components”; and

15 (B) in subclause (V), by striking “and sup-
16 ply chain integrity” and inserting “supply
17 chain integrity, and workforce development”;

18 (2) in subsection (c)—

19 (A) in paragraph (1)—

20 (i) by inserting “and grow the domes-
21 tic semiconductor workforce” after “proto-
22 typing of advanced semiconductor tech-
23 nology”; and

24 (ii) by adding at the end the following:

25 “The Secretary may make financial assist-

1 *ance awards, including construction*
2 *awards, in support of the national semicon-*
3 *ductor technology center.”; and*

4 *(B) in paragraph (2)—*

5 *(i) in subparagraph (B), by inserting*
6 *“and capitalize” before “an investment*
7 *fund”; and*

8 *(ii) by striking subparagraph (C) and*
9 *inserting the following:*

10 *“(C) To work with the Secretary of Labor,*
11 *the Director of the National Science Foundation,*
12 *the Secretary of Energy, the private sector, insti-*
13 *tutions of higher education, and workforce train-*
14 *ing entities to incentivize and expand geographi-*
15 *cally diverse participation in graduate, under-*
16 *graduate, and community college programs rel-*
17 *evant to microelectronics, including through—*

18 *“(i) the development and dissemina-*
19 *tion of curricula and research training ex-*
20 *periences; and*

21 *“(ii) the development of workforce*
22 *training programs and apprenticeships in*
23 *advanced microelectronic design, research,*
24 *fabrication, and packaging capabilities.”;*

25 *(3) in subsection (d)—*

1 (A) by striking “the Manufacturing USA
2 institute” and inserting “a Manufacturing USA
3 institute”; and

4 (B) by adding at the end the following:
5 “The Director may make financial assistance
6 awards, including construction awards, in sup-
7 port of the National Advanced Packaging Manu-
8 facturing Program.”;

9 (4) in subsection (f)—

10 (A) in the matter preceding paragraph
11 (1)—

12 (i) by striking “a Manufacturing USA
13 Institute” and inserting “not more than 3
14 Manufacturing USA Institutes”;

15 (ii) by striking “is focused on semicon-
16 ductor manufacturing.” and inserting “are
17 focused on semiconductor manufacturing.
18 The Secretary of Commerce may award fi-
19 nancial assistance to any Manufacturing
20 USA Institute for work relating to semicon-
21 ductor manufacturing.”; and

22 (iii) by striking “Such institute may
23 emphasize” and inserting “Such institutes
24 may emphasize”; and

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

1 “(h) *CONSTRUCTION PROJECTS.*—Section 602 of the
2 *Public Works and Economic Development Act of 1965* (42
3 *U.S.C. 3212*) shall apply to a construction project that re-
4 ceives financial assistance under this section.”.

5 “(d) *ADDITIONAL AUTHORITIES.*—Division H of title
6 *XCIX of the William M. (Mac) Thornberry National De-*
7 *fense Authorization Act for Fiscal Year 2021* (15 *U.S.C.*
8 *4651 et seq.*) is amended by adding at the end the following:

9 “**SEC. 9909. ADDITIONAL AUTHORITIES.**

10 “(a) *IN GENERAL.*—In carrying out the responsibil-
11 ities of the Department of Commerce under this division,
12 the Secretary may—

13 “(1) enter into agreements, including contracts,
14 grants and cooperative agreements, and other trans-
15 actions as may be necessary and on such terms as the
16 Secretary considers appropriate;

17 “(2) make advance payments under agreements
18 and other transactions authorized under paragraph
19 (1) without regard to section 3324 of title 31, United
20 States Code;

21 “(3) require a person or other entity to make
22 payments to the Department of Commerce upon ap-
23 plication and as a condition for receiving support
24 through an award of assistance or other transaction;

1 “(4) procure temporary and intermittent services
2 of experts and consultants in accordance with section
3 3109 of title 5, United States Code;

4 “(5) notwithstanding section 3104 of title 5,
5 United States Code, or the provisions of any other
6 law relating to the appointment, number, classifica-
7 tion, or compensation of employees, make appoint-
8 ments of scientific, engineering, and professional per-
9 sonnel, and fix the basic pay of such personnel at a
10 rate to be determined by the Secretary at rates not in
11 excess of the highest total annual compensation pay-
12 able at the rate determined under section 104 of title
13 3, United States Code, except that the Secretary shall
14 appoint not more than 25 personnel under this para-
15 graph;

16 “(6) with the consent of another Federal agency,
17 enter into an agreement with that Federal agency to
18 use, with or without reimbursement, any service,
19 equipment, personnel, or facility of that Federal agen-
20 cy; and

21 “(7) establish such rules, regulations, and proce-
22 dures as the Secretary considers appropriate.

23 “(b) REQUIREMENT.—Any funds received from a pay-
24 ment made by a person or entity pursuant to subsection

1 *(a)(3) shall be credited to and merged with the account from*
2 *which support to the person or entity was made”.*

3 *(e) CONFORMING AMENDMENT.—The table of contents*
4 *for division H of title XCIX of the William M. (Mac)*
5 *Thornberry National Defense Authorization Act for Fiscal*
6 *Year 2021 (Public Law 116–283) is amended by adding*
7 *after the item relating to section 9908 the following:*

“9909. Additional authorities.”.

8 **SEC. 104. OPPORTUNITY AND INCLUSION.**

9 *(a) ESTABLISHMENT.—Not later than 180 days after*
10 *the date of enactment of this Act, the Secretary of Commerce*
11 *shall establish activities in the Department of Commerce,*
12 *within the program established under section 9902 of the*
13 *William M. (Mac) Thornberry National Defense Authoriza-*
14 *tion Act for Fiscal Year 2021 (15 U.S.C. 4652), to carry*
15 *out this section using funds appropriated under this Act.*

16 *(b) IN GENERAL.—The Secretary of Commerce shall*
17 *assign personnel to lead and support the activities carried*
18 *out under this section, including coordination with other*
19 *workforce development activities of the Department of Com-*
20 *merce or of Federal agencies, as defined in section 551 of*
21 *title 5, United States Code, as appropriate.*

22 *(c) ACTIVITIES.—Personnel assigned by the Secretary*
23 *to carry out the activities under this section shall—*

24 *(1) assess the eligibility of a covered entity, as*
25 *defined in section 9901 of the William M. (Mac)*

1 *Thornberry National Defense Authorization Act for*
2 *Fiscal Year 2021 (15 U.S.C. 4651), for financial as-*
3 *sistance for a project with respect to the requirements*
4 *under subclauses (II) and (III) of section*
5 *9902(a)(2)(B)(ii) of the William M. (Mac) Thorn-*
6 *berry National Defense Authorization Act for Fiscal*
7 *Year 2021 (15 U.S.C. 4652(a)(2)(B)(ii)(II) and*
8 *(III));*

9 (2) *ensure that each covered entity, as defined in*
10 *section 9901 of the William M. (Mac) Thornberry Na-*
11 *tional Defense Authorization Act for Fiscal Year 2021*
12 *(15 U.S.C. 4651), that is awarded financial assistance*
13 *under section 9902 of that Act (15 U.S.C. 4652) is*
14 *carrying out the commitments of the covered entity to*
15 *economically disadvantaged individuals as described*
16 *in the application of the covered entity under that*
17 *section by the target dates for completion established*
18 *by the Secretary of Commerce under sub-*
19 *section(a)(5)(A) of that section; and*

20 (3) *increase participation of and outreach to eco-*
21 *nomically disadvantaged individuals, minority-owned*
22 *businesses, veteran-owned businesses, and women-*
23 *owned businesses, as defined by the Secretary of Com-*
24 *merce, respectively, in the geographic area of a project*
25 *under section 9902 of the William M. (Mac) Thorn-*

1 *berry National Defense Authorization Act for Fiscal*
2 *Year 2021 (15 U.S.C. 4652) and serve as a resource*
3 *for those individuals, businesses, and covered entities.*

4 *(d) STAFF.—The activities under this section shall be*
5 *staffed at the appropriate levels to carry out the functions*
6 *and responsibilities under this section until 95 percent of*
7 *the amounts of funds made available for the program estab-*
8 *lished under section 9902 of the William M. (Mac) Thorn-*
9 *berry National Defense Authorization Act for Fiscal Year*
10 *2021 (15 U.S.C. 4652) have been expended.*

11 *(e) REPORT.—Beginning on the date that is 1 year*
12 *after the date on which the Secretary of Commerce estab-*
13 *lishes the activities described in subsection (c), the Secretary*
14 *of Commerce shall submit to the appropriate committees of*
15 *Congress, as defined in section 9901(1) of the William M.*
16 *(Mac) Thornberry National Defense Authorization Act for*
17 *Fiscal Year 2021 (15 U.S.C. 4651), and make publicly*
18 *available on the website of the Department of Commerce an*
19 *annual report regarding the actions taken by the Depart-*
20 *ment of Commerce under this section.*

21 **SEC. 105. ADDITIONAL GAO REPORTING REQUIREMENTS.**

22 *(a) NDAA.—Section 9902(c) of William M. (Mac)*
23 *Thornberry National Defense Authorization Act for Fiscal*
24 *Year 2021 (15 U.S.C. 4652(c)) is amended—*

25 *(1) in paragraph (1)—*

1 (A) in subparagraph (B)—

2 (i) in clause (i), by striking “; and”

3 and inserting a semicolon; and

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

5 “(iii) the Federal Government could

6 take specific actions to address shortages in

7 the semiconductor supply chain, includ-

8 ing—

9 “(I) demand-side incentives, in-

10 cluding incentives related to the infor-

11 mation and communications tech-

12 nology supply chain; and

13 “(II) additional incentives, at na-

14 tional and global scales, to accelerate

15 utilization of leading-edge semicon-

16 ductor nodes to address shortages in

17 mature semiconductor nodes; and”;

18 and

19 (B) in subparagraph (C)—

20 (i) in clause (iii), by striking “; and”

21 and inserting a semicolon; and

22 (ii) by inserting after clause (iv) the

23 following:

24 “(v) how projects are supporting the

25 semiconductor needs of critical infrastruc-

1 *ture industries in the United States, includ-*
2 *ing those industries designated by the Cy-*
3 *bersecurity and Infrastructure Security*
4 *Agency as essential infrastructure indus-*
5 *tries; and”;* and

6 (2) *by inserting after paragraph (1)(C)(iv) the*
7 *following:*

8 *“(D) drawing on data made available by*
9 *the Department of Labor or other sources, to the*
10 *extent practicable, an analysis of—*

11 *“(i) semiconductor industry data re-*
12 *garding businesses that are—*

13 *“(I) majority owned and con-*
14 *trolled by minority individuals;*

15 *“(II) majority owned and con-*
16 *trolled by women; or*

17 *“(III) majority owned and con-*
18 *trolled by both women and minority*
19 *individuals;*

20 *“(ii) the number and amount of con-*
21 *tracts and subcontracts awarded by each*
22 *covered entity using funds made available*
23 *under subsection (a) disaggregated by re-*
24 *cipients of each such contract or sub-*
25 *contracts that are majority owned and con-*

1 *trolled by minority individuals and major-*
2 *ity owned and controlled by women; and*
3 “*(iii) aggregated workforce data, in-*
4 *cluding data by race or ethnicity, sex, and*
5 *job categories.*”.

6 (b) *DEPARTMENT OF DEFENSE.—Section*
7 *9202(a)(1)(G)(ii)(I) of the William M. (Mac) Thornberry*
8 *National Defense Authorization Act for Fiscal Year 2021*
9 *(47 U.S.C. 906(a)(1)(G)(ii)(I)) is amended by inserting*
10 “*(including whether recipients are majority owned and con-*
11 *trolled by minority individuals and majority owned and*
12 *controlled by women)*” after “*to whom*”.

13 **SEC. 106. APPROPRIATIONS FOR WIRELESS SUPPLY CHAIN**
14 **INNOVATION.**

15 (a) *DIRECT APPROPRIATIONS.—In addition to*
16 *amounts otherwise available for such purposes, there is ap-*
17 *propriated to the Public Wireless Supply Chain Innovation*
18 *Fund established under section 9202(a)(1) of the William*
19 *M. (Mac) Thornberry National Defense Authorization Act*
20 *for Fiscal Year 2021 (15 U.S.C. 4652(a)(1)), out of amounts*
21 *in the Treasury not otherwise appropriated—*

22 (1) *\$150,000,000 for fiscal year 2022, to remain*
23 *available until September 30, 2031; and*

24 (2) *\$1,350,000,000 for fiscal year 2023, to re-*
25 *main available until September 30, 2032.*

1 (b) *USE OF FUNDS, ADMINISTRATION, AND OVER-*
2 *SIGHT.*—*Of the amounts made available under subsection*

3 *(a)*—

4 (1) *not more than 5 percent of the amounts allo-*
5 *cated pursuant to subsection (c) in a given fiscal year*
6 *may be used by the Assistant Secretary of Commerce*
7 *for Communications and Information to administer*
8 *the programs funded from the Public Wireless Supply*
9 *Chain Innovation Fund; and*

10 (2) *not less than \$2,000,000 per fiscal year shall*
11 *be transferred to the Office of Inspector General of the*
12 *Department of Commerce for oversight related to ac-*
13 *tivities conducted using amounts provided under this*
14 *section.*

15 (c) *ALLOCATION AUTHORITY.*—

16 (1) *SUBMISSION OF COST ESTIMATES.*—*The*
17 *President shall submit to Congress detailed account,*
18 *program, and project allocations of the amount rec-*
19 *ommended for allocation in a fiscal year from*
20 *amounts made available under subsection (a)*—

21 (A) *for fiscal years 2022 and 2023, not*
22 *later than 60 days after the date of enactment of*
23 *this Act; and*

24 (B) *for each subsequent fiscal year through*
25 *2032, as part of the annual budget submission of*

1 *the President under section 1105(a) of title 31,*
2 *United States Code.*

3 (2) *ALTERNATE ALLOCATION.—*

4 (A) *IN GENERAL.—The Committees on Ap-*
5 *propriations of the House of Representatives and*
6 *the Senate may provide for alternate allocation*
7 *of amounts recommended for allocation in a*
8 *given fiscal year from amounts made available*
9 *under subsection (a), including by account, pro-*
10 *gram, and project.*

11 (B) *ALLOCATION BY PRESIDENT.—*

12 (i) *NO ALTERNATE ALLOCATIONS.—If*
13 *Congress has not enacted legislation estab-*
14 *lishing alternate allocations, including by*
15 *account, program, and project, by the date*
16 *on which the Act making full-year appro-*
17 *priations for the Departments of Commerce*
18 *and Justice, Science, and Related Agencies*
19 *for the applicable fiscal year is enacted into*
20 *law, only then shall amounts recommended*
21 *for allocation for that fiscal year from*
22 *amounts made available under subsection*
23 *(a) be allocated by the President or appor-*
24 *tioned or allotted by account, program, and*

1 *project pursuant to title 31, United States*
2 *Code.*

3 (ii) *INSUFFICIENT ALTERNATE ALLOCA-*
4 *TION.—If Congress enacts legislation estab-*
5 *lishing alternate allocations, including by*
6 *account, program, and project, for amounts*
7 *recommended for allocation in a given fiscal*
8 *year from amounts made available under*
9 *subsection (a) that are less than the full*
10 *amount recommended for allocation for that*
11 *fiscal year, the difference between the*
12 *amount recommended for allocation and the*
13 *alternate allocation shall be allocated by the*
14 *President and apportioned and allotted by*
15 *account, program, and project pursuant to*
16 *title 31, United States Code.*

17 (d) *SEQUESTRATION.—Section 255(g)(1)(A) of the*
18 *Balanced Budget and Emergency Deficit Control Act of*
19 *1985 (2 U.S.C. 905(g)(1)(A)) is amended by inserting after*
20 *“Postal Service Fund (18–4020–0–3–372).” the following:*

21 *“Public Wireless Supply Chain Inno-*
22 *vation Fund.”.*

23 (e) *BUDGETARY EFFECTS.—*

24 (1) *STATUTORY PAYGO SCORECARDS.—The budg-*
25 *etary effects of this section shall not be entered on ei-*

1 *ther PAYGO scorecard maintained pursuant to sec-*
2 *tion 4(d) of the Statutory Pay-As-You-Go Act of*
3 *2010.*

4 (2) *SENATE PAYGO SCORECARDS.—The budg-*
5 *etary effects of this section shall not be entered on any*
6 *PAYGO scorecard maintained for purposes of section*
7 *4106 of H. Con. Res. 71 (115th Congress).*

8 (3) *CLASSIFICATION OF BUDGETARY EFFECTS.—*
9 *Notwithstanding Rule 3 of the Budget Scorekeeping*
10 *Guidelines set forth in the joint explanatory statement*
11 *of the committee of conference accompanying Con-*
12 *ference Report 105–217 and section 250(c)(8) of the*
13 *Balanced Budget and Emergency Deficit Control Act*
14 *of 1985, the budgetary effects of this section shall not*
15 *be estimated—*

16 (A) *for purposes of section 251 of such Act;*

17 (B) *for purposes of an allocation to the*
18 *Committee on Appropriations pursuant to sec-*
19 *tion 302(a) of the Congressional Budget Act of*
20 *1974; and*

21 (C) *for purposes of paragraph (4)(C) of sec-*
22 *tion 3 of the Statutory Pay-As-You-Go Act of*
23 *2010 as being included in an appropriation Act.*

1 **SEC. 107. ADVANCED MANUFACTURING INVESTMENT CRED-**

2 **IT.**

3 (a) *IN GENERAL.*—Subpart E of part IV of subchapter
4 A of chapter 1 of the Internal Revenue Code of 1986 is
5 amended by inserting after section 48C the following new
6 section:

7 **“SEC. 48D. ADVANCED MANUFACTURING INVESTMENT**
8 **CREDIT.**

9 “(a) *ESTABLISHMENT OF CREDIT.*—For purposes of
10 section 46, the advanced manufacturing investment credit
11 for any taxable year is an amount equal to 25 percent of
12 the qualified investment for such taxable year with respect
13 to any advanced manufacturing facility of an eligible tax-
14 payer.

15 “(b) *QUALIFIED INVESTMENT.*—

16 “(1) *IN GENERAL.*—For purposes of subsection
17 (a), the qualified investment with respect to any ad-
18 vanced manufacturing facility for any taxable year is
19 the basis of any qualified property placed in service
20 by the taxpayer during such taxable year which is
21 part of an advanced manufacturing facility.

22 “(2) *QUALIFIED PROPERTY.*—

23 “(A) *IN GENERAL.*—For purposes of this
24 subsection, the term ‘qualified property’ means
25 property—

26 “(i) which is tangible property,

1 “(ii) with respect to which deprecia-
2 tion (or amortization in lieu of deprecia-
3 tion) is allowable,

4 “(iii) which is—

5 “(I) constructed, reconstructed, or
6 erected by the taxpayer, or

7 “(II) acquired by the taxpayer if
8 the original use of such property com-
9 mences with the taxpayer, and

10 “(iv) which is integral to the operation
11 of the advanced manufacturing facility.

12 “(B) BUILDINGS AND STRUCTURAL COMPO-
13 NENTS.—

14 “(i) IN GENERAL.—The term ‘qualified
15 property’ includes any building or its struc-
16 tural components which otherwise satisfy
17 the requirements under subparagraph (A).

18 “(ii) EXCEPTION.—Clause (i) shall not
19 apply with respect to a building or portion
20 of a building used for offices, administrative
21 services, or other functions unrelated to
22 manufacturing.

23 “(3) ADVANCED MANUFACTURING FACILITY.—For
24 purposes of this section, the term ‘advanced manufac-
25 turing facility’ means a facility for which the pri-

1 *mary purpose is the manufacturing of semiconductors*
2 *or semiconductor manufacturing equipment.*

3 “(4) *COORDINATION WITH REHABILITATION*
4 *CREDIT.—The qualified investment with respect to*
5 *any advanced manufacturing facility for any taxable*
6 *year shall not include that portion of the basis of any*
7 *property which is attributable to qualified rehabilita-*
8 *tion expenditures (as defined in section 47(c)(2)).*

9 “(5) *CERTAIN PROGRESS EXPENDITURE RULES*
10 *MADE APPLICABLE.—Rules similar to the rules of sub-*
11 *sections (c)(4) and (d) of section 46 (as in effect on*
12 *the day before the date of the enactment of the Rev-*
13 *enue Reconciliation Act of 1990) shall apply for pur-*
14 *poses of subsection (a).*

15 “(c) *ELIGIBLE TAXPAYER.—For purposes of this sec-*
16 *tion, the term ‘eligible taxpayer’ means any taxpayer*
17 *which—*

18 “(1) *is not a foreign entity of concern (as defined*
19 *in section 9901(6) of the William M. (Mac) Thorn-*
20 *berry National Defense Authorization Act for Fiscal*
21 *Year 2021), and*

22 “(2) *has not made an applicable transaction (as*
23 *defined in section 50(a)) during the taxable year.*

24 “(d) *ELECTIVE PAYMENT.—*

1 “(1) *IN GENERAL.*—*Except as otherwise provided*
2 *in paragraph (2)(A), in the case of a taxpayer mak-*
3 *ing an election (at such time and in such manner as*
4 *the Secretary may provide) under this subsection with*
5 *respect to the credit determined under subsection (a)*
6 *with respect to such taxpayer, such taxpayer shall be*
7 *treated as making a payment against the tax imposed*
8 *by subtitle A (for the taxable year with respect to*
9 *which such credit was determined) equal to the*
10 *amount of such credit.*

11 “(2) *SPECIAL RULES.*—*For purposes of this sub-*
12 *section—*

13 “(A) *APPLICATION TO PARTNERSHIPS AND S*
14 *CORPORATIONS.*—

15 “(i) *IN GENERAL.*—*In the case of the*
16 *credit determined under subsection (a) with*
17 *respect to any property held directly by a*
18 *partnership or S corporation, any election*
19 *under paragraph (1) shall be made by such*
20 *partnership or S corporation. If such part-*
21 *nership or S corporation makes an election*
22 *under such paragraph (in such manner as*
23 *the Secretary may provide) with respect to*
24 *such credit—*

1 “(I) the Secretary shall make a
2 payment to such partnership or S cor-
3 poration equal to the amount of such
4 credit,

5 “(II) paragraph (3) shall be ap-
6 plied with respect to such credit before
7 determining any partner’s distributive
8 share, or shareholder’s pro rata share,
9 of such credit,

10 “(III) any amount with respect to
11 which the election in paragraph (1) is
12 made shall be treated as tax exempt in-
13 come for purposes of sections 705 and
14 1366, and

15 “(IV) a partner’s distributive
16 share of such tax exempt income shall
17 be based on such partner’s distributive
18 share of the otherwise applicable credit
19 for each taxable year.

20 “(ii) COORDINATION WITH APPLICA-
21 TION AT PARTNER OR SHAREHOLDER
22 LEVEL.—In the case of any property held
23 directly by a partnership or S corporation,
24 no election by any partner or shareholder
25 shall be allowed under paragraph (1) with

1 *respect to any credit determined under sub-*
2 *section (a) with respect to such property.*

3 “(B) *ELECTIONS.*—*Any election under*
4 *paragraph (1) shall be made not later than the*
5 *due date (including extensions of time) for the*
6 *return of tax for the taxable year for which the*
7 *election is made, but in no event earlier than*
8 *270 days after the date of the enactment of this*
9 *section. Any such election, once made, shall be*
10 *irrevocable. Except as otherwise provided in this*
11 *subparagraph, any election under paragraph (1)*
12 *shall apply with respect to any credit for the*
13 *taxable year for which the election is made.*

14 “(C) *TIMING.*—*The payment described in*
15 *paragraph (1) shall be treated as made on the*
16 *later of the due date (determined without regard*
17 *to extensions) of the return of tax for the taxable*
18 *year or the date on which such return is filed.*

19 “(D) *TREATMENT OF PAYMENTS TO PART-*
20 *NEERSHIPS AND S CORPORATIONS.*—*For purposes*
21 *of section 1324 of title 31, United States Code,*
22 *the payments under subparagraph (A)(i)(I) shall*
23 *be treated in the same manner as a refund due*
24 *from a credit provision referred to in subsection*
25 *(b)(2) of such section.*

1 “(E) *ADDITIONAL INFORMATION.*—As a con-
2 dition of, and prior to, any amount being treat-
3 ed as a payment which is made by the taxpayer
4 under paragraph (1) or any payment being
5 made pursuant to subparagraph (A), the Sec-
6 retary may require such information or registra-
7 tion as the Secretary deems necessary or appro-
8 priate for purposes of preventing duplication,
9 fraud, improper payments, or excessive payments
10 under this section.

11 “(F) *EXCESSIVE PAYMENT.*—

12 “(i) *IN GENERAL.*—In the case of any
13 amount treated as a payment which is
14 made by the taxpayer under paragraph (1),
15 or any payment made pursuant to subpara-
16 graph (A), which the Secretary determines
17 constitutes an excessive payment, the tax
18 imposed on such taxpayer by chapter 1 for
19 the taxable year in which such determina-
20 tion is made shall be increased by an
21 amount equal to the sum of—

22 “(I) the amount of such excessive
23 payment, plus

24 “(II) an amount equal to 20 per-
25 cent of such excessive payment.

1 “(ii) *REASONABLE CAUSE.*—Clause
2 *(i)(II)* shall not apply if the taxpayer dem-
3 onstrates to the satisfaction of the Secretary
4 that the excessive payment resulted from
5 reasonable cause.

6 “(iii) *EXCESSIVE PAYMENT DE-*
7 *FINED.*—For purposes of this subparagraph,
8 the term ‘excessive payment’ means, with
9 respect to property for which an election is
10 made under this subsection for any taxable
11 year, an amount equal to the excess of—

12 “(I) the amount treated as a pay-
13 ment which is made by the taxpayer
14 under paragraph (1), or the amount of
15 the payment made pursuant to sub-
16 paragraph (A), with respect to such
17 property for such taxable year, over

18 “(II) the amount of the credit
19 which, without application of this sub-
20 section, would be otherwise allowable
21 (determined without regard to section
22 38(c)) under subsection (a) with re-
23 spect to such property for such taxable
24 year.

1 “(3) *DENIAL OF DOUBLE BENEFIT.*—*In the case*
2 *of a taxpayer making an election under this sub-*
3 *section with respect to the credit determined under*
4 *subsection (a), such credit shall be reduced to zero and*
5 *shall, for any other purposes under this title, be*
6 *deemed to have been allowed to the taxpayer for such*
7 *taxable year.*

8 “(4) *MIRROR CODE POSSESSIONS.*—*In the case*
9 *of any possession of the United States with a mirror*
10 *code tax system (as defined in section 24(k)), this sub-*
11 *section shall not be treated as part of the income tax*
12 *laws of the United States for purposes of determining*
13 *the income tax law of such possession unless such pos-*
14 *session elects to have this subsection be so treated.*

15 “(5) *BASIS REDUCTION AND RECAPTURE.*—*Rules*
16 *similar to the rules of subsections (a) and (c) of sec-*
17 *tion 50 shall apply with respect to—*

18 “(A) *any amount treated as a payment*
19 *which is made by the taxpayer under paragraph*
20 *(1), and*

21 “(B) *any payment made pursuant to para-*
22 *graph (2)(A).*

23 “(6) *REGULATIONS.*—*The Secretary shall issue*
24 *such regulations or other guidance as may be nec-*

1 *essary or appropriate to carry out the purposes of*
2 *this subsection, including—*

3 *“(A) regulations or other guidance pro-*
4 *viding rules for determining a partner’s dis-*
5 *tributive share of the tax exempt income de-*
6 *scribed in paragraph (2)(A)(i)(III), and*

7 *“(B) guidance to ensure that the amount of*
8 *the payment or deemed payment made under*
9 *this subsection is commensurate with the amount*
10 *of the credit that would be otherwise allowable*
11 *(determined without regard to section 38(c)).*

12 *“(e) TERMINATION OF CREDIT.—The credit allowed*
13 *under this section shall not apply to property the construc-*
14 *tion of which begins after December 31, 2026.”.*

15 *(b) RECAPTURE IN CONNECTION WITH CERTAIN EX-*
16 *PANSIONS.—*

17 *(1) IN GENERAL.—Section 50(a) of the Internal*
18 *Revenue Code of 1986 is amended redesignating para-*
19 *graphs (3) through (5) as paragraphs (4) through (6),*
20 *respectively, and by inserting after paragraph (2) the*
21 *following new paragraph:*

22 *“(3) CERTAIN EXPANSIONS IN CONNECTION WITH*
23 *ADVANCED MANUFACTURING FACILITIES.—*

24 *“(A) IN GENERAL.—If there is a an appli-*
25 *cable transaction by an applicable taxpayer be-*

1 *fore the close of the 10-year period beginning on*
2 *the date such taxpayer placed in service invest-*
3 *ment credit property which is eligible for the ad-*
4 *vanced manufacturing investment credit under*
5 *section 48D(a), then the tax under this chapter*
6 *for the taxable year in which such transaction*
7 *occurs shall be increased by 100 percent of the*
8 *aggregate decrease in the credits allowed under*
9 *section 38 for all prior taxable years which*
10 *would have resulted solely from reducing to zero*
11 *any credit determined under section 46 which is*
12 *attributable to the advanced manufacturing in-*
13 *vestment credit under section 48D(a) with re-*
14 *spect to such property.*

15 *“(B) EXCEPTION.—Subparagraph (A) shall*
16 *not apply if the applicable taxpayer dem-*
17 *onstrates to the satisfaction of the Secretary that*
18 *the applicable transaction has been ceased or*
19 *abandoned within 45 days of a determination*
20 *and notice by the Secretary.*

21 *“(C) REGULATIONS AND GUIDANCE.—The*
22 *Secretary shall issue such regulations or other*
23 *guidance as the Secretary determines necessary*
24 *or appropriate to carry out the purposes of this*
25 *paragraph, including regulations or other guid-*

1 *ance which provide for requirements for record-*
2 *keeping or information reporting for purposes of*
3 *administering the requirements of this para-*
4 *graph.”.*

5 (2) *APPLICABLE TRANSACTION; APPLICABLE TAX-*
6 *PAYER.—Section 50(a)(6) of the Internal Revenue*
7 *Code of 1986, as redesignated by paragraph (1), is*
8 *amended adding at the end the following new sub-*
9 *paragraphs:*

10 “(D) *APPLICABLE TRANSACTION.—For pur-*
11 *poses of this subsection—*

12 “(i) *IN GENERAL.—The term ‘applica-*
13 *ble transaction’ means, with respect to any*
14 *applicable taxpayer, any significant trans-*
15 *action (as determined by the Secretary, in*
16 *coordination with the Secretary of Com-*
17 *merce and the Secretary of Defense) involv-*
18 *ing the material expansion of semiconductor*
19 *manufacturing capacity of such applicable*
20 *taxpayer in the People’s Republic of China*
21 *or a foreign country of concern (as defined*
22 *in section 9901(7) of the William M. (Mac)*
23 *Thornberry National Defense Authorization*
24 *Act for Fiscal Year 2021).*

1 “(ii) *EXCEPTION.*—*Such term shall not*
2 *include a transaction which primarily in-*
3 *volves the expansion of manufacturing ca-*
4 *capacity for legacy semiconductors (as defined*
5 *in section 9902(a)(6) of the William M.*
6 *(Mac) Thornberry National Defense Author-*
7 *ization Act for Fiscal Year 2021).*”

8 “(E) *APPLICABLE TAXPAYER.*—*For pur-*
9 *poses of this subsection, the term ‘applicable tax-*
10 *payer’ means any taxpayer who has been al-*
11 *lowed a credit under section 48D(a) for any*
12 *prior taxable year.’”.*

13 (3) *CONFORMING AMENDMENTS.*—

14 (A) *Section 50(a)(4) of the Internal Rev-*
15 *enue Code of 1986, as redesignated by paragraph*
16 *(1), is amended—*

17 (i) *by inserting “, or any applicable*
18 *transaction to which paragraph (3)(A) ap-*
19 *plies” after “paragraphs (1) and (2)”, and*

20 (ii) *by inserting “or applicable trans-*
21 *action” after “such cessation”.*

22 (B) *Section 50(a)(6)(C) of such Code, as re-*
23 *designated by paragraph (1), is amended by*
24 *striking “paragraph (1) or (2)” and inserting*
25 *“paragraph (1), (2), or (3)”.*

1 (C) Section 1371(d)(1) of such Code is
2 amended by striking “section 50(a)(4)” and in-
3 serting “section 50(a)(5)”.

4 (c) *EXEMPTION OF ELECTIVE PAYMENTS FROM SE-*
5 *QUESTRATION.*—Subsection (d) of section 255 of the Bal-
6 *anced Budget and Emergency Deficit Control Act of 1985*
7 *(2 U.S.C. 905) is amended to read as follows:*

8 “(d) *REFUNDABLE INCOME TAX CREDITS AND CER-*
9 *TAIN ELECTIVE PAYMENTS.*—

10 “(1) *REFUNDABLE INCOME TAX CREDITS.*—Pay-
11 ments to individuals made pursuant to provisions of
12 the Internal Revenue Code of 1986 establishing re-
13 fundable tax credits shall be exempt from reduction
14 under any order issued under this part.

15 “(2) *CERTAIN ELECTIVE PAYMENTS.*—Payments
16 made to taxpayers pursuant to elections under sub-
17 section (d) of section 48D of the Internal Revenue
18 Code of 1986, or amounts treated as payments which
19 are made by taxpayers under paragraph (1) of such
20 subsection, shall be exempt from reduction under any
21 order issued under this part.”.

22 (d) *CONFORMING AMENDMENTS.*—

23 (1) Paragraph (6) of section 46 of the Internal
24 Revenue Code of 1986 is amended to read as follows:

1 “(6) the advanced manufacturing investment
2 *credit.*”.

3 (2) Section 49(a)(1)(C) of such Code is amend-
4 *ed—*

5 (A) by striking “and” at the end of clause
6 *(iv),*

7 (B) by striking the period at the end of
8 *clause (v) and inserting “, and”, and*

9 (C) by adding at the end the following new
10 *clause:*

11 “(vi) the basis of any qualified prop-
12 *erty (as defined in subsection (b)(2) of sec-*
13 *tion 48D) which is part of an advanced*
14 *manufacturing facility (as defined in sub-*
15 *section (b)(3) of such section).”.*

16 (3) Section 50(a)(2)(E) of such Code is amended
17 *by striking “or 48C(b)(2)” and inserting “48C(b)(2),*
18 *or 48D(b)(5)”.*

19 (4) The table of sections for subpart E of part IV
20 *of subchapter A of chapter 1 of such Code is amended*
21 *by inserting after the item relating to section 48C the*
22 *following new item:*

“Sec. 48D. Advanced manufacturing investment credit.”.

23 (e) *BUDGETARY EFFECTS.—*

24 (1) *STATUTORY PAYGO SCORECARDS.—The budg-*
25 *etary effects of this section shall not be entered on ei-*

1 *ther PAYGO scorecard maintained pursuant to sec-*
2 *tion 4(d) of the Statutory Pay-As-You-Go Act of 2010*
3 *(2 U.S.C. 933(d)).*

4 (2) *SENATE PAYGO SCORECARDS.—The budg-*
5 *etary effects of this section shall not be entered on any*
6 *PAYGO scorecard maintained for purposes of section*
7 *4106 of H. Con. Res. 71 (115th Congress).*

8 (3) *CLASSIFICATION OF BUDGETARY EFFECTS.—*
9 *Notwithstanding Rule 3 of the Budget Scorekeeping*
10 *Guidelines set forth in the joint explanatory statement*
11 *of the committee of conference accompanying Con-*
12 *ference Report 105–217 and section 250(c)(8) of the*
13 *Balanced Budget and Emergency Deficit Control Act*
14 *of 1985, the budgetary effects of this section shall not*
15 *be estimated—*

16 (A) *for purposes of section 251 of such Act;*

17 (B) *for purposes of an allocation to the*
18 *Committee on Appropriations pursuant to sec-*
19 *tion 302(a) of the Congressional Budget Act of*
20 *1974; and*

21 (C) *for purposes of paragraph (4)(C) of sec-*
22 *tion 3 of the Statutory Pay-As-You-Go Act of*
23 *2010 as being included in an appropriation Act.*

24 (f) *EFFECTIVE DATE.—*

1 (1) *IN GENERAL.*—*Except as provided in para-*
 2 *graph (2), the amendments made by this section shall*
 3 *apply to property placed in service after December*
 4 *31, 2022, and, for any property the construction of*
 5 *which begins prior to January 1, 2023, only to the*
 6 *extent of the basis thereof attributable to the construc-*
 7 *tion, reconstruction, or erection after the date of en-*
 8 *actment of this Act.*

9 (2) *EXEMPTION OF ELECTIVE PAYMENTS FROM*
 10 *SEQUESTRATION.*—*The amendment made by sub-*
 11 *section (c) shall apply to any sequestration order*
 12 *issued under the Balanced Budget and Emergency*
 13 *Deficit Control Act of 1985 (2 U.S.C. 900 et seq.) on*
 14 *or after December 31, 2022.*

15 ***DIVISION B—RESEARCH AND*** 16 ***INNOVATION***

17 ***SEC. 10000. TABLE OF CONTENTS.***

18 *The table of contents for this division is as follows:*

DIVISION B—RESEARCH AND INNOVATION

- Sec. 10000. Table of contents.*
- Sec. 10001. Short title.*
- Sec. 10002. Definitions.*
- Sec. 10003. Budgetary effects.*

TITLE I—DEPARTMENT OF ENERGY SCIENCE FOR THE FUTURE

- Sec. 10101. Mission of the Office of Science.*
- Sec. 10102. Basic energy sciences program.*
- Sec. 10103. Biological and environmental research.*
- Sec. 10104. Advanced scientific computing research program.*
- Sec. 10105. Fusion energy research.*
- Sec. 10106. High energy physics program.*
- Sec. 10107. Nuclear physics program.*
- Sec. 10108. Science laboratories infrastructure program.*

- Sec. 10109. Accelerator research and development.*
Sec. 10110. Isotope research, development, and production.
Sec. 10111. Increased collaboration with teachers and scientists.
Sec. 10112. High intensity laser research initiative; helium conservation program; Office of Science emerging biological threat preparedness research initiative; midscale instrumentation and research equipment program; authorization of appropriations.
Sec. 10113. Established program to stimulate competitive research.
Sec. 10114. Research security.

**TITLE II—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
FOR THE FUTURE**

- Sec. 10201. Definitions.*

Subtitle A—Authorization of Appropriations

- Sec. 10211. Authorization of appropriations.*

Subtitle B—Measurement Research

- Sec. 10221. Engineering biology and biometrology.*
Sec. 10222. Greenhouse gas measurement research.
Sec. 10223. NIST authority for cybersecurity and privacy activities.
Sec. 10224. Software security and authentication.
Sec. 10225. Digital identity management research.
Sec. 10226. Biometrics research and testing.
Sec. 10227. Federal biometric performance standards.
Sec. 10228. Protecting research from cybersecurity theft.
Sec. 10229. Dissemination of resources for research institutions.
Sec. 10230. Advanced communications research.
Sec. 10231. Neutron scattering.
Sec. 10232. Artificial intelligence.
Sec. 10233. Sustainable chemistry research and education.
Sec. 10234. Premise plumbing research.
Sec. 10235. Dr. David Satcher Cybersecurity Education Grant Program.

Subtitle C—General Activities

- Sec. 10241. Educational outreach and support for underrepresented communities.*
Sec. 10242. Other transactions authority.
Sec. 10243. Report to Congress on collaborations with government agencies.
Sec. 10244. Hiring critical technical experts.
Sec. 10245. International standards development.
Sec. 10246. Standard technical update.
Sec. 10247. GAO study of NIST research security policies and protocols.
Sec. 10248. Standards development organization grants.

Subtitle D—Hollings Manufacturing Extension Partnership

- Sec. 10251. Establishment of expansion awards pilot program as a part of the Hollings Manufacturing Extension Partnership.*
Sec. 10252. Update to Hollings Manufacturing Extension Partnership.
Sec. 10253. National Supply Chain Database.
Sec. 10254. Hollings Manufacturing Extension Partnership activities.
Sec. 10255. Amendment to the Hollings Manufacturing Extension Partnership relating to institutions of higher education.

Subtitle E—Manufacturing USA Program

- Sec. 10261. Supporting geographic diversity.*
Sec. 10262. Expanding opportunities through the Manufacturing USA Program.
Sec. 10263. Promoting domestic production of technologies developed under Manufacturing USA Program.

*TITLE III—NATIONAL SCIENCE FOUNDATION FOR THE FUTURE**Subtitle A—Preliminary Matters*

- Sec. 10301. Sense of Congress.*
Sec. 10302. Definitions.
Sec. 10303. Authorization of appropriations.

Subtitle B—STEM Education

- Sec. 10311. PreK–12 STEM education.*
Sec. 10312. Undergraduate STEM education.
Sec. 10313. Graduate STEM education.
Sec. 10314. STEM workforce data.
Sec. 10315. Cyber workforce development research and development.
Sec. 10316. Federal cyber scholarship-for-service program.
Sec. 10317. Cybersecurity workforce data initiative.
Sec. 10318. Microelectronics workforce development activities.
Sec. 10319. Incorporation of art and design into certain STEM education.
Sec. 10320. Mandatory cost-sharing.
Sec. 10321. Programs to address the STEM workforce.

Subtitle C—Broadening Participation

- Sec. 10321. Presidential awards for excellence in mathematics and science.*
Sec. 10322. Robert Noyce Teacher Scholarship program update.
Sec. 10323. NSF Eddie Bernice Johnson INCLUDES Initiative.
Sec. 10324. Broadening participation on major facilities awards.
Sec. 10325. Expanding geographic and institutional diversity in research.
Sec. 10326. Diversity in tech research.
Sec. 10327. Chief Diversity Officer of the NSF.
Sec. 10328. Research and dissemination to increase the participation of women and underrepresented minorities in STEM fields.
Sec. 10329. Activities to expand STEM opportunities.
Sec. 10330. Intramural emerging research institutions pilot program.

Subtitle D—NSF Research Security

- Sec. 10331. Office of Research Security and Policy.*
Sec. 10332. Chief of Research Security.
Sec. 10333. Reporting to Congress.
Sec. 10334. Online resource.
Sec. 10335. Research awards.
Sec. 10336. Authorities.
Sec. 10337. Responsible conduct in research training.
Sec. 10338. Research security and integrity information sharing analysis organization.
Sec. 10339. Plan with respect to controlled information and background screening.

Sec. 10339A. Foundation funding to institutions hosting or supporting Confucius Institutes.

Sec. 10339B. Foreign financial support.

Sec. 10339C. Authorization of appropriations.

Subtitle E—Fundamental Research

Sec. 10341. Broader impacts.

Sec. 10342. Sense of Congress.

Sec. 10343. Research ethics.

Sec. 10344. Research reproducibility and replicability.

Sec. 10345. Climate change research.

Sec. 10346. Social, behavioral, and economic sciences.

Sec. 10347. Measuring impacts of Federally funded research and development.

Sec. 10348. Food-energy-water research.

Sec. 10349. Biological Field Stations and Marine Laboratories.

Sec. 10350. Sustainable chemistry research and education.

Sec. 10351. Risk and resilience research.

Sec. 10352. Unmanned aircraft systems technologies.

Sec. 10353. Accelerating unmanned maritime systems technologies.

Sec. 10354. Leveraging international expertise in research.

Sec. 10355. Biological research collections.

Sec. 10356. Clean water research and technology acceleration.

Sec. 10357. Technology and behavioral science research.

Sec. 10358. Manufacturing research amendment.

Sec. 10359. Critical minerals mining research and development.

Sec. 10360. Study of AI research capacity.

Sec. 10361. Advancing IoT for Precision Agriculture Capabilities Act.

Sec. 10362. Astronomy and satellite constellations.

Sec. 10363. Research on the impact of inflation.

Sec. 10364. Microgravity utilization policy.

Sec. 10365. Recognition of the Arecibo Observatory.

Subtitle F—Research Infrastructure

Sec. 10371. Facility operation and maintenance.

Sec. 10372. Reviews.

Sec. 10373. Helium conservation.

Sec. 10374. Advanced computing.

Sec. 10375. National secure data service.

Subtitle G—Directorate for Technology, Innovation, and Partnerships

Sec. 10381. Establishment.

Sec. 10382. Purposes.

Sec. 10383. Activities.

Sec. 10384. Requirements.

Sec. 10385. Assistant Director.

Sec. 10386. Advisory committee.

Sec. 10387. Challenges and focus areas.

Sec. 10388. Regional Innovation Engines.

Sec. 10389. Translation accelerator.

Sec. 10390. Test beds.

Sec. 10391. Planning and capacity building awards.

Sec. 10392. Entrepreneurial fellowships.

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- Sec. 10394. Research and development awards.*
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Subtitle F—Miscellaneous

Sec. 10861. Program, workforce, and industrial base reviews.

Sec. 10862. Modification of lease of non-excess property.

1 **SEC. 10001. SHORT TITLE.**

2 *This division may be cited as the “Research and Devel-*
3 *opment, Competition, and Innovation Act”.*

4 **SEC. 10002. DEFINITIONS.**

5 *In this division:*

6 (1) *ARTIFICIAL INTELLIGENCE.*—*The term “arti-*
7 *ficial intelligence” or “AI” has the meaning given*
8 *such term in section 5002 of the William M. (Mac)*
9 *Thornberry National Defense Authorization Act for*
10 *Fiscal Year 2021 (15 U.S.C. 9401).*

11 (2) *AWARDEE.*—*The term “awardee” means the*
12 *legal entity to which Federal assistance is awarded*
13 *and that is accountable to the Federal Government for*
14 *the use of the funds provided.*

15 (3) *AWARD PERSONNEL.*—*The term “award per-*
16 *sonnel” means principal investigators and co-prin-*
17 *cipal investigators, faculty, postdoctoral researchers,*
18 *and other employees supported by a grant, coopera-*
19 *tive agreement, or contract under Federal law.*

20 (4) *BIOMANUFACTURING.*—*The term “biomanu-*
21 *facturing” means the utilization of biological systems*
22 *to develop new and advance existing products, tools,*
23 *and processes at commercial scale.*

1 (5) *EMERGING RESEARCH INSTITUTION.*—The
2 term “emerging research institution” means an insti-
3 tution of higher education with an established under-
4 graduate or graduate program that has less than
5 \$50,000,000 in Federal research expenditures.

6 (6) *ENGINEERING BIOLOGY.*—The term “engi-
7 neering biology” means the application of engineering
8 design principles and practices to biological systems,
9 including molecular and cellular systems, to advance
10 fundamental understanding of complex natural sys-
11 tems and to enable novel or optimize functions and
12 capabilities.

13 (7) *EPSCoR.*—The term “EPSCoR” has the
14 meaning given the term in section 502 of the America
15 COMPETES Reauthorization Act of 2010 (42 U.S.C.
16 1862p note).

17 (8) *EPSCoR INSTITUTION.*—The term “EPSCoR
18 institution” means an institution of higher education,
19 nonprofit organization, or other institution located in
20 a jurisdiction eligible to participate in the program
21 under section 113 of the National Science Foundation
22 Authorization Act of 1988 (42 U.S.C. 1862g).

23 (9) *FEDERAL LABORATORY.*—The term “Federal
24 laboratory” has the meaning given such term in sec-

1 *tion 4 of the Stevenson-Wydler Technology Innovation*
2 *Act of 1980 (15 U.S.C. 3703).*

3 (10) *FEDERAL RESEARCH AGENCY.*—*The term*
4 *“Federal research agency” means any Federal agency*
5 *with an annual extramural research expenditure of*
6 *over \$100,000,000 in fiscal year 2022 constant dol-*
7 *lars.*

8 (11) *FOUNDATION.*—*The term “Foundation”*
9 *means the National Science Foundation.*

10 (12) *HISTORICALLY BLACK COLLEGE AND UNI-*
11 *VERSITY.*—*The term “historically Black college and*
12 *university” has the meaning given the term “part B*
13 *institution” in section 322 of the Higher Education*
14 *Act of 1965 (20 U.S.C. 1061).*

15 (13) *INSTITUTION OF HIGHER EDUCATION.*—*The*
16 *term “institution of higher education” has the mean-*
17 *ing given the term in section 101(a) of the Higher*
18 *Education Act of 1965 (20 U.S.C. 1001(a)).*

19 (14) *INTERAGENCY WORKING GROUP ON INCLU-*
20 *SION IN STEM.*—*The term “interagency working*
21 *group on inclusion in STEM” means the interagency*
22 *working group established by section 308 of the Amer-*
23 *ican Innovation and Competitiveness Act (42 U.S.C.*
24 *6626).*

1 (15) *LABOR ORGANIZATION*.—*The term “labor*
2 *organization” has the meaning given the term in sec-*
3 *tion 2(5) of the National Labor Relations Act (29*
4 *U.S.C. 152(5)), except that such term shall also in-*
5 *clude—*

6 (A) *any organization composed of labor or-*
7 *ganizations, such as a labor union federation or*
8 *a State or municipal labor body; and*

9 (B) *any organization which would be in-*
10 *cluded in the definition for such term under such*
11 *section 2(5) but for the fact that the organization*
12 *represents—*

13 (i) *individuals employed by the United*
14 *States, any wholly owned Government cor-*
15 *poration, any Federal Reserve Bank, or any*
16 *State or political subdivision thereof;*

17 (ii) *individuals employed by persons*
18 *subject to the Railway Labor Act (45 U.S.C.*
19 *151 et seq.); or*

20 (iii) *individuals employed as agricul-*
21 *tural laborers.*

22 (16) *LOW-INCOME INDIVIDUAL*.—*The term “low-*
23 *income individual” means an individual from a fam-*
24 *ily whose taxable income for the preceding year did*
25 *not exceed 150 percent of an amount equal to the pov-*

1 *erty level determined by using criteria of poverty es-*
2 *tablished by the Bureau of the Census.*

3 (17) *MANUFACTURING EXTENSION CENTER.*—*The*
4 *term “manufacturing extension center” has the mean-*
5 *ing given the term “Center” in section 25(a) of the*
6 *National Institute of Standards and Technology Act*
7 *(15 U.S.C. 278k(a)).*

8 (18) *MANUFACTURING USA INSTITUTE.*—*The*
9 *term “Manufacturing USA institute” means a Manu-*
10 *facturing USA institute described in section 34(d) of*
11 *the National Institute of Standards and Technology*
12 *Act (15 U.S.C. 278s(d)).*

13 (19) *MINORITY-SERVING INSTITUTION.*—*The*
14 *term “minority-serving institution” means a His-*
15 *panic-serving institution as defined in section 502(a)*
16 *of the Higher Education Act of 1965 (20 U.S.C.*
17 *1101a(a)); an Alaska Native-serving institution or*
18 *Native Hawaiian-serving institution as defined in*
19 *section 317(b) of such Act (20 U.S.C. 1059d(b)); or a*
20 *Predominantly Black institution, Asian American*
21 *and Native American Pacific Islander-serving institu-*
22 *tion, or Native American-serving nontribal institu-*
23 *tion as defined in section 371(c) of such Act (20*
24 *U.S.C. 1067q(c)).*

1 (20) *NATIONAL ACADEMIES.*—*The term “Na-*
2 *tional Academies” means the National Academies of*
3 *Sciences, Engineering, and Medicine.*

4 (21) *NON-PROFIT ORGANIZATION.*—*The term*
5 *“non-profit organization” means an organization*
6 *which is described in section 501(c)(3) of the Internal*
7 *Revenue Code of 1986 and exempt from tax under sec-*
8 *tion 501(a) of such code.*

9 (22) *PREK-12.*—*The term “PreK-12” means*
10 *pre-kindergarten through grade 12.*

11 (23) *QUANTUM INFORMATION SCIENCE.*—*The*
12 *term “quantum information science” has the meaning*
13 *given such term in section 2 of the National Quantum*
14 *Initiative Act (15 U.S.C. 8801).*

15 (24) *RECIPIENT.*—*The term “recipient” means*
16 *an entity, usually a non-Federal entity, that receives*
17 *a Federal award directly from a Federal research*
18 *agency. The term “recipient” does not include entities*
19 *that receive subawards or individuals that are the*
20 *beneficiaries of the award.*

21 (25) *RESEARCH AND DEVELOPMENT AWARD.*—
22 *The term “research and development award” means*
23 *support provided to an individual or entity by a Fed-*
24 *eral research agency to carry out research and devel-*
25 *opment activities, which may include support in the*

1 *form of a grant, contract, cooperative agreement, or*
2 *other such transaction. The term does not include a*
3 *grant, contract, agreement or other transaction for the*
4 *procurement of goods or services to meet the adminis-*
5 *trative needs of a Federal research agency.*

6 (26) *SKILLED TECHNICAL WORK.*—*The term*
7 *“skilled technical work” means an occupation that re-*
8 *quires a high level of knowledge in a technical domain*
9 *and does not require a bachelor’s degree for entry.*

10 (27) *STEM.*—*The term “STEM” means science,*
11 *technology, engineering, and mathematics, including*
12 *computer science.*

13 (28) *STEM EDUCATION.*—*The term “STEM edu-*
14 *cation” has the meaning given the term in section 2*
15 *of the STEM Education Act of 2015 (42 U.S.C. 6621*
16 *note).*

17 (29) *TECHNICAL STANDARD.*—*The term “tech-*
18 *nical standard” has the meaning given such term in*
19 *section 12(d)(5) of the National Technology Transfer*
20 *and Advancement Act of 1995 (15 U.S.C. 272 note).*

21 (30) *TRIBAL COLLEGE OR UNIVERSITY.*—*The*
22 *term “Tribal College or University” has the meaning*
23 *given such term in section 316 of the Higher Edu-*
24 *cation Act of 1965 (20 U.S.C. 1059c).*

1 **SEC. 10003. BUDGETARY EFFECTS.**

2 (a) *STATUTORY PAYGO SCORECARDS.*—*The budgetary*
3 *effects of this division shall not be entered on either PAYGO*
4 *scorecard maintained pursuant to section 4(d) of the Statu-*
5 *tory Pay-As-You-Go Act of 2010 (2 U.S.C. 933(d)).*

6 (b) *SENATE PAYGO SCORECARDS.*—*The budgetary ef-*
7 *fects of this division shall not be entered on any PAYGO*
8 *scorecard maintained for purposes of section 4106 of H.*
9 *Con. Res. 71 (115th Congress).*

10 (c) *CLASSIFICATION OF BUDGETARY EFFECTS.*—*Not-*
11 *withstanding Rule 3 of the Budget Scorekeeping Guidelines*
12 *set forth in the joint explanatory statement of the committee*
13 *of conference accompanying Conference Report 105–217*
14 *and section 250(c)(8) of the Balanced Budget and Emer-*
15 *gency Deficit Control Act of 1985, the budgetary effects of*
16 *this division shall not be estimated—*

17 (1) *for purposes of section 251 of such Act;*

18 (2) *for purposes of an allocation to the Com-*
19 *mittee on Appropriations pursuant to section 302(a)*
20 *of the Congressional Budget Act of 1974; and*

21 (3) *for purposes of paragraph (4)(C) of section*
22 *3 of the Statutory Pay-As-You-Go Act of 2010 as*
23 *being included in an appropriation Act.*

1 **TITLE I—DEPARTMENT OF EN-**
2 **ERGY SCIENCE FOR THE FU-**
3 **TURE**

4 **SEC. 10101. MISSION OF THE OFFICE OF SCIENCE.**

5 *Section 209 of the Department of Energy Organization*
6 *Act (42 U.S.C. 7139) is amended by adding at the end the*
7 *following:*

8 *“(d) USER FACILITIES.—The Director shall carry out*
9 *the construction, operation, and maintenance of user facili-*
10 *ties to support the mission described in subsection (c). As*
11 *practicable, these facilities shall serve the needs of the De-*
12 *partment, industry, the academic community, and other*
13 *relevant entities for the purposes of advancing the missions*
14 *of the Department, improving the competitiveness of the*
15 *United States, protecting public health and safety, and ad-*
16 *dressing other national priorities including emergencies.*

17 *“(e) COORDINATION.—*

18 *“(1) IN GENERAL.—The Secretary—*

19 *“(A) shall ensure the coordination of the Of-*
20 *fice of Science with the other activities of the De-*
21 *partment, including the transfer of knowledge,*
22 *capabilities, and relevant technologies from basic*
23 *research programs of the Department to applied*
24 *research and development programs of the De-*

1 *partment for the purpose of enabling develop-*
2 *ment of mission-relevant technologies;*

3 *“(B) shall support joint activities among*
4 *the programs of the Department;*

5 *“(C) shall coordinate with other relevant*
6 *Federal agencies operating under existing au-*
7 *thorizations relating to subjects relating to the*
8 *mission described in subsection (c) in supporting*
9 *advancements in related research areas as appro-*
10 *priate; and*

11 *“(D) may form partnerships to enhance the*
12 *utilization of and ensure access to user facilities*
13 *by other Federal agencies.*

14 *“(2) OFFICE OF SCIENCE.—The Director—*

15 *“(A) shall ensure the coordination of pro-*
16 *grams and activities carried out by the Office of*
17 *Science; and*

18 *“(B) shall direct all programs which have*
19 *not recently completed a future planning road-*
20 *map consistent with the funding of such pro-*
21 *grams authorized under the Research and Devel-*
22 *opment, Competition, and Innovation Act to*
23 *complete such a roadmap.”.*

1 **SEC. 10102. BASIC ENERGY SCIENCES PROGRAM.**

2 (a) *DEPARTMENT OF ENERGY RESEARCH AND INNOVA-*
3 *TION ACT.*—Section 303 of the Department of Energy Re-

4 *search and Innovation Act (42 U.S.C. 18641) is amended—*
5 (1) *by redesignating subsections (a) through (e)*
6 *as subsections (c) through (g), respectively;*

7 (2) *by inserting before subsection (c), as so red-*
8 *esignated, 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), the Director shall carry out a*
12 *research and development program in basic energy sciences,*
13 *including materials sciences and engineering, chemical*
14 *sciences, physical biosciences, geosciences, and other dis-*
15 *ciplines, to understand, model, and control matter and en-*
16 *ergy at the electronic, atomic, and molecular levels in order*
17 *to provide the foundations for new energy technologies, ad-*
18 *dress scientific grand challenges, and support the energy,*
19 *environment, and national security missions of the Depart-*
20 *ment.*

21 “(b) *SUSTAINABLE CHEMISTRY.*—In carrying out
22 *chemistry-related research and development activities under*
23 *this section, the Director shall prioritize research and devel-*
24 *opment of sustainable chemistry to support clean, safe, and*
25 *economic alternatives and methodologies to traditional*
26 *chemical products and processes.”;*

1 (3) *in subsection (d), as so redesignated—*

2 (A) *in paragraph (3)—*

3 (i) *in subparagraph (C), by striking*

4 “and” *at the end;*

5 (ii) *by redesignating subparagraph (D)*

6 *as subparagraph (E); and*

7 (iii) *by inserting after subparagraph*

8 (C) *the following:*

9 “(D) *autonomous chemistry and materials*
10 *synthesis and characterization facilities that le-*
11 *verage advances in artificial intelligence; and”;*
12 *and*

13 (B) *by adding at the end the following:*

14 “(4) *ADVANCED PHOTON SOURCE UPGRADE.—*

15 “(A) *DEFINITIONS.—In this paragraph:*

16 “(i) *FLUX.—The term ‘flux’ means the*
17 *rate of flow of photons.*

18 “(ii) *HARD X-RAY.—The term ‘hard x-*
19 *ray’ means a photon with energy greater*
20 *than 20 kiloelectron volts.*

21 “(B) *UPGRADE.—The Secretary shall pro-*
22 *vide for the upgrade to the Advanced Photon*
23 *Source described in the publication approved by*
24 *the Basic Energy Sciences Advisory Committee*
25 *on June 9, 2016, entitled ‘Report on Facility*

1 *Upgrades’, including the development of a*
2 *multibend achromat lattice to produce a high*
3 *flux of coherent x-rays within the hard x-ray en-*
4 *ergy region and a suite of beamlines optimized*
5 *for this source.*

6 “(C) *START OF OPERATIONS.*—*The Sec-*
7 *retary shall, subject to the availability of appro-*
8 *priations, ensure that the start of full operations*
9 *of the upgrade under this paragraph occurs be-*
10 *fore March 31, 2026.*

11 “(D) *FUNDING.*—*Out of funds authorized to*
12 *be appropriated under subsection (j), there is au-*
13 *thorized to be appropriated to the Secretary to*
14 *carry out the upgrade under this paragraph*
15 *\$14,200,000 for fiscal year 2023.*

16 “(5) *SPALLATION NEUTRON SOURCE PROTON*
17 *POWER UPGRADE.*—

18 “(A) *IN GENERAL.*—*The Secretary shall*
19 *provide for the proton power upgrade to the*
20 *Spallation Neutron Source.*

21 “(B) *PROTON POWER UPGRADE DEFINED.*—
22 *In this paragraph, the term ‘proton power up-*
23 *grade’ means the Spallation Neutron Source*
24 *power upgrade described in—*

1 “(i) the publication entitled ‘Facilities
2 for the Future of Science: A Twenty-Year
3 Outlook’, published by the Office of Science
4 of the Department in December, 2003;

5 “(ii) the publication entitled ‘Four
6 Years Later: An Interim Report on Facili-
7 ties for the Future of Science: A Twenty-
8 Year Outlook’, published by the Office of
9 Science of the Department in August, 2007;
10 and

11 “(iii) the publication approved by the
12 Basic Energy Sciences Advisory Committee
13 on June 9, 2016, entitled ‘Report on Facil-
14 ity Upgrades’.

15 “(C) *START OF OPERATIONS.*—The Sec-
16 retary shall, subject to the availability of appro-
17 priations, ensure that the start of full operations
18 of the upgrade under this paragraph occurs be-
19 fore July 30, 2028, with the option for early op-
20 eration in 2025.

21 “(D) *FUNDING.*—Out of funds authorized to
22 be appropriated under subsection (j), there is au-
23 thorized to be appropriated to the Secretary to
24 carry out the upgrade under this paragraph—

25 “(i) \$17,000,000 for fiscal year 2023;

1 “(ii) \$14,202,000 for fiscal year 2024;

2 *and*

3 “(iii) \$1,567,000 for fiscal year 2025.

4 “(6) *SPALLATION NEUTRON SOURCE SECOND*
5 *TARGET STATION.—*

6 “(A) *IN GENERAL.—The Secretary shall*
7 *provide for a second target station for the Spall-*
8 *ation Neutron Source.*

9 “(B) *SECOND TARGET STATION DEFINED.—*
10 *In this paragraph, the term ‘second target sta-*
11 *tion’ means the Spallation Neutron Source sec-*
12 *ond target station described in—*

13 “(i) *the publication entitled, ‘Facilities*
14 *for the Future of Science: A Twenty-Year*
15 *Outlook’, published by the Office of Science*
16 *of the Department in December, 2003;*

17 “(ii) *the publication entitled, ‘Four*
18 *Years Later: An Interim Report on Facili-*
19 *ties for the Future of Science: A Twenty-*
20 *Year Outlook’, published by the Office of*
21 *Science of the Department in August, 2007;*

22 *and*

23 “(iii) *the publication approved by the*
24 *Basic Energy Sciences Advisory Committee*

1 on June 9, 2016, entitled ‘Report on Facil-
2 ity Upgrades’.

3 “(C) *START OF OPERATIONS.*—The Sec-
4 retary shall, subject to the availability of appro-
5 priations, ensure that the start of full operations
6 of the second target station under this paragraph
7 occurs before December 31, 2033, with the option
8 for early operation in 2029.

9 “(D) *FUNDING.*—Out of funds authorized to
10 be appropriated under subsection (j), there are
11 authorized to be appropriated to the Secretary to
12 carry out the activities under this paragraph,
13 including construction—

14 “(i) \$127,000,000 for fiscal year 2023;

15 “(ii) \$205,000,000 for fiscal year 2024;

16 “(iii) \$279,000,000 for fiscal year
17 2025;

18 “(iv) \$300,000,000 for fiscal year 2026;

19 and

20 “(v) \$281,000,000 for fiscal year 2027.

21 “(7) *ADVANCED LIGHT SOURCE UPGRADE.*—

22 “(A) *DEFINITIONS.*—In this paragraph:

23 “(i) *FLUX.*—The term ‘flux’ means the
24 rate of flow of photons.

1 “(ii) *SOFT X-RAY.*—The term ‘soft x-
2 ray’ means a photon with energy in the
3 range from 50 to 2,000 electron volts.

4 “(B) *UPGRADE.*—The Secretary shall pro-
5 vide for the upgrade to the Advanced Light
6 Source described in the publication approved by
7 the Basic Energy Sciences Advisory Committee
8 on June 9, 2016, entitled ‘Report on Facility
9 Upgrades’, including the development of a
10 multibend achromat lattice to produce a high
11 flux of coherent x-rays within the soft x-ray en-
12 ergy region.

13 “(C) *START OF OPERATIONS.*—The Sec-
14 retary shall, subject to the availability of appro-
15 priations, ensure that the start of full operations
16 of the upgrade under this paragraph occurs be-
17 fore September 30, 2029.

18 “(D) *FUNDING.*—Out of funds authorized to
19 be appropriated under subsection (j), there are
20 authorized to be appropriated to the Secretary to
21 carry out the upgrade under this paragraph—

22 “(i) \$135,000,000 for fiscal year 2023;

23 “(ii) \$102,500,000 for fiscal year 2024;

24 “(iii) \$50,000,000 for fiscal year 2025;

25 and

1 “(iv) \$1,400,000 for fiscal year 2026.

2 “(8) *LINAC COHERENT LIGHT SOURCE II HIGH*
3 *ENERGY UPGRADE.*—

4 “(A) *DEFINITIONS.*—*In this paragraph:*

5 “(i) *HIGH ENERGY.*—*The term ‘high*
6 *energy’, with respect to an x-ray, means a*
7 *photon with an energy in the 5 to 13*
8 *kiloelectron volt range.*

9 “(ii) *HIGH REPETITION RATE.*—*The*
10 *term ‘high repetition rate’ means the deliv-*
11 *ery of x-ray pulses up to 1,000,000 pulses*
12 *per second.*

13 “(iii) *ULTRA-SHORT PULSE.*—*The*
14 *term ‘ultra-short pulse’, with respect to an*
15 *x-ray, means that the x-ray has bursts ca-*
16 *pable of durations of less than 100*
17 *femtoseconds.*

18 “(B) *UPGRADE.*—*The Secretary shall—*

19 “(i) *provide for the upgrade to the*
20 *Linac Coherent Light Source II facility de-*
21 *scribed in the publication approved by the*
22 *Basic Energy Sciences Advisory Committee*
23 *on June 9, 2016, entitled ‘Report on Facil-*
24 *ity Upgrades’, including the development of*
25 *experimental capabilities for high energy x-*

1 *rays to reveal fundamental scientific discov-*
2 *eries; and*

3 “(ii) *ensure such upgrade enables the*
4 *production and use of high energy, ultra-*
5 *short pulse x-rays delivered at a high rep-*
6 *etition rate.*

7 “(C) *START OF OPERATIONS.—The Sec-*
8 *retary shall, subject to the availability of appro-*
9 *priations, ensure that the start of full operations*
10 *of the upgrade under this paragraph occurs be-*
11 *fore December 31, 2026.*

12 “(D) *FUNDING.—Out of funds authorized to*
13 *be appropriated under subsection (j), there are*
14 *authorized to be appropriated to the Secretary to*
15 *carry out the upgrade under this paragraph—*

16 “(i) *\$100,000,000 for fiscal year 2023;*

17 “(ii) *\$130,000,000 for fiscal year 2024;*

18 “(iii) *\$135,000,000 for fiscal year*
19 *2025; and*

20 “(iv) *\$99,343,000 for fiscal year 2026.*

21 “(9) *CRYMODULE REPAIR AND MAINTENANCE*
22 *FACILITY.—*

23 “(A) *IN GENERAL.—The Secretary shall*
24 *provide for the construction of a cryomodule re-*
25 *pair and maintenance facility to service the*

1 *Linac Coherent Light Source II and subsequent*
2 *upgrades.*

3 “(B) *CONSULTATION REQUIRED.*—*The Sec-*
4 *retary shall consult with the private sector, insti-*
5 *tutions of higher education, National Labora-*
6 *tories, and relevant Federal agencies to ensure*
7 *that the facility described in subparagraph (A)*
8 *has the capability to maintain, repair, and test*
9 *superconducting radio frequency accelerator com-*
10 *ponents.*

11 “(C) *FUNDING.*—*Out of funds authorized to*
12 *be appropriated under subsection (j), there are*
13 *authorized to be appropriated to the Secretary to*
14 *carry out the activities under this paragraph—*

15 “(i) \$29,300,000 for fiscal year 2023;
16 “(ii) \$24,000,000 for fiscal year 2024;
17 “(iii) \$20,000,000 for fiscal year 2025;
18 and
19 “(iv) \$15,700,000 for fiscal year 2026.

20 “(10) *NANOSCALE SCIENCE RESEARCH CENTER*
21 *RECAPITALIZATION PROJECT.*—

22 “(A) *IN GENERAL.*—*The Secretary shall*
23 *provide for the recapitalization of the Nanoscale*
24 *Science Research Centers, to include the upgrade*
25 *of equipment at each Center supported by the Of-*

1 *ficie of Science on the date of enactment of the*
2 *Research and Development, Competition, and In-*
3 *novation Act, to accelerate advances in the var-*
4 *ious fields of science including nanoscience, ma-*
5 *terials, chemistry, biology, and quantum infor-*
6 *mation science.*

7 *“(B) FUNDING.—Out of funds authorized to*
8 *be appropriated under subsection (j), there are*
9 *authorized to be appropriated to the Secretary to*
10 *carry out the recapitalization under this para-*
11 *graph—*

12 *“(i) \$25,000,000 for fiscal year 2023;*

13 *and*

14 *“(ii) \$25,000,000 for fiscal year 2024.*

15 *“(11) NATIONAL SYNCHROTRON LIGHT SOURCE II*
16 *BEAMLINE BUILDOUT.—*

17 *“(A) IN GENERAL.—The Secretary shall*
18 *provide for the development and construction of*
19 *experimental stations to provide significant ad-*
20 *ditional beamline and instrument capacity, com-*
21 *plement the existing portfolio of beamlines, and*
22 *complete the buildout of the National Synchro-*
23 *tron Light Source II.*

1 “(B) *START OF OPERATIONS.*—Subject to
2 the availability of appropriations, the Sec-
3 retary—

4 “(i) shall begin carrying out subpara-
5 graph (A) not later than September 30,
6 2036; and

7 “(ii) may begin carrying out subpara-
8 graph (A)—

9 “(I) in calendar year 2033; or

10 “(II) after the construction of in-
11 dividual beamlines is complete.”; and

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

13 “(h) *COMPUTATIONAL MATERIALS AND CHEMICAL*
14 *SCIENCES.*—

15 “(1) *IN GENERAL.*—The Director shall support a
16 program of research and development for the applica-
17 tion of advanced computing practices to foundational
18 and emerging research problems in chemistry and
19 materials science. Research activities shall include—

20 “(A) chemical catalysis research and devel-
21 opment;

22 “(B) the use of large data sets to model ma-
23 terials phenomena, including through advanced
24 characterization of materials, materials syn-

1 *thesis, processing, and innovative use of experi-*
2 *mental and theoretical data;*

3 “(C) *codesign of chemical system and chem-*
4 *istry modeling software with advanced com-*
5 *puting systems and hardware technologies; and*

6 “(D) *modeling of chemical processes, assem-*
7 *blies, and reactions such as molecular dynamics*
8 *and quantum chemistry, including through novel*
9 *computing methods.*

10 “(2) *COMPUTATIONAL MATERIALS AND CHEMICAL*
11 *SCIENCES CENTERS.—*

12 “(A) *IN GENERAL.—In carrying out the ac-*
13 *tivities authorized under paragraph (1), the Di-*
14 *rector shall select and establish up to 6 computa-*
15 *tional materials and chemical sciences centers*
16 *to—*

17 “(i) *develop open-source, robust, and*
18 *validated computational codes and user-*
19 *friendly software, coupled with innovative*
20 *use of experimental and theoretical data, to*
21 *enable the design, discovery, and develop-*
22 *ment of new materials and chemical sys-*
23 *tems; and*

24 “(ii) *focus on overcoming challenges*
25 *and maximizing the benefits of exascale and*

1 *other high performance computing under-*
2 *pinned by accelerated node technologies.*

3 “(B) *SELECTION.*—*The Director shall select*
4 *centers under subparagraph (A) on a competi-*
5 *tive, merit-reviewed basis. The Director shall*
6 *consider applications from the National Labora-*
7 *tories, institutions of higher education, multi-in-*
8 *stitutional collaborations, and other appropriate*
9 *entities.*

10 “(C) *DURATION.*—

11 “(i) *NEW CENTERS.*—*A center selected*
12 *under subparagraph (A) shall receive sup-*
13 *port for a period of not more than 5 years*
14 *beginning on the date of establishment of*
15 *that center, subject to the availability of ap-*
16 *propriations.*

17 “(ii) *EXISTING CENTERS.*—*A center al-*
18 *ready in existence on the date of enactment*
19 *of the Research and Development, Competi-*
20 *tion, and Innovation Act may continue to*
21 *receive support for a period of not more*
22 *than 5 years beginning on the date of estab-*
23 *lishment of that center.*

24 “(D) *RENEWAL.*—*Upon the expiration of*
25 *any period of support of a center under this sub-*

1 *section, the Director may renew support for the*
2 *center, on a merit-reviewed basis, for a period of*
3 *not more than 5 years.*

4 “(i) *MATERIALS RESEARCH DATABASE.—*

5 “(1) *IN GENERAL.—The Director shall support*
6 *the development of a web-based platform to develop*
7 *and provide access to a database of computed infor-*
8 *mation on known and predicted materials properties*
9 *and computational tools to accelerate breakthroughs*
10 *in materials discovery and design.*

11 “(2) *PROGRAM.—In carrying out this subsection,*
12 *the Director shall—*

13 “(A) *conduct cooperative research among*
14 *National Laboratories, industry, academia, and*
15 *other research institutions to advance under-*
16 *standing, prediction, and manipulation of mate-*
17 *rials and facilitate the design of novel materials;*

18 “(B) *develop and maintain data infrastruc-*
19 *ture at user facilities that generate data to col-*
20 *lect, analyze, label, and otherwise prepare the*
21 *data for inclusion in the database;*

22 “(C) *leverage existing high performance*
23 *computing systems to conduct high throughput*
24 *calculations, and develop computational and*

1 *data mining algorithms for the prediction of ma-*
2 *terial properties;*

3 “(D) *strengthen the foundation for new*
4 *technologies and advanced manufacturing; and*

5 “(E) *drive the development of advanced ma-*
6 *terials for applications that span the Depart-*
7 *ment’s missions in energy, environment, and na-*
8 *tional security.*

9 “(3) *COORDINATION.—In carrying out this sub-*
10 *section, the Director shall leverage programs and ac-*
11 *tivities across the Department, including computa-*
12 *tional materials and chemical sciences centers estab-*
13 *lished under subsection (h).*

14 “(4) *FUNDING.—Out of funds authorized to be*
15 *appropriated under subsection (j), there is authorized*
16 *to be appropriated to the Secretary to carry out ac-*
17 *tivities under this subsection \$10,000,000 for each of*
18 *fiscal years 2023 through 2027.*

19 “(j) *AUTHORIZATION OF APPROPRIATIONS.—Out of*
20 *funds authorized to be appropriated to the Office of Science*
21 *in a fiscal year, there are authorized to be appropriated*
22 *to the Secretary to carry out the activities described in this*
23 *section—*

24 “(1) *\$2,685,414,000 for fiscal year 2023;*

25 “(2) *\$2,866,890,840 for fiscal year 2024;*

1 “(3) \$2,987,727,170 for fiscal year 2025;

2 “(4) \$3,062,732,781 for fiscal year 2026; and

3 “(5) \$3,080,067,167 for fiscal year 2027.”.

4 (b) *ARTIFICIAL PHOTOSYNTHESIS*.—Section 973 of the
5 *Energy Policy Act of 2005* (42 U.S.C. 16313) is amended—

6 (1) in subsection (b), by striking paragraph (4)
7 and inserting the following:

8 “(4) *FUNDS*.—Of the funds authorized to be ap-
9 propriated for basic energy sciences in a fiscal year,
10 there is authorized to be appropriated to the Sec-
11 retary to carry out activities under this subsection
12 \$50,000,000 for each of fiscal years 2023 through
13 2027.”; and

14 (2) in subsection (c), by striking paragraph (4)
15 and inserting the following:

16 “(4) *FUNDS*.—Of the funds authorized to be ap-
17 propriated for basic energy sciences in a fiscal year,
18 there is authorized to be appropriated to the Sec-
19 retary to carry out activities under this subsection
20 \$50,000,000 for each of fiscal years 2023 through
21 2027.”.

22 (c) *ELECTRICITY STORAGE RESEARCH INITIATIVE*.—
23 Section 975 of the *Energy Policy Act of 2005* (42 U.S.C.
24 16315) is amended—

25 (1) in subsection (a)—

1 (A) in paragraph (1)—

2 (i) in subparagraph (A)(ii), by striking
3 “and” after the semicolon at the end;

4 (ii) in subparagraph (B), by striking
5 the period at the end and inserting “; and”;
6 and

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

9 “(C) to ensure the competitiveness of the
10 United States in energy storage by fostering an
11 ecosystem linking fundamental research and de-
12 velopment to deployment of storage solutions
13 while minimizing the environmental impacts of
14 energy storage technologies.”; and

15 (B) in paragraph (2)—

16 (i) in subparagraph (A), by striking
17 “and” after the semicolon at the end;

18 (ii) in subparagraph (B), by striking
19 the period at the end and inserting “; and”;
20 and

21 (iii) by adding at the end the fol-
22 lowing:

23 “(C) any other relevant office of the Depart-
24 ment.”;

1 (2) *in subsection (b), by striking paragraph (4)*
2 *and inserting the following:*

3 “(4) *FUNDING.—Of the funds authorized to be*
4 *appropriated for basic energy sciences in a fiscal*
5 *year, there is authorized to be appropriated to the*
6 *Secretary to carry out activities under this subsection*
7 *\$50,000,000 for each of fiscal years 2023 through*
8 *2027.”;*

9 (3) *in subsection (c), by striking paragraph (4)*
10 *and inserting the following:*

11 “(4) *FUNDING.—Of the funds authorized to be*
12 *appropriated for basic energy sciences in a fiscal*
13 *year, there is authorized to be appropriated to the*
14 *Secretary to carry out activities under this subsection*
15 *\$50,000,000 for each of fiscal years 2023 through*
16 *2027.”; and*

17 (4) *in subsection (d), by striking paragraph (4)*
18 *and inserting the following:*

19 “(4) *FUNDING.—Of the funds authorized to be*
20 *appropriated for basic energy sciences in a fiscal*
21 *year, there is authorized to be appropriated to the*
22 *Secretary to carry out activities under this subsection*
23 *\$20,000,000 for each of fiscal years 2023 through*
24 *2027.”.*

25 (d) *FOUNDATIONAL NUCLEAR SCIENCE.—*

1 (1) *IN GENERAL.*—*The Director of the Office of*
2 *Science shall support a program of research and de-*
3 *velopment to bridge scientific barriers to, and expand*
4 *theoretical and fundamental knowledge relevant to,*
5 *understanding nuclear materials and matter for the*
6 *benefit of commerce, medicine, and national security.*

7 (2) *ACTIVITIES.*—*As part of the program de-*
8 *scribed in paragraph (1)—*

9 (A) *the Director of the Office of Science*
10 *shall support basic research to pursue distinct*
11 *lines of scientific inquiry, including—*

12 (i) *research in nuclear materials*
13 *science, including the application of ad-*
14 *vanced computing practices to foundational*
15 *and emerging research areas in nuclear ma-*
16 *terials science and discovery, such as—*

17 (I) *the advanced characterization*
18 *of materials;*

19 (II) *materials synthesis;*

20 (III) *processing;*

21 (IV) *the innovative use of experi-*
22 *mental and theoretical data; and*

23 (V) *mechanical behavior in*
24 *unique environments, including the ef-*
25 *fects of radiation;*

1 (ii) *electrochemistry research and asso-*
2 *ciated techniques for processing nuclear ma-*
3 *terials;*

4 (iii) *the development of advanced in-*
5 *strumentation and nuclear data collection*
6 *to inform the activities described in clauses*
7 *(i) and (ii); and*

8 (iv) *any other area of research, as de-*
9 *termined by the Director of the Office of*
10 *Science; and*

11 (B) *the Assistant Secretary for Nuclear En-*
12 *ergy shall consult with the Director of the Office*
13 *of Science to support the direction of*
14 *translational research, development, and valida-*
15 *tion of physical concepts developed under the*
16 *program.*

17 (3) *FUNDING.*—*Of the funds authorized to be ap-*
18 *propriated for basic energy sciences in a fiscal year,*
19 *there is authorized to be appropriated to the Sec-*
20 *retary of Energy to carry out activities under this*
21 *subsection \$50,000,000 for each of fiscal years 2023*
22 *through 2027.*

23 (e) *CARBON MATERIALS SCIENCE INITIATIVE.*—

24 (1) *INITIATIVE.*—

1 (A) *IN GENERAL.*—*The Director of the Of-*
2 *fice of Science (referred to in this subsection as*
3 *the “Director”)* shall establish a research initia-
4 *tive, to be known as the “Carbon Materials*
5 *Science Initiative” (referred to in this subsection*
6 *as the “Initiative”), to expand the fundamental*
7 *knowledge of coal, coal-wastes, and carbon ore*
8 *chemistry useful for understanding the conver-*
9 *sion of carbon to material products.*

10 (B) *COORDINATION.*—*In carrying out pro-*
11 *grams and activities under the Initiative, the*
12 *Director shall leverage expertise and resources*
13 *from the Office of Fossil Energy and Carbon*
14 *Management and the United States Geological*
15 *Survey.*

16 (C) *TEAMS.*—

17 (i) *IN GENERAL.*—*In carrying out the*
18 *Initiative, the Director shall establish and*
19 *organize activities among multidisciplinary*
20 *teams to leverage, to the maximum extent*
21 *practicable, expertise from the National*
22 *Laboratories, institutions of higher edu-*
23 *cation, and the private sector.*

24 (ii) *GOALS.*—*The multidisciplinary*
25 *teams described in clause (i) shall pursue*

1 *expedient, milestone-driven research goals*
2 *established by the Director.*

3 (2) *RESEARCH PROGRAM.*—

4 (A) *IN GENERAL.*—*The Director shall carry*
5 *out under the Initiative a program to support,*
6 *and discover fundamental knowledge relevant to,*
7 *carbon materials and carbon ore processing re-*
8 *search.*

9 (B) *ACTIVITIES.*—*As part of the program*
10 *described in subparagraph (A), the Director*
11 *shall, in coordination with the Assistant Sec-*
12 *retary of Energy for Fossil Energy and Carbon*
13 *Management, as appropriate, support research to*
14 *pursue distinct lines of scientific inquiry, includ-*
15 *ing—*

16 (i) *methods of extraction, processing,*
17 *recycling, and utilization of the materials*
18 *and valuable minerals contained in raw*
19 *coal and coal-waste;*

20 (ii) *methods of improving performance,*
21 *cost, and availability of materials for use in*
22 *carbon capture systems; and*

23 (iii) *unconventional pathways and*
24 *materials for conversion of carbon dioxide*
25 *molecules, minerals, and materials.*

1 (C) *REVIEW.*—*The Director shall periodically*
2 *review activities carried out under the pro-*
3 *gram described in subparagraph (A) to evaluate*
4 *the achievement of scientific objectives and re-*
5 *search milestones.*

6 (D) *COORDINATION WITH EXISTING PRO-*
7 *GRAMS AND CENTERS.*—*In carrying out the pro-*
8 *gram described in subparagraph (A), the Direc-*
9 *tor shall—*

10 (i) *ensure coordination and knowledge*
11 *sharing with—*

12 (I) *the United States Geological*
13 *Survey; and*

14 (II) *the programs and the Carbon*
15 *Utilization Research Center established*
16 *under section 969A of the Energy Pol-*
17 *icy Act of 2005 (42 U.S.C. 16298a);*
18 *and*

19 (ii) *avoid duplication of efforts to the*
20 *maximum extent practicable.*

21 (3) *CARBON MATERIALS RESEARCH CENTERS.*—

22 (A) *IN GENERAL.*—*In carrying out the ac-*
23 *tivities authorized under paragraph (2), the Di-*
24 *rector shall establish 1 center in each of the 2*

1 *major coal-producing regions of the United*
2 *States, each of which shall—*

3 *(i) be known as a “Carbon Materials*
4 *Research Center” (referred to in this para-*
5 *graph as a “Center”); and*

6 *(ii) focus on early stage research and*
7 *development activities, including—*

8 *(I) developing and advancing*
9 *methods of extracting, processing, or*
10 *recycling carbon or other valuable ma-*
11 *terials or minerals from raw coal, coal-*
12 *waste, or other solid carbon materials,*
13 *for the development of new carbon-*
14 *based materials;*

15 *(II) methods of improving the*
16 *structural, physical, and chemical*
17 *properties of carbon-based materials or*
18 *other valuable materials from raw coal,*
19 *coal-waste, or other solid carbon mate-*
20 *rials and their recyclability;*

21 *(III) overcoming the challenges*
22 *and maximizing the benefits of com-*
23 *mercially extracting, producing, or im-*
24 *proving coal-derived carbon and result-*
25 *ing products; and*

1 (IV) *identifying novel pathways*
2 *and materials for carbon storage and*
3 *conversion into useful products.*

4 (B) *SELECTION.—The Director shall—*

5 (i) *select Centers under subparagraph*
6 (A) *on a competitive, merit-reviewed basis;*
7 *and*

8 (ii) *consider applications from the Na-*
9 *tional Laboratories, institutions of higher*
10 *education, multi-institutional collabora-*
11 *tions, and other appropriate entities.*

12 (C) *DURATION.—A Center shall receive sup-*
13 *port for a period of not more than 5 years begin-*
14 *ning on the date of establishment of that Center,*
15 *subject to the availability of appropriations.*

16 (D) *RENEWAL.—On the expiration of any*
17 *period of support of a Center, the Director may*
18 *renew support for that Center, on a merit-re-*
19 *viewed basis, for a period of not more than 5*
20 *years.*

21 (E) *EXISTING FACILITIES.—The Director*
22 *shall—*

23 (i) *ensure that the research activities*
24 *carried out by the Centers are not duplica-*
25 *tive of existing efforts; and*

1 (ii) if practicable, leverage existing
2 user facilities and other capabilities of the
3 Department of Energy to carry out the re-
4 search objectives of the Centers.

5 (f) CARBON SEQUESTRATION RESEARCH AND GEO-
6 LOGIC COMPUTATIONAL SCIENCE INITIATIVE.—

7 (1) INITIATIVE.—

8 (A) IN GENERAL.—The Secretary of Energy
9 (referred to in this subsection as the “Secretary”)
10 shall establish a research initiative, to be known
11 as the “Carbon Sequestration Research and Geo-
12 logic Computational Science Initiative” (referred
13 to in this subsection as the “Initiative”), to ex-
14 pand the fundamental knowledge, data collection,
15 data analysis, and modeling of subsurface geol-
16 ogy for the purpose of advancing carbon seques-
17 tration in geologic formations.

18 (B) LEVERAGING.—In carrying out pro-
19 grams and activities under the Initiative, the
20 Secretary shall leverage expertise and resources
21 from the Office of Fossil Energy and Carbon
22 Management and the United States Geological
23 Survey.

24 (C) TEAMS.—

1 (i) *IN GENERAL.*—*In carrying out the*
2 *Initiative, the Secretary shall establish and*
3 *organize activities among multidisciplinary*
4 *teams to leverage, to the maximum extent*
5 *practicable, expertise from the National*
6 *Laboratories, institutions of higher edu-*
7 *cation, and the private sector.*

8 (ii) *GOALS.*—*The multidisciplinary*
9 *teams described in clause (i) shall pursue*
10 *aggressive, milestone-driven research goals*
11 *established by the Secretary.*

12 (D) *ADDITIONAL ACTIVITIES.*—*The Sec-*
13 *retary may organize additional activities under*
14 *this subsection through other organizational*
15 *structures.*

16 (2) *RESEARCH PROGRAM.*—

17 (A) *IN GENERAL.*—*The Secretary shall*
18 *carry out under the Initiative a program to sup-*
19 *port research needed for, and discover knowledge*
20 *relevant to, the sequestration of carbon in geo-*
21 *logic formations.*

22 (B) *ACTIVITIES.*—*As part of the program*
23 *described in subparagraph (A), the Director of*
24 *the Office of Science shall support fundamental*

1 *research to pursue distinct lines of scientific in-*
2 *quiry, including—*

3 *(i) gathering geologic data for pore*
4 *space characterization, including improve-*
5 *ments to geologic seismic imaging;*

6 *(ii) evaluating pore space quality, in-*
7 *cluding evaluation of geologic samples, to*
8 *determine appropriate sequestration zones*
9 *for carbon;*

10 *(iii) testing carbon sequestration;*

11 *(iv) monitoring carbon migration in*
12 *geologic formations;*

13 *(v) advancements in data analytics,*
14 *including the analysis of seismic data, and*
15 *computational science to improve the ad-*
16 *vanced computing, visualization, and imag-*
17 *ing of geologic formations for the sequestra-*
18 *tion of carbon; and*

19 *(vi) predictive understanding of cou-*
20 *pled processes in complex subsurface geo-*
21 *logic systems for secure carbon storage.*

22 *(C) REVIEW.—The Secretary shall periodi-*
23 *cally review activities carried out under the pro-*
24 *gram described in subparagraph (A) to evaluate*

1 *achievement of scientific objectives and research*
2 *milestones.*

3 (3) *CARBON STORAGE RESEARCH AND GEOLOGIC*
4 *COMPUTATIONAL SCIENCE CENTERS.—*

5 (A) *IN GENERAL.—In carrying out the ac-*
6 *tivities authorized under paragraph (2), the Sec-*
7 *retary shall select and establish not more than 2*
8 *carbon storage research and geologic computa-*
9 *tional science centers (referred to in this para-*
10 *graph as a “Center”) to develop and advance*
11 *improvements to data collection, analysis, and*
12 *modeling of subsurface geology for the purpose of*
13 *advancing carbon sequestration in geologic for-*
14 *mations.*

15 (B) *SELECTION.—*

16 (i) *IN GENERAL.—The Secretary*
17 *shall—*

18 (I) *select Centers under subpara-*
19 *graph (A) on a competitive, merit-re-*
20 *viewed basis; and*

21 (II) *to the maximum extent prac-*
22 *ticable, locate each Center in a geo-*
23 *graphically diverse region with estab-*
24 *lished and ongoing geologic carbon se-*

1 *questration research and demonstra-*
2 *tion.*

3 *(ii) APPLICATIONS.—In selecting Cen-*
4 *ters under subparagraph (A), the Secretary*
5 *shall consider applications from institutions*
6 *of higher education, multi-institutional col-*
7 *laborations, and other appropriate entities.*

8 *(C) DURATION.—*

9 *(i) NEW CENTERS.—A Center estab-*
10 *lished after the date of enactment of this Act*
11 *shall receive support for a period of not*
12 *more than 5 years beginning on the date of*
13 *establishment of that Center, subject to the*
14 *availability of appropriations.*

15 *(ii) EXISTING CENTERS.—A Center al-*
16 *ready in existence on the date of enactment*
17 *of this Act may continue to receive support*
18 *for a period of not more than 5 years begin-*
19 *ning on that date of enactment.*

20 *(iii) RENEWAL.—On expiration of a*
21 *period of support described in clause (i) or*
22 *(ii), the Secretary may renew support for*
23 *the Center, on a merit-reviewed basis, for a*
24 *period of not more than 5 years.*

1 (4) *COORDINATION WITH EXISTING PROGRAMS*
2 *AND CENTERS.*—*In carrying out this subsection, the*
3 *Secretary shall—*

4 (A) *ensure coordination with—*

5 (i) *the United States Geological Sur-*
6 *vey; and*

7 (ii) *the programs established under sec-*
8 *tion 963 of the Energy Policy Act of 2005*
9 *(42 U.S.C. 16293); and*

10 (B) *avoid duplication of efforts to the max-*
11 *imum extent practicable.*

12 (g) *FUNDING FOR CARBON INITIATIVES.*—*Of the funds*
13 *authorized to be appropriated for basic energy sciences in*
14 *a fiscal year, there is authorized to be appropriated to the*
15 *Secretary to carry out activities under subsections (e) and*
16 *(f) \$50,000,000 for each of fiscal years 2023 through 2027.*

17 **SEC. 10103. BIOLOGICAL AND ENVIRONMENTAL RESEARCH.**

18 (a) *PROGRAM; BIOLOGICAL SYSTEMS; BIOMOLECULAR*
19 *CHARACTERIZATION AND IMAGING SCIENCE.*—*Section 306*
20 *of the Department of Energy Research and Innovation Act*
21 *(42 U.S.C. 18644) is amended—*

22 (1) *in subsection (c), by redesignating para-*
23 *graphs (6) through (8) as paragraphs (5) through (7),*
24 *respectively;*

1 (2) *by redesignating subsections (b) through (d)*
2 *as subsections (d) through (f), respectively;*

3 (3) *by striking subsection (a) and inserting the*
4 *following:*

5 “(a) *PROGRAM.—As part of the duties of the Director*
6 *authorized under section 209 of the Department of Energy*
7 *Organization Act (42 U.S.C. 7139), and coordinated with*
8 *the activities authorized under sections 303 and 304, the*
9 *Director shall carry out a program of research and develop-*
10 *ment in the areas of biological systems science and climate*
11 *and environmental science, including subsurface science,*
12 *relevant to the development of new energy technologies and*
13 *to support the energy, environmental, and national security*
14 *missions of the Department.*

15 “(b) *BIOLOGICAL SYSTEMS.—The Director shall carry*
16 *out research and development activities in genomic science*
17 *including fundamental research on plants and microbes to*
18 *increase systems-level understanding of the complex biologi-*
19 *cal systems, which may include activities—*

20 (1) *to provide a fundamental understanding of*
21 *the biology of plants, fungi, and microbes as a basis*
22 *for developing innovative processes for bioenergy and*
23 *bioproducts and accelerate breakthroughs and new*
24 *knowledge that would enable the cost-effective, sustain-*
25 *able production of—*

1 “(A) advanced biofuels;

2 “(B) bioenergy; and

3 “(C) biobased materials;

4 “(2) to conduct foundational functional systems
5 biology research—

6 “(A) to support expanded biosystems design
7 research; and

8 “(B) to understand—

9 “(i) fundamental genome structure;
10 and

11 “(ii) phenomes, including functional
12 genomics of gene products at genome scale;

13 “(3) to develop biosystems designs and synthetic
14 biology approaches for new nonfood plant-derived and
15 microbially derived bioproducts as a basis for new
16 bioeconomy and biotechnology applications in bio-
17 products production, resource recovery, recycling, and
18 upcycling ventures;

19 “(4) to better understand the behavior of
20 microbiomes in the environment and the interdepend-
21 encies between plants and microbes in a sustainable
22 ecosystem;

23 “(5) to improve fundamental understanding of
24 plant and microbial processes impacting the global
25 carbon cycle, including processes for removing carbon

1 *dioxide from the atmosphere, through photosynthesis*
2 *and other biological processes, for sequestration, stor-*
3 *age, and utilization;*

4 “(6) to understand the microbiome mechanisms
5 *and microbiota used to transform, immobilize, or re-*
6 *move contaminants from subsurface environments*
7 *and that affect the cycling and disposition of carbon,*
8 *nutrients, and contaminants in the environment;*

9 “(7) to develop the computational approaches
10 *and integrated platforms for open access collaborative*
11 *science;*

12 “(8) to leverage tools and approaches across the
13 *Office of Science to expand research to include novel*
14 *processes, methods, and science to develop bio-based*
15 *chemicals, polymers, inorganic materials, including*
16 *research—*

17 “(A) to advance fungal, microbial, and
18 *plant biosystems design research to advance the*
19 *understanding of how CRISPR tools and other*
20 *gene editing tools and technologies work in na-*
21 *ture, in the laboratory, and in practice;*

22 “(B) to deepen genome-enabled knowledge of
23 *the roles of microbes and microbial communities,*
24 *including fungi, in—*

1 “(i) supporting plant and tree growth,
2 productivity, performance, adaptation, and
3 resilience in changing environmental condi-
4 tions; and

5 “(ii) optimizing end uses of biomass;
6 “(C) to develop biosystems design methods
7 and tools to increase the efficiency of photosyn-
8 thesis in plants; and

9 “(D) to increase the scale and pace of char-
10 acterizing the functions and physical character-
11 istics of microbes and microbial communities to
12 improve biosystems design;

13 “(9) to conduct research focused on developing
14 analysis techniques and simulation capabilities, in-
15 cluding artificial intelligence and machine learning,
16 on high-performance computing platforms to accel-
17 erate collaborative and reproducible systems biology
18 research;

19 “(10) to develop and improve new technologies
20 for bioimaging, measurement, and characterization
21 purposes to understand the structural, spatial, and
22 temporal relationships of metabolic processes gov-
23 erning phenotypic expression in plants and microbes;

24 “(11) to conduct research focused on genotype-to-
25 phenotype translations to develop a predictive under-

1 *standing of cellular function under a variety of rel-*
2 *evant environmental and bioenergy-related conditions;*

3 *“(12) to conduct metagenomic and metadata as-*
4 *sembly research sequencing and analysis; and*

5 *“(13) to develop other relevant methods and*
6 *processes as determined by the Director.*

7 *“(c) BIOMOLECULAR CHARACTERIZATION AND IMAG-*
8 *ING SCIENCE.—The Director shall carry out research and*
9 *development activities in biomolecular characterization and*
10 *imaging science, including development of new and integra-*
11 *tive imaging and analysis platforms and biosensors to un-*
12 *derstand the expression, structure, and function of genome*
13 *information encoded within cells and for real-time measure-*
14 *ments in ecosystems and field sites of relevance to the mis-*
15 *sion of the Department.”; and*

16 *(4) by adding at the end the following:*

17 *“(l) DEFINITIONS.—In this section:*

18 *“(1) ADVANCED BIOFUEL.—The term ‘advanced*
19 *biofuel’ has the meaning given the term in section*
20 *9001 of the Farm Security and Rural Investment Act*
21 *of 2002 (7 U.S.C. 8101).*

22 *“(2) BIOENERGY.—The term ‘bioenergy’ means*
23 *energy derived from biofuels.*

1 “(3) *BIOMASS*.—The term ‘biomass’ has the
2 meaning given the term in section 203(b) of the *En-*
3 *ergy Policy Act of 2005* (42 U.S.C. 15852(b)).

4 “(4) *BIOPRODUCT*.—The term ‘bioproduct’ has
5 the meaning given the term ‘biobased product’ in sec-
6 tion 9001 of the *Farm Security and Rural Invest-*
7 *ment Act of 2002* (7 U.S.C. 8101).”.

8 (b) *LOW-DOSE RADIATION RESEARCH PROGRAM*.—
9 Paragraph (8) of subsection (e) of section 306 of the *Depart-*
10 *ment of Energy Research and Innovation Act* (42 U.S.C.
11 18644), as redesignated by subsection (a)(2), is amended—

12 (1) in subparagraph (C), by striking “and”;

13 (2) in subparagraph (D), by striking the period
14 at the end and inserting a semicolon; and

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

16 “(E) \$40,000,000 for fiscal year 2025;

17 “(F) \$50,000,000 for fiscal year 2026; and

18 “(G) \$50,000,000 for fiscal year 2027.”.

19 (c) *LOW-DOSE RADIATION AND SPACE RADIATION RE-*
20 *SEARCH PROGRAM*.—Subsection (f) of section 306 of the *De-*
21 *partment of Energy Research and Innovation Act* (42
22 U.S.C. 18644), as redesignated by subsection (a)(2), is
23 amended to read as follows:

24 “(f) *LOW-DOSE RADIATION AND SPACE RADIATION*
25 *RESEARCH PROGRAM*.—

1 “(1) *IN GENERAL.*—*The Secretary, in consulta-*
2 *tion with the Administrator of the National Aero-*
3 *navics and Space Administration, shall carry out a*
4 *basic research program on the similarities and dif-*
5 *ferences between the effects of exposure to low-dose ra-*
6 *diation on Earth, in low Earth orbit, and in the*
7 *space environment.*

8 “(2) *PURPOSE.*—*The purpose of the program de-*
9 *scribed in paragraph (1) is to accelerate break-*
10 *throughs in low-dose and low dose-rate radiation re-*
11 *search and development as described in subsection (e)*
12 *and to inform the advancement of new tools, tech-*
13 *nologies, and advanced materials needed to facilitate*
14 *long-duration space exploration.”.*

15 *(d) CLIMATE, ENVIRONMENTAL SCIENCE, AND OTHER*
16 *ACTIVITIES.*—*Section 306 of the Department of Energy Re-*
17 *search and Innovation Act (42 U.S.C. 18644) (as amended*
18 *by subsection (a)) is amended by inserting after subsection*
19 *(f) the following:*

20 “(g) *EARTH AND ENVIRONMENTAL SYSTEMS SCIENCES*
21 *ACTIVITIES.*—

22 “(1) *IN GENERAL.*—*As part of the activities au-*
23 *thorized under subsection (a), and in coordination*
24 *with activities carried out under subsection (b), the*
25 *Director shall coordinate with the National Oceanic*

1 *and Atmospheric Administration, the National*
2 *Science Foundation, the Environmental Protection*
3 *Agency, the National Aeronautics and Space Admin-*
4 *istration, the Department of Agriculture, the Depart-*
5 *ment of the Interior, and any other relevant agencies*
6 *to carry out activities relating to Earth and environ-*
7 *mental systems science research, which may include*
8 *activities—*

9 “(A) to understand, observe, measure, and
10 model the response of Earth’s atmosphere and
11 biosphere to changing concentrations of green-
12 house gas emissions and any associated changes
13 in climate, including frequency and intensity of
14 extreme weather events;

15 “(B) to understand the coupled physical,
16 chemical, and biological processes to transform,
17 immobilize, remove, or move carbon, nitrogen,
18 and other energy production-derived contami-
19 nants such as radionuclides and heavy metals,
20 and understand the process of sequestration and
21 transformation of these, carbon dioxide, and
22 other relevant molecules in subsurface environ-
23 ments;

1 “(C) to understand, observe, and model the
2 *cycling of water, carbon, and nutrients in terres-*
3 *trial systems across spatiotemporal scales;*

4 “(D) to understand the biological, biogeo-
5 *chemical, and physical processes across the mul-*
6 *multiple scales that control the flux of environ-*
7 *mentally relevant compounds between the terres-*
8 *trial surface and the atmosphere; and*

9 “(E) to understand and predict interactions
10 *among natural and human systems to inform*
11 *potential mitigation and adaptation options for*
12 *increased concentrations of greenhouse gas emis-*
13 *sions and any associated changes in climate.*

14 “(2) *PRIORITIZATION.*—*In carrying out the pro-*
15 *gram authorized under paragraph (1), the Director*
16 *shall prioritize—*

17 “(A) *the development of software and algo-*
18 *rithms to enable the productive application of*
19 *environmental systems and extreme weather in*
20 *climate and Earth system prediction models in*
21 *high-performance computing systems; and*

22 “(B) *capabilities that support the Depart-*
23 *ment’s mission needs for energy and infrastruc-*
24 *ture security, resilience, and reliability.*

1 “(3) *ENVIRONMENTAL SYSTEMS SCIENCE RE-*
2 *SEARCH.*—

3 “(A) *IN GENERAL.*—*As part of the activities*
4 *described in paragraph (1), the Director shall*
5 *carry out research to advance an integrated, ro-*
6 *bust, and scale-aware predictive understanding*
7 *of environmental systems, including the role of*
8 *hydrobiogeochemistry, from the subsurface to the*
9 *top of the vegetative canopy that considers effects*
10 *of seasonal to interannual variability and*
11 *change.*

12 “(B) *CLEAN WATER AND WATERSHED RE-*
13 *SEARCH.*—*As part of the activities described in*
14 *subparagraph (A), the Director shall—*

15 “(i) *support interdisciplinary research*
16 *to significantly advance our understanding*
17 *of water availability, quality, and the im-*
18 *act of human activity and a changing cli-*
19 *mate on urban and rural watershed sys-*
20 *tems, including in freshwater environments;*

21 “(ii) *consult with the Interagency Re-*
22 *search, Development, and Demonstration*
23 *Coordination Committee on the Nexus of*
24 *Energy and Water for Sustainability estab-*
25 *lished under section 1010 of the Energy Act*

1 of 2020 (Public Law 116–260) on energy-
2 water nexus research activities;

3 “(iii) engage with representatives of re-
4 search and academic institutions, nonprofit
5 organizations, State, territorial, local, and
6 Tribal governments, and industry, who have
7 expertise in technologies, technological inno-
8 vations, or practices relating to the energy-
9 water nexus, as applicable; and

10 “(iv) coordinate with the National Oce-
11 anic and Atmospheric Administration, the
12 National Science Foundation, the Environ-
13 mental Protection Agency, the National
14 Aeronautics and Space Administration, the
15 Department of Agriculture, the Department
16 of the Interior, and any other relevant agen-
17 cy.

18 “(C) COORDINATION.—

19 “(i) DIRECTOR.—The Director shall
20 carry out activities under this paragraph in
21 accordance with priorities established by the
22 Secretary to support and accelerate the de-
23 contamination of relevant facilities man-
24 aged by the Department.

1 “(ii) *SECRETARY.*—*The Secretary shall*
2 *ensure the coordination of activities of the*
3 *Department, including activities under this*
4 *paragraph, to support and accelerate the de-*
5 *contamination of relevant facilities man-*
6 *aged by the Department.*

7 “(4) *CLIMATE AND EARTH MODELING.*—*As part*
8 *of the activities described in paragraph (1), the Direc-*
9 *tor, in collaboration with the Advanced Scientific*
10 *Computing Research program described in section*
11 *304 and other programs carried out by the Depart-*
12 *ment, as applicable, and in coordination with the Na-*
13 *tional Oceanic and Atmospheric Administration, the*
14 *National Science Foundation, the National Aero-*
15 *navitics and Space Administration, and other relevant*
16 *agencies, shall carry out research to develop, evaluate,*
17 *and use high-resolution regional climate, global cli-*
18 *mate, Earth system, and other relevant models to in-*
19 *form decisions on reducing greenhouse gas emissions*
20 *and the resulting impacts of a changing global cli-*
21 *mate. Such modeling shall include—*

22 “(A) *integrated capabilities for modeling*
23 *multisectoral interactions, including the impacts*
24 *of climate policies on human systems and the*

1 *interdependencies and risks at the energy-water-*
2 *land nexus;*

3 *“(B) greenhouse gas emissions, air quality,*
4 *energy supply and demand, and other critical*
5 *elements; and*

6 *“(C) interaction among human and Earth*
7 *systems informed by interdisciplinary research,*
8 *including the economic and social sciences.*

9 *“(5) MIDSACLE FUNDING MECHANISM.—*

10 *“(A) IN GENERAL.—Any of the activities*
11 *authorized in this subsection may be carried out,*
12 *in lieu of individual research grants—*

13 *“(i) by competitively selected midscale,*
14 *multi-institutional research centers;*

15 *“(ii) by large-scale experiments or user*
16 *facilities; or*

17 *“(iii) through existing facilities and*
18 *systems of the Department or the National*
19 *Oceanic and Atmospheric Administration.*

20 *“(B) CONSIDERATION.—The Biological and*
21 *Environmental Research Advisory Committee*
22 *shall provide recommendations to the Director on*
23 *projects most suitable for the research centers de-*
24 *scribed in subparagraph (A).*

1 “(6) *ATMOSPHERIC SYSTEMS AND SCIENCES RE-*
2 *SEARCH PROGRAM.*—

3 “(A) *IN GENERAL.*—*As part of the activities*
4 *carried out under paragraph (1), the Director*
5 *shall carry out a program, to be known as the*
6 *‘Atmospheric Systems and Sciences Research*
7 *Program’, to use observations to improve under-*
8 *standing of atmospheric processes, under which*
9 *the Director, in coordination, and as appro-*
10 *priate, collaboration, with the National Oceanic*
11 *and Atmospheric Administration and other rel-*
12 *evant Federal agencies conducting research*
13 *under the topics described in this subparagraph,*
14 *shall conduct research relating to—*

15 “(i) *better understanding the atmos-*
16 *phere and the interaction of the atmosphere*
17 *with the surface of the Earth;*

18 “(ii) *understanding sources of uncer-*
19 *tainty in Earth system models, including*
20 *with respect to the interdependence of*
21 *clouds, atmospheric aerosols, radiation*
22 *processes, and precipitation;*

23 “(iii) *understanding the radiative bal-*
24 *ance and hydrological cycle of Earth;*

1 “(iv) demonstrating the improved pre-
2 dictability of regional and global atmos-
3 pheric models due to improved process-level
4 understanding;

5 “(v) atmospheric regimes with large
6 uncertainties in earth system prediction,
7 aerosol processes, warm boundary-layer
8 processes, convective processes, and high-
9 latitude processes;

10 “(vi) reduced uncertainty and im-
11 proved simulation capability of earth sys-
12 tem models of the atmospheric system in a
13 holistic, comprehensive fashion; and

14 “(vii) understanding and modeling
15 representation of priority research areas,
16 including aerosol, warm boundary layer,
17 convective, and high-latitude processes.

18 “(B) *ACTIVITIES.*—In carrying out the At-
19 mospheric Systems and Sciences Research Pro-
20 gram, the Director shall, in coordination, and as
21 appropriate, in collaboration, with other relevant
22 Federal agencies—

23 “(i) collect data and conduct research
24 to advance atmospheric and Earth system
25 modeling capabilities;

1 “(ii) develop or participate in existing
2 or future integrated, scalable test-beds
3 that—

4 “(I) incorporate process-level un-
5 derstanding of the life cycles of
6 aerosols, clouds, and precipitation; and

7 “(II) can be incorporated into
8 other models;

9 “(iii) improve data, analysis, and pre-
10 diction systems in marine, littoral, terres-
11 trial, and arctic environments, including
12 those environments sensitive to changes in
13 the climate, relating to the energy and
14 science mission of the Department; and

15 “(iv) support the development of tech-
16 nologies relating to—

17 “(I) more accurate cloud, aerosol,
18 and other atmospheric sensors;

19 “(II) observing sensor networks;
20 and

21 “(III) computational predictive
22 modeling.

23 “(C) USE OF ATMOSPHERIC RADIATION
24 MEASUREMENT PROGRAM FACILITIES AND INFRA-
25 STRUCTURE.—To support the Atmospheric Sys-

1 *tems and Sciences Research Program and, in co-*
2 *ordination, and as appropriate, in collaboration,*
3 *with the National Oceanic and Atmospheric Ad-*
4 *ministration and other relevant Federal agencies,*
5 *to improve fundamental understanding of the*
6 *physical and chemical processes that impact the*
7 *formation, life cycle, and radiative impacts of*
8 *cloud and aerosol particles, atmospheric proc-*
9 *esses, and surface or subsurface phenomena, the*
10 *Director shall use the facilities and infrastruc-*
11 *ture of the Atmospheric Radiation Measurement*
12 *User Facility, the Global Monitoring Laboratory*
13 *of the National Oceanic and Atmospheric Ad-*
14 *ministration, or other Earth and Environmental*
15 *Systems Sciences User Facilities—*

16 *“(i) to provide support to environ-*
17 *mental scientists by collecting high-quality*
18 *and well-characterized in-situ, remote-sens-*
19 *ing, and aircraft observations of—*

20 *“(I) the microphysical properties*
21 *of clouds and atmospheric aerosols;*

22 *“(II) the coincident and highly*
23 *detailed dynamical and thermo-*
24 *dynamic properties of the atmospheric*

1 *environment that contains those clouds*
2 *and aerosols;*

3 *“(III) the properties of precipita-*
4 *tion;*

5 *“(IV) the properties of radiation*
6 *and the background environment; and*

7 *“(V) the properties of surface or*
8 *subsurface phenomena;*

9 *“(ii) to carry out laboratory studies*
10 *and ground-based and airborne field cam-*
11 *paigns to target specific atmospheric and*
12 *surface or subsurface processes relating to*
13 *the energy and science mission of the De-*
14 *partment in different locations and across a*
15 *range of environments, including by devel-*
16 *oping technologies to assist in advancing*
17 *predictive capabilities;*

18 *“(iii) to build data sets that can be in-*
19 *corporated into atmospheric models; and*

20 *“(iv) to enhance observations by using*
21 *modeling and simulations that test the ac-*
22 *curacy of climate model parameterizations.*

23 *“(h) BIOLOGICAL AND ENVIRONMENTAL RESEARCH*
24 *USER FACILITIES.—*

1 “(1) *IN GENERAL.*—*The Director shall carry out*
2 *a program for the development, construction, oper-*
3 *ation, and maintenance of user facilities to enhance*
4 *the collection and analysis of observational data re-*
5 *lated to complex biological, climate, and environ-*
6 *mental systems.*

7 “(2) *SELECTION.*—

8 “(A) *IN GENERAL.*—*The Director shall se-*
9 *lect user facilities under paragraph (1) on a*
10 *competitive, merit-reviewed basis.*

11 “(B) *APPLICANTS.*—*In selecting user facili-*
12 *ties under paragraph (1), the Director shall con-*
13 *sider applications from the National Labora-*
14 *tories, institutions of higher education, multi-in-*
15 *stitutional collaborations, and other appropriate*
16 *entities.*

17 “(3) *FACILITY REQUIREMENTS.*—*To the max-*
18 *imum extent practicable, the user facilities developed,*
19 *constructed, operated, or maintained under para-*
20 *graph (1) shall include—*

21 “(A) *distributed field research and observa-*
22 *tion platforms for understanding earth system*
23 *processes;*

24 “(B) *analytical techniques, instruments,*
25 *and modeling resources, including high-through-*

1 *put molecular phenotyping, for understanding*
2 *and predicting the functional processes of bio-*
3 *logical and environmental systems;*

4 *“(C) integrated high-throughput sequencing,*
5 *advanced bioanalytic techniques, DNA design*
6 *and synthesis, metabolomics, and computational*
7 *analysis; and*

8 *“(D) such other facilities as the Director*
9 *considers appropriate, consistent with section*
10 *209 of the Department of Energy Organization*
11 *Act (42 U.S.C. 7139).*

12 *“(4) EXISTING FACILITIES.—In carrying out the*
13 *program established under paragraph (1), the Direc-*
14 *tor is encouraged to evaluate the capabilities of exist-*
15 *ing user facilities and, to the maximum extent prac-*
16 *ticable, invest in modernization of those capabilities*
17 *to address emerging research priorities.*

18 *“(5) EARTH AND ENVIRONMENTAL SYSTEMS*
19 *SCIENCES USER FACILITIES.—In carrying out the*
20 *program established under paragraph (1), the Direc-*
21 *tor shall operate at least 1 user facility to advance the*
22 *collection, validation, and analysis of atmospheric*
23 *data, including through activities—*

1 “(A) to advance knowledge of the Earth and
2 environmental systems and improve model rep-
3 resentations; and

4 “(B) to measure the impact of atmospheric
5 gases, aerosols, and clouds on the Earth and en-
6 vironmental systems.

7 “(6) *MICROBIAL MOLECULAR PHENOTYPING CA-*
8 *PABILITY PROJECT.*—

9 “(A) *IN GENERAL.*—*The Secretary shall*
10 *provide for the expansion of the Environmental*
11 *Molecular Sciences Laboratory, or subsequent fa-*
12 *cility successor, to advance high-throughput mi-*
13 *crobial plant and molecular phenotyping capa-*
14 *bility to accelerate discovery of new protein func-*
15 *tions and metabolic pathways in microbial sys-*
16 *tems.*

17 “(B) *CAPABILITIES.*—*In carrying out sub-*
18 *paragraph (A), the Secretary shall ensure the fol-*
19 *lowing capabilities:*

20 “(i) *Coupled high-throughput autono-*
21 *mous experimental and multimodal analyt-*
22 *ical capabilities.*

23 “(ii) *Direct integration of automated*
24 *multiomics analyses, biomolecular and cel-*
25 *lular imaging, and functional biological as-*

1 *says with high-throughput microbial cul-*
2 *turing and cultivation capabilities at*
3 *timescales relevant to biological processes*
4 *under natural and perturbed environmental*
5 *conditions.*

6 “(C) *DATA COORDINATION.*—*In carrying*
7 *out subparagraph (A), the Secretary shall ensure*
8 *integration and coordination with existing data*
9 *platforms and user facilities of the Department.*

10 “(D) *START OF OPERATIONS.*—*Subject to*
11 *the availability of appropriations, the Secretary*
12 *shall begin carrying out subparagraph (A) not*
13 *later than September 29, 2027.*

14 “(E) *FUNDING.*—*Of the funds authorized to*
15 *be appropriated under subsection (k) for a fiscal*
16 *year, there are authorized to be appropriated to*
17 *the Secretary to carry out this paragraph—*

18 “(i) *\$550,000 for fiscal year 2023;*

19 “(ii) *\$29,000,000 for fiscal year 2024;*

20 “(iii) *\$32,000,000 for fiscal year 2025;*

21 “(iv) *\$30,500,000 for fiscal year 2026;*

22 *and*

23 “(v) *\$27,500,000 for fiscal year 2027.*

24 “(7) *USER FACILITIES INTEGRATION AND COL-*
25 *LABORATION PROGRAM.*—

1 “(A) *IN GENERAL.*—*The Director shall sup-*
2 *port a program of collaboration between user fa-*
3 *ilities to encourage and enable researchers to*
4 *more readily integrate the tools, expertise, re-*
5 *sources, and capabilities of multiple Office of*
6 *Science user facilities (as described in subsection*
7 *(d) of section 209 of the Department of Energy*
8 *Organization Act (42 U.S.C. 7139)) to further*
9 *research and advance emerging technologies.*

10 “(B) *ACTIVITIES.*—*The program shall ad-*
11 *vance the integration of automation, robotics,*
12 *computational biology, bioinformatics, bio-*
13 *sensing, cellular platforms and other relevant*
14 *emerging technologies as determined by the Di-*
15 *rector to enhance productivity and scientific im-*
16 *pect of user facilities.*

17 “(8) *COORDINATION.*—*In carrying out the pro-*
18 *gram authorized under paragraph (1), the Director*
19 *shall ensure that the Office of Science coordinates*
20 *with—*

21 “(A) *the National Oceanic Atmospheric Ad-*
22 *ministration, the Environmental Protection*
23 *Agency, the National Aeronautics and Space Ad-*
24 *ministration, the Department of Agriculture, the*
25 *Department of the Interior, and any other rel-*

1 *evant Federal agency on the collection, valida-*
2 *tion, and analysis of atmospheric data; and*

3 “(B) *relevant stakeholders, including insti-*
4 *tutions of higher education, nonprofit research*
5 *institutions, industry, State, territorial, local,*
6 *and Tribal governments, and other appropriate*
7 *entities to ensure access to the best available rel-*
8 *evant atmospheric and historical weather data.*

9 “(i) *TERRESTRIAL-AQUATIC INTERFACE RESEARCH*
10 *INITIATIVE.—*

11 “(1) *IN GENERAL.—The Director shall carry out*
12 *a research program to enhance the understanding of*
13 *terrestrial-aquatic interface. In carrying out the pro-*
14 *gram, the Director shall prioritize efforts to enhance*
15 *the collection of observational data, and shall develop*
16 *models to analyze the natural and human processes*
17 *that interact in littoral zones.*

18 “(2) *LITTORAL DATA COLLECTION SYSTEM.—The*
19 *Director shall establish an integrated system of geo-*
20 *graphically diverse field research sites in order to im-*
21 *prove the scientific understanding and predictability*
22 *of the major land water interfaces of the United*
23 *States through improved data quantity and quality,*
24 *including in—*

25 “(A) *the Great Lakes region;*

1 “(B) the Pacific coast;

2 “(C) the Atlantic coast;

3 “(D) the Arctic;

4 “(E) the Gulf coast; and

5 “(F) the coasts of United States territories
6 and freely associated States.

7 “(3) *EXISTING INFRASTRUCTURE*.—In carrying
8 out the programs and establishing the field research
9 sites under paragraphs (1) and (2), the Secretary
10 shall leverage existing research and development in-
11 frastructure supported by the Department, including
12 the Department’s existing marine and coastal re-
13 search lab.

14 “(4) *COORDINATION*.—For the purposes of car-
15 rying out the programs and establishing the field re-
16 search sites under paragraphs (1) and (2), the Sec-
17 retary may enter into agreements with Federal de-
18 partments and agencies with complementary capabili-
19 ties, including the National Oceanic and Atmospheric
20 Administration and any other relevant Federal agen-
21 cy as appropriate.

22 “(5) *REPORT*.—Not earlier than 2 years after the
23 date of enactment of the Research and Development,
24 Competition, and Innovation Act, the Director shall
25 provide to the Committee on Science, Space, and

1 *Technology, the Committee on Natural Resources, and*
2 *the Committee on Appropriations of the House of*
3 *Representatives, and the Committee on Energy and*
4 *Natural Resources and the Committee on Appropria-*
5 *tions of the Senate, a report examining whether the*
6 *system described in paragraph (2) should be estab-*
7 *lished as a National User Facility within the Depart-*
8 *ment or as a research facility within another Federal*
9 *agency.*

10 “(6) *INTEROPERABILITY.*—

11 “(A) *IN GENERAL.*—*The Director shall en-*
12 *sure that activities carried out under paragraphs*
13 *(1) and (2), including observation, data collec-*
14 *tion, monitoring, and model development and*
15 *enhancements, are interoperable and may be in-*
16 *tegrated with existing related systems at the Na-*
17 *tional Oceanic and Atmospheric Administration*
18 *and other relevant Federal agencies, as prac-*
19 *ticable.*

20 “(B) *RESOURCES.*—*In carrying out sub-*
21 *paragraph (A), in support of interoperability, as*
22 *practicable, the Director may make available to*
23 *other Federal agencies high performance com-*
24 *puting resources.*

1 “(C) NOAA.—*The National Oceanic and*
2 *Atmospheric Administration shall integrate the*
3 *data collected under the programs carried out*
4 *under paragraphs (1) and (2) into relevant data*
5 *systems and models, as practicable.*

6 “(j) *ENGINEERED ECOSYSTEMS INITIATIVE.*—

7 “(1) *IN GENERAL.*—*The Secretary shall establish*
8 *within the Biological and Environmental Research*
9 *program an initiative focused on the development of*
10 *engineered ecosystems through the application of arti-*
11 *ficial intelligence, novel sensing capabilities, and*
12 *other emerging technologies.*

13 “(2) *INTERAGENCY COORDINATION.*—*The Sec-*
14 *retary shall coordinate with the Director of the Na-*
15 *tional Science Foundation, the Administrator of the*
16 *National Oceanic and Atmospheric Administration,*
17 *the Director of the U.S. Geological Survey, the Sec-*
18 *retary of Agriculture, and other relevant officials to*
19 *avoid duplication of research and observational ac-*
20 *tivities and to ensure that activities carried out under*
21 *the initiative established under paragraph (1) are*
22 *complimentary to activities being undertaken by other*
23 *agencies.*

24 “(3) *REPORT.*—*Not later than 180 days after the*
25 *date of enactment of the Research and Development,*

1 *Competition, and Innovation Act, the Secretary shall*
2 *submit to the Committee on Science, Space, and Tech-*
3 *nology of the House of Representatives and the Com-*
4 *mittee on Energy and Natural Resources of the Sen-*
5 *ate a report on the activity authorized under this sub-*
6 *section.*

7 “(k) *AUTHORIZATION OF APPROPRIATIONS.—Out of*
8 *funds authorized to be appropriated for the Office of Science*
9 *in a fiscal year, there are authorized to be appropriated*
10 *to the Secretary to carry out the activities described in this*
11 *section—*

12 “(1) \$885,420,000 for fiscal year 2023;

13 “(2) \$946,745,200 for fiscal year 2024;

14 “(3) \$1,001,149,912 for fiscal year 2025;

15 “(4) \$1,068,818,907 for fiscal year 2026; and

16 “(5) \$1,129,948,041 for fiscal year 2027.”.

17 “(e) *BIOENERGY RESEARCH CENTERS.—Section 977 of*
18 *the Energy Policy Act of 2005 (42 U.S.C. 16317) is amend-*
19 *ed by striking subsection (f) and inserting the following:*

20 “(f) *BIOENERGY RESEARCH CENTERS.—*

21 “(1) *IN GENERAL.—In carrying out the program*
22 *under section 306(a) of the Department of Energy Re-*
23 *search and Innovation Act (42 U.S.C. 18644(a)), the*
24 *Director shall support up to 6 bioenergy research cen-*
25 *ters to conduct fundamental research in plant and*

1 *microbial systems biology, biological imaging and*
2 *analysis, and genomics, and to accelerate advanced*
3 *research and development of advanced biofuels, bio-*
4 *energy or biobased materials, chemicals, and products*
5 *that are produced from a variety of regionally diverse*
6 *feedstocks, and to facilitate the translation of research*
7 *results to industry. The activities of the centers au-*
8 *thorized under this subsection may include—*

9 *“(A) accelerating the domestication of bio-*
10 *energy-relevant plants, microbes, and associated*
11 *microbial communities to enable high-impact,*
12 *value-added coproduct development at multiple*
13 *points in the bioenergy supply chain;*

14 *“(B) developing the science and techno-*
15 *logical advances to ensure process sustainability*
16 *is considered in the creation of advanced biofuels*
17 *and bioproducts from lignocellulosic biomass;*
18 *and*

19 *“(C) using the latest tools in genomics, mo-*
20 *lecular biology, catalysis science, chemical engi-*
21 *neering, systems biology, and computational and*
22 *robotics technologies to sustainably produce and*
23 *transform biomass into advanced biofuels and*
24 *bioproducts.*

25 *“(2) SELECTION AND DURATION.—*

1 “(A) *IN GENERAL.*—A center established
2 under paragraph (1) shall be selected on a com-
3 petitive, merit-reviewed basis for a period of not
4 more than 5 years, subject to the availability of
5 appropriations, beginning on the date of estab-
6 lishment of that center.

7 “(B) *APPLICATIONS.*—The Director shall
8 consider applications from National Labora-
9 tories, multi-institutional collaborations, and
10 other appropriate entities.

11 “(C) *EXISTING CENTERS.*—A center already
12 in existence on the date of enactment of the Re-
13 search and Development, Competition, and Inno-
14 vation Act may continue to receive support for
15 a period of not more than 5 years beginning on
16 the date of establishment of that center.

17 “(D) *NEW CENTERS.*—The Director shall se-
18 lect any new center pursuant to paragraph (1)
19 on a competitive, merit-reviewed basis, with spe-
20 cial consideration for applications from an insti-
21 tution of higher education (as defined in section
22 101 of the Higher Education Act of 1965 (20
23 U.S.C. 1001)) that is located in an eligible juris-
24 diction (as defined in section 2203(b)(3)(A) of

1 *the Energy Policy Act of 1992 (42 U.S.C.*
2 *13503(b)(3)(A)).*

3 “(3) *RENEWAL.*—*After the end of the applicable*
4 *period described in paragraph (2), the Director may*
5 *renew support for a center for a period of not more*
6 *than 5 years on a merit-reviewed basis. For a center*
7 *in operation for 10 years after its previous selection*
8 *on a competitive, merit-reviewed basis, the Director*
9 *may renew support for the center on a competitive,*
10 *merit-reviewed basis for a period of not more than 5*
11 *years, and may subsequently provide an additional*
12 *renewal on a merit-reviewed basis for a period of not*
13 *more than 5 years.*

14 “(4) *ACTIVITIES.*—*Centers shall undertake re-*
15 *search activities to accelerate the production of ad-*
16 *vanced biofuels and bioproducts from biomass re-*
17 *sources by identifying the most suitable species of*
18 *plants for use as energy crops; and improving meth-*
19 *ods of breeding, propagation, planting, producing,*
20 *harvesting, storage and processing. Activities may in-*
21 *clude the following:*

22 “(A) *Research activities to increase sustain-*
23 *ability, including—*

24 “(i) *advancing knowledge of how bio-*
25 *energy crop interactions with biotic and*

1 *abiotic environmental factors influence crop*
2 *growth, yield, and quality;*

3 *“(ii) identifying the most impactful re-*
4 *search areas that address the economics of*
5 *advanced biofuels and bioproducts produc-*
6 *tion; and*

7 *“(iii) utilizing multiscale modeling to*
8 *advance predictive understanding of ad-*
9 *vanced biofuel cropping ecosystems.*

10 *“(B) Research activities to further feedstock*
11 *development, including lignocellulosic, algal, gas-*
12 *eous wastes including carbon oxides and meth-*
13 *ane, and direct air capture of single carbon gases*
14 *via plants and microbes, including—*

15 *“(i) developing genetic and genomic*
16 *tools, high-throughput analytical tools, and*
17 *biosystems design approaches to enhance*
18 *bioenergy feedstocks and their associated*
19 *microbiomes;*

20 *“(ii) conducting field testing of new*
21 *potential bioenergy feedstock crops under*
22 *environmentally benign and geographically*
23 *diverse conditions to assess viability and*
24 *robustness; and*

1 “(iii) developing quantitative models
2 informed by experimentation to predict how
3 bioenergy feedstocks perform under diverse
4 conditions.

5 “(C) Research activities to improve
6 lignocellulosic deconstruction and separation
7 methods, including—

8 “(i) developing feedstock-agnostic
9 deconstruction processes capable of effi-
10 ciently fractionating biomass into targeted
11 output streams;

12 “(ii) gaining a detailed understanding
13 of plant cell wall biosynthesis, composition,
14 structure, and properties during
15 deconstruction; and

16 “(iii) improving enzymes and ap-
17 proaches for biomass breakdown and cel-
18 lulose, hemicellulose, and lignin processing.

19 “(D) Research activities to improve the
20 feedstock conversion process for advanced biofuels
21 and bioproducts, including—

22 “(i) developing high-throughput meth-
23 ods to screen or select high-performance mi-
24 crobial strains and communities to improve

1 *product formation rates, yields, and selec-*
2 *tivity;*

3 *“(ii) establishing a broad set of plat-*
4 *form microorganisms and microbial com-*
5 *munities suitable for metabolic engineering*
6 *to produce advanced biofuels and biopro-*
7 *ducts and high-throughput methods for exper-*
8 *imental validation of gene function;*

9 *“(iii) developing techniques to enhance*
10 *microbial robustness for tolerating toxins to*
11 *improve advanced biofuel and bioproduct*
12 *yields and to gain a better understanding of*
13 *the cellular and molecular bases of tolerance*
14 *for major chemical classes of inhibitors*
15 *found in these processes;*

16 *“(iv) advancing technologies for the use*
17 *of batch, continuous, and consolidated bio-*
18 *processing;*

19 *“(v) identifying, creating, and opti-*
20 *mizing microbial and chemical pathways to*
21 *produce promising, atom-economical inter-*
22 *mediates and final bioproducts from bio-*
23 *mass with considerations given to environ-*
24 *mentally benign processes;*

1 “(vi) developing high-throughput, real-
2 time, in situ analytical techniques to under-
3 stand and characterize the pre- and post-
4 bioproduct separation streams in detail;

5 “(vii) creating methodologies for effi-
6 ciently identifying viable target molecules,
7 identifying high-value bioproducts in exist-
8 ing biomass streams, and utilizing current
9 byproduct streams;

10 “(viii) identifying and improving
11 plant feedstocks with enhanced extractable
12 levels of desired bioproducts or bioproduct
13 precursors, including lignin streams; and

14 “(ix) developing integrated biological
15 and chemical catalytic approaches to
16 valorize and produce a diverse portfolio of
17 advanced biofuels and bioproducts.

18 “(5) *INDUSTRY PARTNERSHIPS.*—Centers shall
19 establish industry partnerships to translate research
20 results to commercial applications.

21 “(6) *COORDINATION.*—In coordination with the
22 Bioenergy Technologies Office of the Department, the
23 Secretary shall support interdisciplinary research ac-
24 tivities to improve the capacity, efficiency, resilience,
25 security, reliability, and affordability, of the produc-

1 *tion and use of advanced biofuels and bioproducts, as*
2 *well as activities to enable positive impacts and avoid*
3 *the potential negative impacts that the production*
4 *and use of advanced biofuels and bioproducts may*
5 *have on ecosystems, people, and historically*
6 *marginalized communities.*

7 *“(7) FUNDING.—Of the funds authorized to be*
8 *appropriated under subsection (k) of section 306 of*
9 *the Department of Energy Research and Innovation*
10 *Act (42 U.S.C. 18644) for a fiscal year, there is au-*
11 *thorized to be appropriated to the Secretary to carry*
12 *out this subsection \$30,000,000 per center established*
13 *under paragraph (1) for each of fiscal years 2023*
14 *through 2027.*

15 *“(8) DEFINITIONS.—In this subsection:*

16 *“(A) ADVANCED BIOFUEL.—The term ‘ad-*
17 *vanced biofuel’ has the meaning given the term*
18 *in section 9001 of the Farm Security and Rural*
19 *Investment Act of 2002 (7 U.S.C. 8101).*

20 *“(B) BIOENERGY.—The term ‘bioenergy’*
21 *means energy derived from biofuels.*

22 *“(C) BIOMASS.—The term ‘biomass’ has the*
23 *meaning given the term in section 203(b) of the*
24 *Energy Policy Act of 2005 (42 U.S.C. 15852(b)).*

1 “(D) *BIOPRODUCT*.—The term ‘bioproduct’
 2 has the meaning given the term ‘biobased prod-
 3 uct’ in section 9001 of the Farm Security and
 4 Rural Investment Act of 2002 (7 U.S.C. 8101).”.

5 **SEC. 10104. ADVANCED SCIENTIFIC COMPUTING RESEARCH**
 6 **PROGRAM.**

7 (a) *ADVANCED SCIENTIFIC COMPUTING RESEARCH*.—
 8 Section 304 of the Department of Energy Research and In-
 9 novation Act (42 U.S.C. 18642) is amended—

10 (1) by redesignating subsections (a) through (c)
 11 as subsections (b) through (d), respectively;

12 (2) by inserting before subsection (b), as so redesi-
 13 gnated, the following:

14 “(a) *IN GENERAL*.—As part of the activities author-
 15 ized under section 209 of the Department of Energy Organi-
 16 zation Act (42 U.S.C. 7139), the Director shall carry out,
 17 in coordination with academia and relevant public and
 18 private sector entities, a research, development, and dem-
 19 onstration program—

20 “(1) to steward applied mathematics, computa-
 21 tional science, and computer science research relevant
 22 to the missions of the Department and the competi-
 23 tiveness of the United States;

24 “(2) to develop modeling, simulation, and other
 25 computational tools relevant to other scientific dis-

1 *ciplines and to the development of new energy tech-*
 2 *nologies and other technologies;*

3 *“(3) to advance computing and networking ca-*
 4 *capabilities for data-driven discovery; and*

5 *“(4) to develop advanced scientific computing*
 6 *hardware and software tools for science and engineer-*
 7 *ing.”;*

8 *(3) in subsection (c), as so redesignated—*

9 *(A) by striking “The Director” and insert-*
 10 *ing the following:*

11 *“(1) DIRECTOR.—The Director”;* and

12 *(B) by adding at the end the following:*

13 *“(2) COORDINATION.—The Under Secretary for*
 14 *Science shall ensure the coordination of the activities*
 15 *of the Department, including activities under this sec-*
 16 *tion, to determine and meet the computational and*
 17 *networking research and facility needs of the Office of*
 18 *Science and all other relevant energy technology and*
 19 *energy efficiency programs within the Department*
 20 *and with other Federal agencies as appropriate.”;*

21 *(4) by amending subsection (d), as so redesign-*
 22 *ated, to read as follows:*

23 *“(d) APPLIED MATHEMATICS AND SOFTWARE DEVEL-*
 24 *OPMENT FOR HIGH-END COMPUTING SYSTEMS AND COM-*
 25 *PUTER SCIENCES RESEARCH.—*

1 “(1) *IN GENERAL.*—*The Director shall carry out*
2 *activities to develop, test, and support—*

3 “(A) *mathematics, statistics, and algo-*
4 *rithms for modeling complex systems relevant to*
5 *the missions of the Department, including on ad-*
6 *vanced computing architectures; and*

7 “(B) *tools, languages, programming envi-*
8 *ronments, and operations for high-end com-*
9 *puting systems (as defined in section 2 of the*
10 *American Super Computing Leadership Act of*
11 *2017 (15 U.S.C. 5541)).*

12 “(2) *PORTFOLIO BALANCE.*—

13 “(A) *IN GENERAL.*—*The Director shall*
14 *maintain a balanced portfolio within the ad-*
15 *vanced scientific computing research and devel-*
16 *opment program established under section 976 of*
17 *the Energy Policy Act of 2005 (42 U.S.C. 16316)*
18 *that supports robust investment in—*

19 “(i) *applied mathematical, computa-*
20 *tional, and computer sciences research needs*
21 *relevant to the mission of the Department,*
22 *including foundational areas that are crit-*
23 *ical to the advancement of energy sciences*
24 *and technologies and new and emerging*
25 *computing technologies; and*

1 “(i) associated high-performance com-
2 puting hardware and facilities.

3 “(B) EXASCALE ECOSYSTEM
4 SUSTAINMENT.—

5 “(i) SENSE OF CONGRESS.—It is the
6 sense of Congress that the Exascale Com-
7 puting Project has successfully created a
8 broad ecosystem that provides shared soft-
9 ware packages, novel evaluation systems,
10 and applications relevant to the science and
11 engineering requirements of the Depart-
12 ment, and that such products must be
13 maintained and improved in order that the
14 full potential of the deployed systems can be
15 continuously realized.

16 “(ii) SUSTAINMENT.—The Secretary
17 shall seek to sustain and evolve the eco-
18 system described in clause (i) to ensure that
19 the exascale software stack and other re-
20 search software will continue to be main-
21 tained, hardened, and otherwise optimized
22 for long-term use on exascale systems and
23 beyond and reliable availability to the user
24 community.”; and

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

1 “(e) *ADVANCED COMPUTING PROGRAM.*—

2 “(1) *IN GENERAL.*—*The Secretary shall establish*
3 *a program to develop and implement a strategy for*
4 *achieving computing systems with capabilities beyond*
5 *exascale computing systems. In establishing this pro-*
6 *gram, the Secretary shall—*

7 “(A) *maintain foundational research pro-*
8 *grams in mathematical, computational, and*
9 *computer sciences focused on new and emerging*
10 *computing needs within the mission of the De-*
11 *partment, including post-Moore’s law computing*
12 *architectures, novel approaches to modeling and*
13 *simulation, artificial intelligence and scientific*
14 *machine learning, quantum computing, edge*
15 *computing, extreme heterogeneity, including po-*
16 *tential quantum accelerators, and distributed*
17 *high-performance computing;*

18 “(B) *retain best practices and maintain*
19 *support for essential hardware, applications, and*
20 *software elements of the Exascale Computing*
21 *Program that are necessary for sustaining the*
22 *vitality of a long-term capable software eco-*
23 *system for exascale and beyond; and*

1 “(C) develop a Department-wide strategy
2 for balancing on-premises and cloud-based com-
3 puting and scientific data management.

4 “(2) REPORT.—Not later than 1 year after the
5 date of enactment of the Research and Development,
6 Competition, and Innovation Act, the Secretary shall
7 submit to the Committee on Science, Space, and Tech-
8 nology of the House of Representatives and the Com-
9 mittee on Energy and Natural Resources of the Sen-
10 ate a report on the development and implementation
11 of the strategy described in paragraph (1).

12 “(f) GUIDANCE ON MITIGATION OF BIAS IN HIGH-PER-
13 FORMANCE COMPUTING CAPABILITIES.—In leveraging
14 high-performance computing systems for research purposes,
15 including through the use of machine learning algorithms
16 for data analysis and artificial intelligence, the Secretary
17 shall issue, and ensure adherence to, guidance for the De-
18 partment, the National Laboratories, and users as to how
19 those capabilities should be employed in a manner that
20 mitigates and, to the maximum extent practicable, avoids
21 harmful algorithmic bias.

22 “(g) ARCHITECTURAL RESEARCH IN HETEROGENEOUS
23 COMPUTING SYSTEMS.—

24 “(1) IN GENERAL.—The Secretary shall carry
25 out a program of research and development in hetero-

1 *geneous and reconfigurable computing systems to ex-*
2 *pend understanding of the potential for heterogeneous*
3 *and reconfigurable computing systems to deliver high*
4 *performance, high efficiency computing for Depart-*
5 *ment mission challenges. The program shall include*
6 *research and development that explores the conver-*
7 *gence of big data analytics, simulations, and artifi-*
8 *cial intelligence to drive the design of heterogeneous*
9 *computing system architectures.*

10 *“(2) COORDINATION.—In carrying out the pro-*
11 *gram described in paragraph (1), the Secretary shall*
12 *ensure coordination between research activities under-*
13 *taken by the Advanced Scientific Computing Research*
14 *program and materials research supported by the*
15 *Basic Energy Sciences program within the Office of*
16 *Science.*

17 *“(h) ENERGY EFFICIENT COMPUTING PROGRAM.—*

18 *“(1) IN GENERAL.—The Secretary shall support*
19 *a program of fundamental research, development, and*
20 *demonstration of energy efficient computing and data*
21 *center technologies relevant to advanced computing*
22 *applications, including high-performance computing,*
23 *artificial intelligence, and scientific machine learn-*
24 *ing.*

25 *“(2) EXECUTION.—*

1 “(A) PROGRAM.—In carrying out the pro-
2 gram under paragraph (1), the Secretary shall—

3 “(i) establish a partnership for Na-
4 tional Laboratories, industry partners, and
5 institutions of higher education for codesign
6 of energy efficient hardware, technology,
7 software, and applications across all appli-
8 cable program offices of the Department,
9 and provide access to energy efficient com-
10 puting resources to such partners;

11 “(ii) develop hardware and software
12 technologies that decrease the energy needs
13 of advanced computing practices, including
14 through data center codesign;

15 “(iii) consider multiple heterogeneous
16 computing architectures in collaboration
17 with the program established under sub-
18 section (g), including neuromorphic com-
19 puting, persistent computing, and ultrafast
20 networking; and

21 “(iv) provide, as appropriate, on a
22 competitive, merit-reviewed basis, access for
23 researchers from institutions of higher edu-
24 cation, National Laboratories, industry,
25 and other Federal agencies to the energy ef-

1 *efficient computing technologies developed*
2 *pursuant to clause (i).*

3 “(B) *SELECTION OF PARTNERS.*—*In select-*
4 *ing participants for the partnership established*
5 *under subparagraph (A)(i), the Secretary shall*
6 *select participants through a competitive, merit*
7 *review process.*

8 “(C) *REPORT.*—*Not later than 1 year after*
9 *the date of enactment of the Research and Devel-*
10 *opment, Competition, and Innovation Act, the*
11 *Secretary shall submit to the Committee on*
12 *Science, Space, and Technology of the House of*
13 *Representatives and the Committee on Energy*
14 *and Natural Resources of the Senate a report*
15 *on—*

16 “(i) *the activities conducted under sub-*
17 *paragraph (A); and*

18 “(ii) *the coordination and manage-*
19 *ment of the program under subparagraph*
20 *(A) to ensure an integrated research pro-*
21 *gram across the Department.*

22 “(i) *ENERGY SCIENCES NETWORK.*—

23 “(1) *IN GENERAL.*—*The Secretary shall provide*
24 *for upgrades to the Energy Sciences Network user fa-*
25 *cility in order to meet the research needs of the De-*

1 *partment for highly reliable data transport capabili-*
2 *ties optimized for the requirements of large-scale*
3 *science.*

4 “(2) *CAPABILITIES.—In carrying out paragraph*
5 *(1), the Secretary shall ensure the following capabili-*
6 *ties:*

7 “(A) *To provide high bandwidth scientific*
8 *networking across the continental United States*
9 *and the Atlantic Ocean.*

10 “(B) *To ensure network reliability.*

11 “(C) *To protect the network infrastructure*
12 *from cyberattacks.*

13 “(D) *To manage transport of exponentially*
14 *increasing levels of data from the Department’s*
15 *National Laboratories and sites, user facilities,*
16 *experiments, and sensors.*

17 “(E) *To contribute to the integration of het-*
18 *erogeneous computing frameworks and systems.*

19 “(j) *COMPUTATIONAL SCIENCE GRADUATE FELLOW-*
20 *SHIP.—*

21 “(1) *IN GENERAL.—The Secretary shall support*
22 *the Computational Science Graduate Fellowship pro-*
23 *gram in order to facilitate collaboration between*
24 *graduate students and researchers at the National*
25 *Laboratories, and contribute to the development of a*

1 *diverse and inclusive computational workforce to help*
2 *advance research in all areas of computational science*
3 *relevant to the mission of the Department, including*
4 *quantum computing.*

5 “(2) *FUNDING.—Of the funds authorized to be*
6 *appropriated for the Advanced Scientific Computing*
7 *Research Program, there are authorized to be appro-*
8 *priated to the Secretary for carrying out activities*
9 *under this subsection—*

10 “(A) *\$15,750,000 for fiscal year 2023;*

11 “(B) *\$16,537,500 for fiscal year 2024;*

12 “(C) *\$17,364,375 for fiscal year 2025;*

13 “(D) *\$18,232,594 for fiscal year 2026; and*

14 “(E) *\$19,144,223 for fiscal year 2027.*

15 “(k) *AUTHORIZATION OF APPROPRIATIONS.—Out of*
16 *funds authorized to be appropriated for the Office of Science*
17 *in a fiscal year, there are authorized to be appropriated*
18 *to the Secretary to carry out the activities described in this*
19 *section—*

20 “(1) *\$1,126,950,000 for fiscal year 2023;*

21 “(2) *\$1,194,109,500 for fiscal year 2024;*

22 “(3) *\$1,265,275,695 for fiscal year 2025;*

23 “(4) *\$1,340,687,843 for fiscal year 2026; and*

24 “(5) *\$1,420,599,500 for fiscal year 2027.”.*

25 (b) *QUANTUM SCIENCE NETWORK.—*

1 (1) *DEFINITIONS.*—Section 2 of the National
2 *Quantum Initiative Act (15 U.S.C. 8801) is amend-*
3 *ed—*

4 (A) *by redesignating paragraph (7) as*
5 *paragraph (8); and*

6 (B) *by inserting after paragraph (6) the fol-*
7 *lowing:*

8 “(7) *QUANTUM NETWORK INFRASTRUCTURE.*—
9 *The term ‘quantum network infrastructure’ means*
10 *any facility, expertise, or capability that is necessary*
11 *to enable the development and deployment of scalable*
12 *and diverse quantum network technologies.”.*

13 (2) *DEPARTMENT OF ENERGY QUANTUM NET-*
14 *WORK INFRASTRUCTURE RESEARCH AND DEVELOP-*
15 *MENT PROGRAM.*—

16 (A) *IN GENERAL.*—Title IV of the National
17 *Quantum Initiative Act (15 U.S.C. 8851 et seq.)*
18 *is amended by adding at the end the following:*

19 “**SEC. 403. DEPARTMENT OF ENERGY QUANTUM NETWORK**
20 **INFRASTRUCTURE RESEARCH AND DEVELOP-**
21 **MENT PROGRAM.**”

22 “(a) *IN GENERAL.*—The Secretary of Energy (referred
23 *to in this section as the ‘Secretary’)* shall carry out a re-
24 *search, development, and demonstration program to accel-*

1 *erate innovation in quantum network infrastructure in*
2 *order to—*

3 “(1) *facilitate the advancement of distributed*
4 *quantum computing systems through the internet and*
5 *intranet;*

6 “(2) *improve the precision of measurements of*
7 *scientific phenomena and physical imaging tech-*
8 *nologies;*

9 “(3) *develop secure national quantum commu-*
10 *nications technologies and strategies;*

11 “(4) *demonstrate quantum networking utilizing*
12 *the Department of Energy’s Energy Sciences Network*
13 *User Facility; and*

14 “(5) *advance the relevant domestic supply*
15 *chains, manufacturing capabilities, and associated*
16 *simulations or modeling capabilities.*

17 “(b) *PROGRAM.—In carrying out this section, the Sec-*
18 *retary shall—*

19 “(1) *coordinate with—*

20 “(A) *the Director of the National Science*
21 *Foundation;*

22 “(B) *the Director of the National Institute*
23 *of Standards and Technology;*

24 “(C) *the Chair of the Subcommittee on*
25 *Quantum Information Science of the National*

1 *Science and Technology Council established*
2 *under section 103(a); and*

3 “(D) *the Chair of the Subcommittee on the*
4 *Economic and Security Implications of Quan-*
5 *tum Science;*

6 “(2) *conduct cooperative research with industry,*
7 *National Laboratories, institutions of higher edu-*
8 *cation, and other research institutions to facilitate*
9 *new quantum infrastructure methods and tech-*
10 *nologies, including—*

11 “(A) *quantum-limited detectors, ultra-low*
12 *loss optical channels, space-to-ground connec-*
13 *tions, and classical networking and cybersecurity*
14 *protocols;*

15 “(B) *entanglement and hyper-entangled*
16 *state sources and transmission, control, and*
17 *measurement of quantum states;*

18 “(C) *quantum interconnects that allow*
19 *short range local connections between quantum*
20 *processors;*

21 “(D) *transducers for quantum sources and*
22 *signals between optical wavelength regimes, in-*
23 *cluding telecommunications regimes and quan-*
24 *tum computer-relevant domains, including*
25 *microwaves;*

1 “(E) development of quantum memory buff-
2 ers and small-scale quantum computers that are
3 compatible with photon-based quantum bits in
4 the optical or telecommunications wavelengths;

5 “(F) long-range entanglement distribution,
6 including allowing entanglement-based protocols
7 between small- and large scale quantum proc-
8 essors, at the terrestrial and space-based level
9 using quantum repeaters and optical or laser
10 communications;

11 “(G) quantum routers, multiplexers, repeat-
12 ers, and related technologies necessary to create
13 secure long-distance quantum communication;
14 and

15 “(H) integration of systems across the
16 quantum technology stack into traditional com-
17 puting networks, including the development of
18 remote controlled, high-performance, and reliable
19 implementations of key quantum network compo-
20 nents by leveraging the expertise, infrastructure
21 and supplemental investments at the National
22 Laboratories in the Energy Sciences Network
23 User Facility;

24 “(3) engage with the Quantum Economic Devel-
25 opment Consortium and other organizations, as ap-

1 *plicable, to transition component technologies to help*
2 *facilitate as appropriate the development of a quan-*
3 *tum supply chain for quantum network technologies;*

4 *“(4) advance basic research in advanced sci-*
5 *entific computing, particle and nuclear physics, and*
6 *material science to enhance the understanding, pre-*
7 *diction, and manipulation of materials, processes,*
8 *and physical phenomena relevant to quantum net-*
9 *work infrastructure;*

10 *“(5) develop experimental tools and testbeds in*
11 *collaboration with the Energy Sciences Network User*
12 *Facility necessary to support cross-cutting funda-*
13 *mental research and development activities with di-*
14 *verse stakeholders from industry, National Labora-*
15 *tories, and institutions of higher education; and*

16 *“(6) consider quantum network infrastructure*
17 *applications that span the Department of Energy’s*
18 *missions in energy, environment, and national secu-*
19 *rity.*

20 *“(c) LEVERAGING.—In carrying out this section, the*
21 *Secretary shall leverage resources, infrastructure, and ex-*
22 *pertise across the Department of Energy and from—*

23 *“(1) the National Institute of Standards and*
24 *Technology;*

25 *“(2) the National Science Foundation;*

1 “(3) *the National Aeronautics and Space Ad-*
2 *ministration;*

3 “(4) *other relevant Federal agencies;*

4 “(5) *the National Laboratories;*

5 “(6) *industry stakeholders;*

6 “(7) *institutions of higher education; and*

7 “(8) *the National Quantum Information Science*
8 *Research Centers.*

9 “(d) *RESEARCH PLAN.—Not later than 180 days after*
10 *the date of enactment of the Research and Development,*
11 *Competition, and Innovation Act, the Secretary shall sub-*
12 *mit to the Committee on Science, Space, and Technology*
13 *of the House of Representatives and the Committee on En-*
14 *ergy and Natural Resources of the Senate a 4-year research*
15 *plan that identifies and prioritizes basic research needs re-*
16 *lating to quantum network infrastructure.*

17 “(e) *STANDARD OF REVIEW.—The Secretary shall re-*
18 *view activities carried out under this section to determine*
19 *the achievement of technical milestones.*

20 “(f) *FUNDING.—Of the funds authorized to be appro-*
21 *priated for the Department of Energy’s Office of Science,*
22 *there is authorized to be appropriated to the Secretary to*
23 *carry out the activities under this section \$100,000,000 for*
24 *each of fiscal years 2023 through 2027.*

1 **“SEC. 404. DEPARTMENT OF ENERGY QUANTUM USER EX-**
2 **PANSION FOR SCIENCE AND TECHNOLOGY**
3 **PROGRAM.**

4 “(a) *IN GENERAL.*—*The Secretary of Energy (referred*
5 *to in this section as the ‘Secretary’) shall establish and*
6 *carry out a program, to be known as the ‘Quantum User*
7 *Expansion for Science and Technology program’ or*
8 *‘QUEST program’, to encourage and facilitate access to*
9 *United States quantum computing hardware and quantum*
10 *computing clouds for research purposes—*

11 “(1) *to enhance the United States quantum re-*
12 *search enterprise;*

13 “(2) *to educate the future quantum computing*
14 *workforce;*

15 “(3) *to accelerate the advancement of United*
16 *States quantum computing capabilities; and*

17 “(4) *to advance the relevant domestic supply*
18 *chains, manufacturing processes, and associated sim-*
19 *ulations or modeling capabilities.*

20 “(b) *PROGRAM.*—*In carrying out this section, the Sec-*
21 *retary shall—*

22 “(1) *coordinate with—*

23 “(A) *the Director of the National Science*
24 *Foundation;*

25 “(B) *the Director of the National Institute*
26 *of Standards and Technology;*

1 “(C) the Chair of the Subcommittee on
2 Quantum Information Science of the National
3 Science and Technology Council established
4 under section 103(a); and

5 “(D) the Chair of the Subcommittee on the
6 Economic and Security Implications of Quan-
7 tum Science;

8 “(2) provide researchers based within the United
9 States with access to, and use of, United States quan-
10 tum computing resources through a competitive,
11 merit-reviewed process;

12 “(3) consider applications from the National
13 Laboratories, multi-institutional collaborations, insti-
14 tutions of higher education, industry stakeholders,
15 and any other entities that the Secretary determines
16 are appropriate to provide national leadership on
17 quantum computing related issues;

18 “(4) coordinate with private sector stakeholders,
19 the user community, and interagency partners on
20 program development and best management practices;
21 and

22 “(5) to the extent practicable, balance user access
23 to commercial prototypes available for use across a
24 broad class of applications and Federal research pro-

1 *totypes that enable benchmarking a wider variety of*
2 *early-stage devices.*

3 “(c) *LEVERAGING.*—*In carrying out this section, the*
4 *Secretary shall leverage resources and expertise across the*
5 *Department of Energy and from—*

6 “(1) *the National Institute of Standards and*
7 *Technology;*

8 “(2) *the National Science Foundation;*

9 “(3) *the National Aeronautics and Space Ad-*
10 *ministration;*

11 “(4) *other relevant Federal agencies;*

12 “(5) *the National Laboratories;*

13 “(6) *industry stakeholders;*

14 “(7) *institutions of higher education; and*

15 “(8) *the National Quantum Information Science*
16 *Research Centers.*

17 “(d) *SECURITY.*—*In carrying out the activities au-*
18 *thorized by this section, the Secretary, in consultation with*
19 *the Director of the National Science Foundation and the*
20 *Director of the National Institute of Standards and Tech-*
21 *nology, shall ensure proper security controls are in place*
22 *to protect sensitive information, as appropriate.*

23 “(e) *FUNDING.*—*Of the funds authorized to be appro-*
24 *priated for the Department of Energy’s Office of Science,*

1 *there are authorized to be appropriated to the Secretary to*
 2 *carry out the activities under this section—*

3 “(1) \$30,000,000 for fiscal year 2023;

4 “(2) \$31,500,000 for fiscal year 2024;

5 “(3) \$33,075,000 for fiscal year 2025;

6 “(4) \$34,728,750 for fiscal year 2026; and

7 “(5) \$36,465,188 for fiscal year 2027.”.

8 (B) *CLERICAL AMENDMENT.*—*The table of*
 9 *contents in section 1(b) of the National Quantum*
 10 *Initiative Act (Public Law 115–368; 132 Stat.*
 11 *5092) is amended by inserting after the item re-*
 12 *lating to section 402 the following:*

 “Sec. 403. *Department of Energy quantum network infrastructure research and*
 development program.

 “Sec. 404. *Department of Energy quantum user expansion for science and tech-*
 nology program.”.

13 **SEC. 10105. FUSION ENERGY RESEARCH.**

14 (a) *FUSION ENERGY RESEARCH.*—*Section 307 of the*
 15 *Department of Energy Research and Innovation Act (42*
 16 *U.S.C. 18645) is amended—*

17 (1) *in subsection (b)—*

18 (A) *in paragraph (2), by redesignating sub-*
 19 *paragraphs (A) and (B) as clauses (i) and (ii),*
 20 *respectively, and indenting appropriately;*

21 (B) *by redesignating paragraphs (1) and*
 22 *(2) as subparagraphs (A) and (B), respectively,*
 23 *and indenting appropriately;*

1 (C) in the matter preceding subparagraph
2 (A) (as so redesignated), by striking “As part of”
3 and inserting the following:

4 “(1) *IN GENERAL.*—As part of”; and

5 (D) by adding at the end the following:

6 “(2) *AUTHORIZATION OF APPROPRIATIONS.*—Out
7 of funds authorized to be appropriated under sub-
8 section (q), there is authorized to be appropriated to
9 the Secretary to carry out activities described in
10 paragraph (1) \$50,000,000 for each of fiscal years
11 2023 through 2027.”;

12 (2) in subsection (d)(3)—

13 (A) by striking “(o)” and inserting “(q)”;

14 (B) by striking “subsection (d)” and insert-
15 ing “this subsection”; and

16 (C) by striking “2025” and inserting
17 “2027”;

18 (3) in subsection (e)(4)—

19 (A) by striking “(o)” and inserting “(q)”;

20 (B) by striking “subsection (e)” and insert-
21 ing “this subsection”; and

22 (C) by striking “2025” and inserting
23 “2027”;

24 (4) in subsection (i)(10)—

- 1 (A) *in the matter preceding subparagraph*
2 (A)—
3 (i) *by striking “(o)” and inserting*
4 “(q)”; and
5 (ii) *by striking “subsection (i)” and*
6 *inserting “this subsection”;*
7 (B) *in subparagraph (D), by striking “and”*
8 *at the end;*
9 (C) *in subparagraph (E), by striking the*
10 *period at the end and inserting a semicolon; and*
11 (D) *by adding at the end the following:*
12 “(F) \$45,000,000 for fiscal year 2026; and
13 “(G) \$45,000,000 for fiscal year 2027.”;
14 (5) *by striking subsection (j) and inserting the*
15 *following:*
16 “(j) *FUSION REACTOR SYSTEM DESIGN.—*
17 “(1) *IN GENERAL.—Not later than 180 days*
18 *after the date of enactment of the Research and Devel-*
19 *opment, Competition, and Innovation Act, the Direc-*
20 *tor shall establish not less than 2 national teams de-*
21 *scribed in paragraph (2) that shall—*
22 “(A) *develop conceptual pilot plant designs*
23 *and technology roadmaps; and*

1 “(B) create an engineering design of a pilot
2 plant that will bring fusion to commercial via-
3 bility.

4 “(2) NATIONAL TEAMS.—A national team re-
5 ferred to in paragraph (1) shall—

6 “(A) be composed of developers, manufactur-
7 ers, universities, National Laboratories, and rep-
8 resentatives of the engineering, procurement, and
9 construction industries; and

10 “(B) include public-private partnerships.

11 “(3) AUTHORIZATION OF APPROPRIATIONS.—Of
12 the funds authorized to be appropriated for Fusion
13 Energy Sciences in a fiscal year, there are authorized
14 to be appropriated to the Secretary to carry out this
15 subsection—

16 “(A) \$35,000,000 for fiscal year 2023;

17 “(B) \$50,000,000 for fiscal year 2024;

18 “(C) \$65,000,000 for fiscal year 2025;

19 “(D) \$80,000,000 for fiscal year 2026; and

20 “(E) \$80,000,000 for fiscal year 2027.”;

21 (6) by redesignating subsection (o) as subsection
22 (r);

23 (7) by inserting after subsection (n) the fol-
24 lowing:

1 “(o) *HIGH-PERFORMANCE COMPUTATION COLLABO-*
2 *RATIVE RESEARCH PROGRAM.*—

3 “(1) *IN GENERAL.*—*The Secretary shall carry*
4 *out a program to conduct and support collaborative*
5 *research, development, and demonstration of fusion*
6 *energy technologies, through high-performance com-*
7 *putation modeling and simulation techniques, in*
8 *order—*

9 “(A) *to support fundamental research in*
10 *plasmas and matter at very high temperatures*
11 *and densities;*

12 “(B) *to inform the development of a broad*
13 *range of fusion energy systems; and*

14 “(C) *to facilitate the translation of research*
15 *results in fusion energy science to industry.*

16 “(2) *COORDINATION.*—*In carrying out the pro-*
17 *gram under paragraph (1), the Secretary shall co-*
18 *ordinate with relevant Federal agencies, and*
19 *prioritize the following objectives:*

20 “(A) *To use expertise from the private sec-*
21 *tor, institutions of higher education, and the Na-*
22 *tional Laboratories to leverage existing, and de-*
23 *velop new, computational software and capabili-*
24 *ties that prospective users may use to accelerate*

1 *research and development of fusion energy sys-*
2 *tems.*

3 “(B) *To develop computational tools to sim-*
4 *ulate and predict fusion energy science phe-*
5 *nomena that may be validated through physical*
6 *experimentation.*

7 “(C) *To increase the utility of the research*
8 *infrastructure of the Department by coordinating*
9 *with the Advanced Scientific Computing Re-*
10 *search program within the Office of Science.*

11 “(D) *To leverage experience from existing*
12 *modeling and simulation entities sponsored by*
13 *the Department.*

14 “(E) *To ensure that new experimental and*
15 *computational tools are accessible to relevant re-*
16 *search communities, including private sector en-*
17 *tities engaged in fusion energy technology devel-*
18 *opment.*

19 “(F) *To ensure that newly developed com-*
20 *putational tools are compatible with modern vir-*
21 *tual engineering and visualization capabilities to*
22 *accelerate the realization of fusion energy tech-*
23 *nologies and systems.*

24 “(3) *DUPLICATION.—The Secretary shall ensure*
25 *the coordination of, and avoid unnecessary duplica-*

1 *tion of, the activities of the program under paragraph*
2 *(1) with the activities of—*

3 *“(A) other research entities of the Depart-*
4 *ment, including the National Laboratories, the*
5 *Advanced Research Projects Agency—Energy,*
6 *and the Advanced Scientific Computing Re-*
7 *search program within the Office of Science; and*

8 *“(B) industry.*

9 *“(4) HIGH-PERFORMANCE COMPUTING FOR FU-*
10 *SION INNOVATION CENTER.—*

11 *“(A) IN GENERAL.—In carrying out the*
12 *program under paragraph (1), the Secretary*
13 *shall, in coordination with the Innovation Net-*
14 *work for Fusion Energy, establish and operate a*
15 *national High-Performance Computing for Fu-*
16 *sion Innovation Center (referred to in this para-*
17 *graph as the ‘Center’), to support the program*
18 *under paragraph (1) by providing, to the extent*
19 *practicable, a centralized entity for multidisci-*
20 *plinary, collaborative, fusion energy research*
21 *and development through high-performance com-*
22 *puting and advanced data analytics technologies*
23 *and processes.*

24 *“(B) ELIGIBLE ENTITIES.—An entity eligi-*
25 *ble to serve as the Center shall be—*

1 “(i) a National Laboratory;

2 “(ii) an institution of higher edu-
3 cation;

4 “(iii) a multi-institutional collabora-
5 tion; or

6 “(iv) any other entity that the Sec-
7 retary determines to be appropriate.

8 “(C) APPLICATION; SELECTION.—

9 “(i) APPLICATION.—To be eligible to
10 serve as the Center, an eligible entity shall
11 submit to the Secretary an application at
12 such time, in such manner, and containing
13 such information as the Secretary may re-
14 quire.

15 “(ii) SELECTION.—The Secretary shall
16 select the Center on a competitive, merit-re-
17 viewed basis.

18 “(D) EXISTING ACTIVITIES.—The Center
19 may incorporate existing research activities that
20 are consistent with the program under para-
21 graph (1).

22 “(E) PRIORITIES.—

23 “(i) IN GENERAL.—The Center shall
24 prioritize activities that utilize expertise
25 and infrastructure from a balance among

1 *the private sector, institutions of higher*
2 *education, and the National Laboratories to*
3 *enhance existing computation tools and de-*
4 *velop new computational software and ca-*
5 *pabilities to accelerate the commercial ap-*
6 *plication of fusion energy systems.*

7 “(i) *MAINTENANCE OF RESOURCE*
8 *AVAILABILITY.—The Secretary may enter*
9 *into contracts with commercial cloud com-*
10 *puting providers to ensure that resource*
11 *availability within the Department is not*
12 *reduced or disproportionately distributed as*
13 *a result of Center activities.*

14 “(F) *DURATION.—Subject to subparagraph*
15 *(G), the Center shall receive support for a period*
16 *of not more than 5 years, subject to the avail-*
17 *ability of appropriations.*

18 “(G) *RENEWAL.—On the expiration of the*
19 *period of support of the Center under subpara-*
20 *graph (F), the Secretary may renew support for*
21 *the Center, on a merit-reviewed basis, for a pe-*
22 *riod of not more than 5 years.*

23 “(p) *MATERIAL PLASMA EXPOSURE EXPERIMENT.—*

24 “(1) *IN GENERAL.—The Secretary shall construct*
25 *a Material Plasma Exposure Experiment facility as*

1 *described in the 2020 publication approved by the*
2 *Fusion Energy Sciences Advisory Committee entitled*
3 *‘Powering the Future: Fusion and Plasmas’. The Sec-*
4 *retary shall consult with the private sector, institu-*
5 *tions of higher education, National Laboratories, and*
6 *relevant Federal agencies to ensure that the facility is*
7 *capable of meeting Federal research needs for steady*
8 *state, high-heat-flux, and plasma-material interaction*
9 *testing of fusion materials over a range of fusion en-*
10 *ergy relevant parameters.*

11 “(2) *FACILITY CAPABILITIES.—The Secretary*
12 *shall ensure that the facility described in paragraph*
13 *(1) will provide the following capabilities:*

14 “(A) *A magnetic field at the target of 1*
15 *Tesla.*

16 “(B) *An energy flux at the target of 10 MW/*
17 *m².*

18 “(C) *The ability to expose previously irra-*
19 *diated plasma facing material samples to plas-*
20 *ma.*

21 “(3) *START OF OPERATIONS.—The Secretary*
22 *shall, subject to the availability of appropriations, en-*
23 *sure that the start of full operations of the facility de-*
24 *scribed in paragraph (1) occurs before December 31,*
25 *2027.*

1 “(4) *FUNDING.*—Of the funds authorized to be
2 *appropriated for Fusion Energy Sciences, there are*
3 *authorized to be appropriated to the Secretary for the*
4 *Office of Fusion Energy Sciences to complete con-*
5 *struction of the facility described in paragraph (1)—*

6 “(A) \$21,895,000 for fiscal year 2023; and

7 “(B) \$3,800,000 for fiscal year 2024.

8 “(q) *MATTER IN EXTREME CONDITIONS INSTRUMENT*
9 *UPGRADE.*—

10 “(1) *IN GENERAL.*—The Secretary shall provide
11 *for the upgrade to the Matter in Extreme Conditions*
12 *endstation at the Linac Coherent Light Source as de-*
13 *scribed in the 2020 publication approved by the Fu-*
14 *sion Energy Sciences Advisory Committee entitled*
15 *‘Powering the Future: Fusion and Plasmas’. The Sec-*
16 *retary shall consult with the private sector, institu-*
17 *tions of higher education, National Laboratories, and*
18 *relevant Federal agencies to ensure that this facility*
19 *is capable of meeting Federal research needs for un-*
20 *derstanding physical and chemical changes to plas-*
21 *mas at fundamental timescales, and explore new re-*
22 *gimes of dense material physics, astrophysics, plan-*
23 *etary physics, and short-pulse laser-plasma inter-*
24 *actions.*

1 “(2) *START OF OPERATIONS.*—*The Secretary*
2 *shall, subject to the availability of appropriations, en-*
3 *sure that the start of full operations of the facility de-*
4 *scribed in paragraph (1) occurs before December 31,*
5 *2028.”; and*

6 (8) *in subsection (r) (as so redesignated)—*

7 (A) *by striking “There” and inserting “Out*
8 *of funds authorized to be appropriated for the*
9 *Office of Science in a fiscal year, there”;* and

10 (B) *by striking paragraphs (3) through (5)*
11 *and inserting the following:*

12 “(3) \$1,025,500,400 for fiscal year 2023;

13 “(4) \$1,043,489,724 for fiscal year 2024;

14 “(5) \$1,053,266,107 for fiscal year 2025;

15 “(6) \$1,047,962,074 for fiscal year 2026; and

16 “(7) \$1,114,187,798 for fiscal year 2027.”.

17 (b) *ITER CONSTRUCTION.*—*Section 972(c)(3) of the*
18 *Energy Policy Act of 2005 (42 U.S.C. 16312(c)(3)) is*
19 *amended—*

20 (1) *in subparagraph (A), by striking “and” at*
21 *the end; and*

22 (2) *by striking subparagraph (B) and inserting*
23 *the following:*

24 “(B) \$379,700,000 for fiscal year 2023;

25 “(C) \$419,250,000 for fiscal year 2024;

1 “(D) \$415,000,000 for fiscal year 2025;

2 “(E) \$370,500,000 for fiscal year 2026; and

3 “(F) \$411,078,000 for fiscal year 2027.”.

4 **SEC. 10106. HIGH ENERGY PHYSICS PROGRAM.**

5 (a) *PROGRAM.*—Section 305 of the Department of En-
6 *ergy Research and Innovation Act (42 U.S.C. 18643) is*
7 *amended—*

8 (1) *by redesignating subsections (b) through (d)*
9 *as subsections (d) through (f), respectively; and*

10 (2) *by inserting after subsection (a) the fol-*
11 *lowing:*

12 “(b) *PROGRAM.*—As part of the activities authorized
13 *under section 209 of the Department of Energy Organiza-*
14 *tion Act (42 U.S.C. 7139), the Director shall carry out a*
15 *research program in elementary particle physics and ad-*
16 *vanced technology research and development to improve the*
17 *understanding of the fundamental properties of the uni-*
18 *verse, including constituents of matter and energy and the*
19 *nature of space and time.*

20 “(c) *HIGH ENERGY FRONTIER RESEARCH.*—As part
21 *of the program described in subsection (b), the Director*
22 *shall carry out research using high energy accelerators and*
23 *advanced detectors, including accelerators and detectors*
24 *that will function as national user facilities, to create and*

1 *study interactions of elementary particles and investigate*
2 *fundamental forces.”.*

3 **(b) INTERNATIONAL COLLABORATION.**—Section 305 of
4 *the Department of Energy Research and Innovation Act (42*
5 *U.S.C. 18643) is amended by striking subsection (d) (as*
6 *redesignated by subsection (a)(1)) and inserting the fol-*
7 *lowing:*

8 **“(d) INTERNATIONAL COLLABORATION.**—*The Director*
9 *shall—*

10 **“(1) as practicable and in coordination with**
11 *other appropriate Federal agencies as necessary, en-*
12 *sure the access of United States researchers to the*
13 *most advanced accelerator facilities and research ca-*
14 *pabilities in the world, including the Large Hadron*
15 *Collider;*

16 **“(2) to the maximum extent practicable, con-**
17 *tinue to leverage United States participation in the*
18 *Large Hadron Collider, and prioritize expanding*
19 *international partnerships and investments in the*
20 *Long-Baseline Neutrino Facility and Deep Under-*
21 *ground Neutrino Experiment; and*

22 **“(3) to the maximum extent practicable,**
23 *prioritize engagement in collaborative efforts in sup-*
24 *port of future international facilities that would pro-*

1 *vide access to the most advanced accelerator facilities*
2 *in the world to United States researchers.”.*

3 (c) *COSMIC FRONTIER RESEARCH.*—Section 305 of the
4 *Department of Energy Research and Innovation Act (42*
5 *U.S.C. 18645) is amended by striking subsection (f) (as re-*
6 *designated by subsection (a)(1)) and inserting the following:*

7 “(f) *COSMIC FRONTIER RESEARCH.*—The Director
8 *shall carry out research activities on the nature of the pri-*
9 *mary contents of the universe, including the nature of dark*
10 *energy and dark matter. These activities shall, to the max-*
11 *imum extent practicable, be consistent with the research*
12 *priorities identified by the High Energy Physics Advisory*
13 *Panel or the National Academy of Sciences, and may in-*
14 *clude—*

15 “(1) *collaborations with the National Aero-*
16 *nautics and Space Administration, the National*
17 *Science Foundation, or international partners on rel-*
18 *evant projects; and*

19 “(2) *the development of space-based, land-based,*
20 *water-based, and underground facilities and experi-*
21 *ments.”.*

22 (d) *FURTHER ACTIVITIES.*—Section 305 of the Depart-
23 *ment of Energy Research and Innovation Act (42 U.S.C.*
24 *18645) (as amended by subsection (c)), is amended by add-*
25 *ing at the end the following:*

1 “(g) *FACILITY CONSTRUCTION AND MAJOR ITEMS OF*
2 *EQUIPMENT.*—

3 “(1) *PROJECTS.*—*Consistent with the Office of*
4 *Science’s project management practices, the Director*
5 *shall, to the maximum extent practicable, by incor-*
6 *porating the findings and recommendations of the*
7 *2014 Particle Physics Project Prioritization Panel*
8 *(P5) report entitled ‘Building for Discovery’, support*
9 *construction or fabrication of—*

10 “(A) *an international Long-Baseline Neu-*
11 *trino Facility based in the United States;*

12 “(B) *the Proton Improvement Plan II;*

13 “(C) *Second Generation Dark Matter ex-*
14 *periments;*

15 “(D) *the Legacy Survey of Space and Time*
16 *camera;*

17 “(E) *upgrades to detectors and other compo-*
18 *nents of the Large Hadron Collider; and*

19 “(F) *the Cosmic Microwave Background*
20 *Stage 4 project; and*

21 “(G) *other high priority projects rec-*
22 *ommended in the most recent report of the Par-*
23 *ticule Physics Project Prioritization Panel of the*
24 *High Energy Physics Advisory Panel.*

25 “(2) *LONG-BASELINE NEUTRINO FACILITY.*—

1 “(A) *IN GENERAL.*—*The Secretary shall*
2 *support construction of a Long-Baseline Neu-*
3 *trino Facility to facilitate the international*
4 *Deep Underground Neutrino Experiment to ex-*
5 *amine the fundamental properties of neutrinos,*
6 *explore physics beyond the Standard Model, and*
7 *better clarify the existence and nature of anti-*
8 *matter.*

9 “(B) *FACILITY CAPABILITIES.*—*The Sec-*
10 *retary shall ensure that the facility described in*
11 *subparagraph (A) will provide, at a minimum,*
12 *the following capabilities:*

13 “(i) *A neutrino beam with wideband*
14 *capability of 1.2 megawatts of beam power*
15 *and upgradable to 2.4 megawatts of beam*
16 *power.*

17 “(ii) *3 caverns excavated for a 70 kil-*
18 *oton fiducial detector mass and supporting*
19 *surface buildings and utilities.*

20 “(iii) *Cryogenic systems to support*
21 *neutrino detectors.*

22 “(C) *START OF OPERATIONS.*—*The Sec-*
23 *retary shall, subject to the availability of appro-*
24 *priations, ensure that the start of full operations*

1 *of the facility described in subparagraph (A) oc-*
2 *curs before December 31, 2031.*

3 “(D) *FUNDING.*—*Out of funds authorized to*
4 *be appropriated under subsection (k), there are*
5 *authorized to be appropriated to the Secretary to*
6 *carry out construction of the project described in*
7 *subparagraph (A)—*

8 “(i) *\$180,000,000 for fiscal year 2023;*

9 “(ii) *\$255,000,000 for fiscal year 2024;*

10 “(iii) *\$305,000,000 for fiscal year*
11 *2025;*

12 “(iv) *\$305,000,000 for fiscal year 2026;*

13 *and*

14 “(v) *\$305,000,000 for fiscal year 2027.*

15 “(3) *PROTON IMPROVEMENT PLAN—II ACCEL-*
16 *ERATOR UPGRADE PROJECT.—*

17 “(A) *IN GENERAL.*—*The Secretary shall*
18 *support construction of the Proton Improvement*
19 *Plan II, an upgrade to the Fermilab accelerator*
20 *complex identified in the 2014 Particle Physics*
21 *Project Prioritization Panel (P5) report entitled*
22 *‘Building for Discovery’, to provide the world’s*
23 *most intense beam of neutrinos to the inter-*
24 *national Long Baseline Neutrino Facility and to*
25 *carry out a broad range of future high energy*

1 *physics experiments. The Secretary shall work*
2 *with international partners to enable further sig-*
3 *nificant contributions to the capabilities of that*
4 *project.*

5 “(B) *FACILITY CAPABILITIES.*—*The Sec-*
6 *retary shall ensure that the facility described in*
7 *subparagraph (A) will provide, at a minimum,*
8 *the following capabilities:*

9 “(i) *A state-of-the-art 800 megaelectron*
10 *volt superconducting linear accelerator.*

11 “(ii) *Proton beam power of 1.2*
12 *megawatts at the start of LBNF/DUNE,*
13 *upgradeable to 2.4 megawatts of beam*
14 *power.*

15 “(iii) *A flexible design to enable high*
16 *power beam delivery to multiple users si-*
17 *multaneously and customized beams tai-*
18 *lored to specific scientific needs.*

19 “(iv) *Sustained high reliability oper-*
20 *ation of the Fermilab accelerator complex.*

21 “(C) *START OF OPERATIONS.*—*The Sec-*
22 *retary shall, subject to the availability of appro-*
23 *priations, ensure that the start of full operations*
24 *of the facility described in subparagraph (A) oc-*
25 *curs before December 31, 2028.*

1 “(D) *FUNDING.*—*Out of funds authorized to*
2 *be appropriated under subsection (k), there are*
3 *authorized to be appropriated to the Secretary to*
4 *carry out construction of the facility described in*
5 *subparagraph (A)—*

6 “(i) \$130,000,000 for fiscal year 2023;

7 “(ii) \$120,000,000 for fiscal year 2024;

8 “(iii) \$120,000,000 for fiscal year
9 2025;

10 “(iv) \$115,000,000 for fiscal year 2026;

11 *and*

12 “(v) \$110,000,000 for fiscal year 2027.

13 “(4) *COSMIC MICROWAVE BACKGROUND STAGE*

14 4.—

15 “(A) *IN GENERAL.*—*The Secretary, in part-*
16 *nership with the Director of the National Science*
17 *Foundation, shall support construction of the*
18 *Cosmic Microwave Background Stage 4 project*
19 *to survey the cosmic microwave background to*
20 *test theories of cosmic inflation as described in*
21 *the 2014 Particle Physics Prioritization Panel*
22 *(P5) report entitled ‘Building for Discovery:*
23 *Strategic Plan for U.S. Particle Physics in the*
24 *Global Context.’.*

1 “(B) *CONSULTATION.*—*The Secretary shall*
2 *consult with the private sector, institutions of*
3 *higher education, National Laboratories, and rel-*
4 *evant Federal agencies to ensure that the project*
5 *described in subparagraph (A) is capable of*
6 *meeting Federal research needs in accessing the*
7 *ultra-high energy physics of inflation and im-*
8 *portant neutrino properties.*

9 “(C) *EXPERIMENTAL CAPABILITIES.*—*The*
10 *Secretary shall ensure to the maximum extent*
11 *practicable that the facility described in sub-*
12 *paragraph (A) will provide, at a minimum,*
13 *500,000 superconducting detectors deployed on*
14 *an array of millimeter-wave telescopes with the*
15 *required range in frequency, sensitivity, and sur-*
16 *vey speed that will provide sufficient capability*
17 *to enable an order of magnitude advance in ob-*
18 *servations of the Cosmic Microwave Background,*
19 *delivering transformative discoveries in funda-*
20 *mental physics, cosmology, and astrophysics.*

21 “(D) *START OF OPERATIONS.*—*The Sec-*
22 *retary shall, subject to the availability of appro-*
23 *priations, ensure that the start of full operations*
24 *of the facility described in subparagraph (A) oc-*
25 *currs before December 31, 2030.*

1 “(E) *FUNDING.*—*Out of funds authorized to*
2 *be appropriated under subsection (k), there are*
3 *authorized to be appropriated to the Secretary to*
4 *carry out construction of the facility described in*
5 *subparagraph (A)—*

6 “(i) \$10,000,000 for fiscal year 2023;

7 “(ii) \$25,000,000 for fiscal year 2024;

8 “(iii) \$60,000,000 for fiscal year 2025;

9 “(iv) \$80,000,000 for fiscal year 2026;

10 and

11 “(v) \$80,000,000 for fiscal year 2027.

12 “(h) *ACCELERATOR AND DETECTOR UPGRADES.*—*The*
13 *Director shall upgrade accelerator facilities and detectors,*
14 *as necessary and appropriate, to increase beam power, sus-*
15 *tain high reliability, and improve precision measurement*
16 *to advance the highest priority particle physics research*
17 *programs. In carrying out facility upgrades, the Director*
18 *shall continue to work with international partners, when*
19 *appropriate and in the United States’ interest, to leverage*
20 *investments and expertise in critical technologies to help*
21 *build and upgrade accelerator and detector facilities in the*
22 *United States.*

23 “(i) *ACCELERATOR AND DETECTOR RESEARCH AND*
24 *DEVELOPMENT.*—*As part of the program described in sub-*
25 *section (b), the Director shall carry out research and devel-*

1 *opment in particle beam physics, accelerator science and*
2 *technology, and particle and radiation detection with rel-*
3 *evance to the specific needs of the High Energy Physics pro-*
4 *gram, in coordination with the Accelerator Research and*
5 *Development program authorized under section 310.*

6 “(j) *UNDERGROUND SCIENCE.—The Director shall—*

7 “(1) *support an underground science program*
8 *consistent with the missions of the Department and*
9 *the scientific needs of the High Energy Physics pro-*
10 *gram, including those articulated in the most recent*
11 *report of the Particle Physics Project Prioritization*
12 *Panel of the High Energy Physics Advisory Panel,*
13 *that leverages the capabilities of relevant underground*
14 *science and engineering facilities;*

15 “(2) *carry out a competitive grant program to*
16 *award scientists and engineers at institutions of high-*
17 *er education, nonprofit institutions, and National*
18 *Laboratories to conduct research in underground*
19 *science and engineering; and*

20 “(3) *submit to the Committee on Energy and*
21 *Natural Resources of the Senate and the Committee*
22 *on Science, Space, and Technology of the House of*
23 *Representatives a report on the inventory of under-*
24 *ground mines in the United States that may be suit-*
25 *able for future development of underground science*

1 *and engineering facilities and any anticipated chal-*
2 *lenges associated with repurposing, repair, facility*
3 *siting, or construction.*

4 “(k) *AUTHORIZATION OF APPROPRIATIONS.—Out of*
5 *funds authorized to be appropriated for the Office of Science*
6 *in a fiscal year, there are authorized to be appropriated*
7 *to the Secretary to carry out the activities described in this*
8 *section—*

9 “(1) *\$1,159,520,000 for fiscal year 2023;*

10 “(2) *\$1,289,891,200 for fiscal year 2024;*

11 “(3) *\$1,428,284,672 for fiscal year 2025;*

12 “(4) *\$1,499,881,752 for fiscal year 2026; and*

13 “(5) *\$1,554,874,657 for fiscal year 2027.”.*

14 **SEC. 10107. NUCLEAR PHYSICS PROGRAM.**

15 *Section 308 of the Department of Energy Research and*
16 *Innovation Act (Public Law 115–246; 132 Stat. 3150) is*
17 *amended to read as follows:*

18 **“SEC. 308. NUCLEAR PHYSICS.**

19 “(a) *PROGRAM.—As part of the activities authorized*
20 *under section 209 of the Department of Energy Organiza-*
21 *tion Act (42 U.S.C. 7139), the Director shall carry out a*
22 *research program, and support relevant facilities, to dis-*
23 *cover and understand various forms of nuclear matter.*

24 “(b) *ELECTRON ION COLLIDER.—*

1 “(1) *IN GENERAL.*—*The Secretary shall support*
2 *construction of an Electron Ion Collider as described*
3 *in the 2015 Long Range Plan of the Nuclear Science*
4 *Advisory Committee and the report from the National*
5 *Academies of Science, Engineering, and Medicine en-*
6 *titled ‘An Assessment of U.S.-Based Electron-Ion*
7 *Collider Science’, in order to measure the internal*
8 *structure of the proton and the nucleus and answer*
9 *fundamental questions about the nature of visible*
10 *matter.*

11 “(2) *FACILITY CAPABILITY.*—*The Secretary shall*
12 *ensure that the facility described in paragraph (1)*
13 *meets the requirements in the 2015 Long Range Plan*
14 *described in that paragraph, including—*

15 “(A) *at least 70 percent polarized beams of*
16 *electrons and light ions;*

17 “(B) *ion beams from deuterium to the*
18 *heaviest stable nuclei;*

19 “(C) *variable center of mass energy from 20*
20 *to 140 GeV;*

21 “(D) *high collision luminosity of*
22 *$10^{33-34} \text{cm}^{-2} \text{s}^{-1}$; and*

23 “(E) *the possibility of more than 1 inter-*
24 *action region.*

1 “(3) *START OF OPERATIONS.*—*The Secretary*
2 *shall, subject to the availability of appropriations, en-*
3 *sure that the start of full operations of the facility*
4 *under this subsection occurs before December 31,*
5 *2030.*

6 “(4) *FUNDING.*—*Out of funds authorized to be*
7 *appropriated under subsection (c), there are author-*
8 *ized to be appropriated to the Secretary to carry out*
9 *construction of the facility under this subsection—*

10 “(A) \$90,000,000 for fiscal year 2023;

11 “(B) \$181,000,000 for fiscal year 2024;

12 “(C) \$219,000,000 for fiscal year 2025;

13 “(D) \$297,000,000 for fiscal year 2026; and

14 “(E) \$301,000,000 for fiscal year 2027.

15 “(c) *AUTHORIZATION OF APPROPRIATIONS.*—*Out of*
16 *funds authorized to be appropriated for the Office of Science*
17 *in a fiscal year, there are authorized to be appropriated*
18 *to the Secretary to carry out the activities described in this*
19 *section—*

20 “(1) \$840,480,000 for fiscal year 2023;

21 “(2) \$976,508,800 for fiscal year 2024;

22 “(3) \$1,062,239,328 for fiscal year 2025;

23 “(4) \$1,190,833,688 for fiscal year 2026; and

24 “(5) \$1,248,463,709 for fiscal year 2027.”.

1 **SEC. 10108. SCIENCE LABORATORIES INFRASTRUCTURE**
2 **PROGRAM.**

3 *Section 309 of the Department of Energy Research and*
4 *Innovation Act (42 U.S.C. 18647) is amended by adding*
5 *at the end the following:*

6 “(c) *APPROACH.—In carrying out the program under*
7 *subsection (a), the Director shall use all available ap-*
8 *proaches and mechanisms, as the Secretary determines to*
9 *be appropriate, including—*

10 “(1) *capital line items;*

11 “(2) *minor construction projects;*

12 “(3) *energy savings performance contracts;*

13 “(4) *utility energy service contracts;*

14 “(5) *alternative financing; and*

15 “(6) *expense funding.*

16 “(d) *SUBMISSION TO CONGRESS.—For each fiscal year*
17 *through fiscal year 2027, at the same time as the annual*
18 *budget submission of the President, the Secretary shall sub-*
19 *mit to the Committee on Appropriations and the Committee*
20 *on Energy and Natural Resources of the Senate and the*
21 *Committee on Appropriations and the Committee on*
22 *Science, Space, and Technology of the House of Representa-*
23 *tives a list of projects for which the Secretary will provide*
24 *funding under this section, including a description of each*
25 *project and the funding profile for the project.*

1 “(e) *AUTHORIZATION OF APPROPRIATIONS.*—Out of
2 *funds authorized to be appropriated for the Office of Science*
3 *in a fiscal year, there is authorized to be appropriated to*
4 *the Secretary to carry out the activities described in this*
5 *section \$550,000,000 for each of fiscal years 2023 through*
6 *2027.”.*

7 **SEC. 10109. ACCELERATOR RESEARCH AND DEVELOPMENT.**

8 *The Department of Energy Research and Innovation*
9 *Act (42 U.S.C. 18601 et seq.) is amended by adding at the*
10 *end the following:*

11 **“SEC. 310. ACCELERATOR RESEARCH AND DEVELOPMENT.**

12 “(a) *PROGRAM.*—As part of the activities authorized
13 *under section 209 of the Department of Energy Organiza-*
14 *tion Act (42 U.S.C. 7139), the Director shall carry out a*
15 *research program—*

16 “(1) *to advance accelerator science and tech-*
17 *nology relevant to the Department, other Federal*
18 *agencies, and United States industry;*

19 “(2) *to foster partnerships to develop, dem-*
20 *onstrate, and enable the commercial application of*
21 *accelerator technologies;*

22 “(3) *to support the development of a skilled, di-*
23 *verse, and inclusive accelerator workforce; and*

24 “(4) *to provide access to accelerator design and*
25 *engineering resources.*

1 “(b) *ACCELERATOR RESEARCH.*—*In carrying out the*
2 *program authorized under subsection (a), the Director shall*
3 *support—*

4 “(1) *research activities in cross-cutting accel-*
5 *erator technologies including superconducting*
6 *magnets and accelerators, beam physics, data ana-*
7 *lytics-based accelerator controls, simulation software,*
8 *new particle sources, advanced laser technology, and*
9 *transformative research; and*

10 “(2) *optimal operation of the Accelerator Test*
11 *Facility.*

12 “(c) *ACCELERATOR DEVELOPMENT.*—*In carrying out*
13 *the program authorized under subsection (a), the Director*
14 *shall support partnerships to foster the development, dem-*
15 *onstration, and commercial application of accelerator tech-*
16 *nologies, including advanced superconducting wire and*
17 *cable, superconducting RF cavities, and high efficiency ra-*
18 *diofrequency power sources for accelerators.*

19 “(d) *RESEARCH COLLABORATIONS.*—*In developing ac-*
20 *celerator technologies under the program authorized under*
21 *subsection (a), the Director shall—*

22 “(1) *consider the requirements necessary to sup-*
23 *port translational research and development for med-*
24 *ical, industrial, security, and defense applications;*
25 *and*

1 “(2) *leverage investments in accelerator tech-*
2 *nologies and fundamental research in particle physics*
3 *by partnering with institutions of higher education,*
4 *industry, and other Federal agencies to enable the*
5 *commercial application of advanced accelerator tech-*
6 *nologies.*

7 “(e) *AUTHORIZATION OF APPROPRIATIONS.—Out of*
8 *funds authorized to be appropriated for the Office of Science*
9 *in a fiscal year, there are authorized to be appropriated*
10 *to the Secretary to carry out the activities described in this*
11 *section—*

12 “(1) \$19,080,000 for fiscal year 2023;

13 “(2) \$20,224,800 for fiscal year 2024;

14 “(3) \$21,438,288 for fiscal year 2025;

15 “(4) \$22,724,585 for fiscal year 2026; and

16 “(5) \$24,088,060 for fiscal year 2027.”.

17 **SEC. 10110. ISOTOPE RESEARCH, DEVELOPMENT, AND PRO-**
18 **DUCTION.**

19 “(a) *IN GENERAL.—The Department of Energy Re-*
20 *search and Innovation Act (42 U.S.C. 18601 et seq.) is*
21 *amended by adding after section 310 (as added by section*
22 *10109) the following:*

1 **“SEC. 311. ISOTOPE RESEARCH, DEVELOPMENT, AND PRO-**
2 **DUCTION.**

3 *“(a) DEFINITION OF CRITICAL RADIOACTIVE AND STA-*
4 *BLE ISOTOPE.—*

5 *“(1) IN GENERAL.—In this section, the term*
6 *‘critical radioactive and stable isotope’ means a ra-*
7 *dioactive and stable isotope—*

8 *“(A) the domestic commercial production of*
9 *which is unavailable or inadequate to satisfy the*
10 *demand of research, medical, industrial, or re-*
11 *lated industries in the United States; and*

12 *“(B) the supply of which is augmented*
13 *through—*

14 *“(i) Department production; or*

15 *“(ii) foreign suppliers.*

16 *“(2) EXCLUSION.—In this section, the term ‘crit-*
17 *ical radioactive and stable isotope’ does not include*
18 *the medical isotope molybdenum-99, the production*
19 *and supply of which is addressed in the American*
20 *Medical Isotopes Production Act of 2012 (Public Law*
21 *112–239; 126 Stat. 2211) (including the amendments*
22 *made by that Act).*

23 *“(b) PROGRAM.—The Director shall—*

24 *“(1) carry out, in coordination with other rel-*
25 *evant programs across the Department, a program—*

1 “(A) for the production of critical radio-
2 active and stable isotopes, including the develop-
3 ment of techniques to produce isotopes, that the
4 Secretary determines are needed and of sufficient
5 quality and quantity for research, medical, in-
6 dustrial, or related purposes;

7 “(B) for the production of critical radio-
8 active and stable isotopes that are in short sup-
9 ply or projected to be in short supply in the fu-
10 ture, including byproducts, surplus materials,
11 and related isotope services;

12 “(C) to maintain and enhance the infra-
13 structure required to produce and supply critical
14 radioactive and stable isotope products and re-
15 lated services;

16 “(D) to conduct research and development
17 on new and improved isotope production and
18 processing techniques that can make critical ra-
19 dioactive and stable isotopes available for re-
20 search and application as soon as possible while
21 assisting in workforce development;

22 “(E) to reduce domestic dependency on the
23 foreign supply of critical radioactive and stable
24 isotopes to ensure national preparedness; and

1 “(F) to the maximum extent practicable, in
2 accordance with—

3 “(i) evidence-based reports, such as the
4 2015 report of the Nuclear Science Advisory
5 Committee entitled ‘Meeting Isotope Needs
6 and Capturing Opportunities for the Fu-
7 ture’; and

8 “(ii) assessments of isotope supply
9 chains, including the assessment described
10 in paragraph (3), any reports submitted
11 pursuant to subsection (d), and other cur-
12 rent and future assessments;

13 “(2) ensure that isotope production activities
14 carried out under this subsection are consistent with
15 the statement of policy entitled ‘Policies and Proce-
16 dures for Transfer of Commercial Radioisotope Pro-
17 duction and Distribution to Private Industry’ (30
18 Fed. Reg. 3247 (March 9, 1965));

19 “(3) assess the domestic requirements of current
20 and emerging critical radioactive and stable isotopes
21 and associated applications, including by consulting
22 end-users, to identify areas that may require Federal
23 investment for expedited development of domestic pro-
24 duction capacity for those isotopes, including through
25 public-private partnerships, as appropriate;

1 “(4) ensure that actions taken by the Depart-
2 ment do not interfere with, delay, compete with, or
3 otherwise adversely affect efforts by the private sector
4 to make available or otherwise facilitate the supply of
5 critical radioactive and stable isotopes, including ef-
6 forts under existing agreements between the Depart-
7 ment or contractors of the Department and the pri-
8 vate sector; and

9 “(5) in coordination with the Assistant Sec-
10 retary for Nuclear Energy, assess options for dem-
11 onstrating the production of critical radioactive and
12 stable isotopes in research, test, or commercial nuclear
13 reactors and accelerators, including reactors and ac-
14 celerators operated at universities.

15 “(c) *ADVISORY COMMITTEE.*—

16 “(1) *IN GENERAL.*—Not later than 90 days after
17 the date of enactment of this section, the Secretary
18 shall establish an advisory committee (referred to in
19 this subsection as the ‘committee’) in alignment with
20 the program established under subsection (b)—

21 “(A) to carry out the activities previously
22 executed as part of the Isotope Subcommittee of
23 the Nuclear Science Advisory Committee; and

24 “(B) to provide expert advice and assistance
25 to the Director in carrying out that program.

1 “(2) *REPORT.*—

2 “(A) *IN GENERAL.*—*Not later than 1 year*
3 *after the committee is established, the committee*
4 *shall—*

5 “(i) *update the 2015 Nuclear Science*
6 *Advisory Committee Isotopes Subcommittee*
7 *Report entitled ‘Meeting Isotope Needs and*
8 *Capturing Opportunities for the Future’;*
9 *and*

10 “(ii) *periodically update that report*
11 *thereafter as needed.*

12 “(B) *INCLUSIONS.*—*An updated report*
13 *under subparagraph (A) shall include an assess-*
14 *ment of—*

15 “(i) *current demand in the United*
16 *States for critical radioactive and stable*
17 *isotopes;*

18 “(ii) *the impact of continued reliance*
19 *on foreign supply of critical radioactive and*
20 *stable isotopes;*

21 “(iii) *proposed mitigation strategies,*
22 *including increasing domestic production*
23 *sources for critical radioactive and stable*
24 *isotopes, that—*

1 “(I) are not commercially avail-
2 able; or

3 “(II) are commercially produced
4 in quantities that are not sufficient—

5 “(aa) to satisfy domestic de-
6 mand; and

7 “(bb) to minimize production
8 constraints and supply disrup-
9 tions to the United States
10 healthcare and industrial isotope
11 industries;

12 “(iv) current facilities, including up-
13 grades to those facilities, and new facilities
14 needed to meet domestic critical isotope
15 needs; and

16 “(v) workforce development needs.

17 “(3) NONDUPLICATION.—The committee shall
18 work in alignment with, and shall not duplicate the
19 efforts of, preexisting advisory committees that are
20 advising the program established under subsection (b).

21 “(4) FACA.—The committee shall be subject to
22 the Federal Advisory Committee Act (5 U.S.C. App.).

23 “(d) REPORT.—

24 “(1) IN GENERAL.—Not later than the end of the
25 first fiscal year beginning after the date of enactment

1 of this section, and biennially thereafter, the Sec-
2 retary of Energy Advisory Board shall submit to the
3 Committees on Energy and Natural Resources and
4 Environment and Public Works of the Senate and the
5 Committees on Science, Space, and Technology and
6 Energy and Commerce of the House of Representa-
7 tives a report describing the progress made under the
8 program established under subsection (b) during the
9 preceding 2 fiscal years.

10 “(2) *INCLUSIONS.*—Each report under para-
11 graph (1) shall include—

12 “(A) an updated assessment of any critical
13 radioactive and stable isotope shortages in the
14 United States;

15 “(B) a description of—

16 “(i) any disruptions in the inter-
17 national supply of critical radioactive and
18 stable isotopes during the preceding 2 fiscal
19 years; and

20 “(ii) the impact of those disruptions on
21 related activities; and

22 “(C)(i) a projection of anticipated disrup-
23 tions in the international supply, or supply con-
24 straints, of critical radioactive and stable iso-
25 topes during the next 2 fiscal years; and

1 “(i) the anticipated impact of those disrup-
2 tions or constraints, as applicable, on related do-
3 mestic activities.

4 “(e) *AUTHORIZATION OF APPROPRIATIONS.*—Out of
5 funds authorized to be appropriated for the Office of Science
6 in a fiscal year, there are authorized to be appropriated
7 to the Secretary to carry out this section—

8 “(1) \$175,708,000 for fiscal year 2023;

9 “(2) \$196,056,480 for fiscal year 2024;

10 “(3) \$215,759,869 for fiscal year 2025;

11 “(4) \$200,633,461 for fiscal year 2026; and

12 “(5) \$146,293,469 for fiscal year 2027.”.

13 (b) *DEMONSTRATION OF ISOTOPE PRODUCTION.*—Sec-
14 tion 952(a) of the Energy Policy Act of 2005 (42 U.S.C.
15 16272(a)) is amended—

16 (1) by redesignating paragraph (2) as para-
17 graph (4) and moving the paragraph so as to appear
18 after paragraph (3); and

19 (2) by inserting after paragraph (1) the fol-
20 lowing:

21 “(2) *ISOTOPE DEMONSTRATION EVALUATION.*—

22 “(A) *IN GENERAL.*—Not later than 1 year
23 after the date of enactment of the Research and
24 Development, Competition, and Innovation Act,
25 the Secretary, acting through the Assistant Sec-

1 *retary for Nuclear Energy, shall evaluate the*
2 *technical and economic feasibility of the estab-*
3 *lishment of an isotope demonstration subpro-*
4 *gram of the program established under para-*
5 *graph (1) to support the development and com-*
6 *mercial demonstration of critical radioactive and*
7 *stable isotope production in existing commercial*
8 *nuclear power plants.*

9 *“(B) CONSULTATION.—The Secretary, act-*
10 *ing through the Assistant Secretary for Nuclear*
11 *Energy, shall consult with the Director of the Of-*
12 *fice of Science in carrying out the evaluation*
13 *under subparagraph (A).*

14 *“(C) DEFINITION OF CRITICAL RADIOACTIVE*
15 *AND STABLE ISOTOPE.—In this paragraph, the*
16 *term ‘critical radioactive and stable isotope’ has*
17 *the meaning given the term in section 311(a) of*
18 *the Department of Energy Research and Innova-*
19 *tion Act.”.*

20 *(c) RADIOISOTOPE PROCESSING FACILITY.—*

21 *(1) IN GENERAL.—The Secretary of Energy (re-*
22 *ferred to in this subsection as “the Secretary”) shall*
23 *construct a radioisotope processing facility to provide*
24 *for the growing radiochemical processing capability*
25 *needs associated with the production of critical radio-*

1 *active isotopes authorized under section 311 of the De-*
2 *partment of Energy Research and Innovation Act.*

3 (2) *FUNDING.*—*Out of funds authorized to be ap-*
4 *propriated under section 311(e) of the Department of*
5 *Energy Research and Innovation Act, there are au-*
6 *thorized to be appropriated to the Secretary to carry*
7 *out this subsection—*

8 (A) *\$30,500,000 for fiscal year 2023;*

9 (B) *\$75,000,000 for fiscal year 2024;*

10 (C) *\$105,000,000 for fiscal year 2025;*

11 (D) *\$83,000,000 for fiscal year 2026; and*

12 (E) *\$43,000,000 for fiscal year 2027.*

13 (d) *STABLE ISOTOPE PRODUCTION AND RESEARCH*
14 *CENTER.*—

15 (1) *IN GENERAL.*—*The Secretary of Energy (re-*
16 *ferred to in this subsection as “the Secretary”) shall*
17 *establish a stable isotope production and research cen-*
18 *ter—*

19 (A) *to expand the ability of the United*
20 *States to perform multiple stable isotope produc-*
21 *tion campaigns at large-scale production, as au-*
22 *thorized under section 311 of the Department of*
23 *Energy Research and Innovation Act;*

1 (B) to mitigate the dependence of the
2 United States on foreign-produced stable iso-
3 topes;

4 (C) to promote economic resilience; and

5 (D) to conduct research and development on
6 stable isotope production and associated methods
7 and technology.

8 (2) *FUNDING.*—Out of funds authorized to be ap-
9 propriated under section 311(e) of the Department of
10 Energy Research and Innovation Act, there are au-
11 thorized to be appropriated to the Secretary to carry
12 out this subsection—

13 (A) \$74,400,000 for fiscal year 2023;

14 (B) \$46,000,000 for fiscal year 2024;

15 (C) \$31,200,000 for fiscal year 2025;

16 (D) \$33,300,000 for fiscal year 2026; and

17 (E) \$13,900,000 for fiscal year 2027.

18 **SEC. 10111. INCREASED COLLABORATION WITH TEACHERS**

19 **AND SCIENTISTS.**

20 (a) *IN GENERAL.*—The Department of Energy Re-
21 search and Innovation Act (42 U.S.C. 18601 et seq.) is
22 amended by adding after section 311 (as added by section
23 10110), the following:

1 **“SEC. 312. INCREASED COLLABORATION WITH TEACHERS**
2 **AND SCIENTISTS.**

3 *“The Director shall support the development of a sci-*
4 *entific workforce through programs that facilitate collabora-*
5 *tion between and among teachers at elementary schools and*
6 *secondary schools served by local educational agencies, stu-*
7 *dents at institutions of higher education, early-career re-*
8 *searchers, faculty at institutions of higher education, and*
9 *the National Laboratories, including through the use of*
10 *proven techniques to expand the number of individuals from*
11 *underrepresented groups pursuing and attaining skills or*
12 *undergraduate and graduate degrees relevant to the mission*
13 *of the Office of Science.”.*

14 (b) *AUTHORIZATION OF APPROPRIATIONS.—Section*
15 *3169 of the Department of Energy Science Education En-*
16 *hancement Act (42 U.S.C. 7381e) is amended—*

17 (1) *by striking “There are” and inserting “Out*
18 *of funds authorized to be appropriated for the Office*
19 *of Science of the Department of Energy in a fiscal*
20 *year, there are”;* and

21 (2) *by striking “fiscal year 1991” and inserting*
22 *“each of fiscal years 2023 through 2027”.*

23 (c) *BROADENING PARTICIPATION IN WORKFORCE DE-*
24 *VELOPMENT FOR TEACHERS AND SCIENTISTS.—*

25 (1) *IN GENERAL.—The Department of Energy*
26 *Science Education Enhancement Act is amended by*

1 *inserting after section 3167 (42 U.S.C. 7381c–1) the*
2 *following:*

3 **“SEC. 3167A. BROADENING PARTICIPATION FOR TEACHERS**
4 **AND SCIENTISTS.**

5 “(a) *IN GENERAL.*—*The Secretary shall—*

6 “(1) *expand opportunities to increase the num-*
7 *ber of highly skilled science, technology, engineering,*
8 *and mathematics (STEM) professionals working in*
9 *disciplines relevant to the mission of the Department;*
10 *and*

11 “(2) *broaden the recruitment pool to increase*
12 *participation from Historically Black Colleges or*
13 *Universities (as defined in section 3167B(f)), His-*
14 *panic-serving institutions (as defined in that section),*
15 *Tribal Colleges or Universities (as defined in that sec-*
16 *tion), minority-serving institutions (as defined in*
17 *that section), institutions in eligible jurisdictions (as*
18 *defined in that section), emerging research institu-*
19 *tions, community colleges, and scientific societies in*
20 *those disciplines.*

21 “(b) *PLAN.*—*Not later than 1 year after the date of*
22 *enactment of the Research and Development, Competition,*
23 *and Innovation Act, the Secretary shall submit to the Com-*
24 *mittee on Science, Space, and Technology of the House of*
25 *Representatives and the Committees on Energy and Nat-*

1 *ural Resources and Commerce, Science, and Transportation*
2 *of the Senate and make available to the public a plan for*
3 *broadening participation of underrepresented groups in*
4 *science, technology, engineering, and mathematics in pro-*
5 *grams supported by the Department, including—*

6 “(1) *a plan for supporting relevant Federal re-*
7 *search award grantees and leveraging the National*
8 *Science Foundation INCLUDES National Network*
9 *and relevant partnerships, including partnerships*
10 *maintained by other Federal research agencies;*

11 “(2) *metrics for assessing the participation of*
12 *underrepresented groups in programs supported by*
13 *the Department;*

14 “(3) *experienced and potential barriers to broad-*
15 *ening participation of underrepresented groups in*
16 *programs supported by the Department, including*
17 *recommended solutions; and*

18 “(4) *any other activities the Secretary deter-*
19 *mines appropriate.*

20 “(c) *AUTHORIZATION OF APPROPRIATIONS.—Of the*
21 *amounts authorized to be appropriated under section 3169,*
22 *not less than \$2,000,000 is authorized to be appropriated*
23 *each fiscal year for the activities described in this section.*

1 **“SEC. 3167B. EXPANDING OPPORTUNITIES FOR HIGHLY**
2 **SKILLED SCIENCE, TECHNOLOGY, ENGINEER-**
3 **ING, AND MATHEMATICS (STEM) PROFES-**
4 **SIONALS.**

5 “(a) *IN GENERAL.*—*The Secretary shall—*

6 “(1) *expand opportunities and increase the num-*
7 *ber of highly skilled science, technology, engineering,*
8 *and mathematics (STEM) professionals working in*
9 *disciplines relevant to the mission of the Department;*
10 *and*

11 “(2) *broaden the recruitment pool to increase*
12 *participation from and expand partnerships with*
13 *Historically Black Colleges or Universities, Hispanic*
14 *serving institutions, Tribal Colleges or Universities,*
15 *minority-serving institutions, institutions in eligible*
16 *jurisdictions, emerging research institutions, commu-*
17 *nity colleges, and scientific societies in those dis-*
18 *ciplines.*

19 “(b) *PLAN AND OUTREACH STRATEGY.*—

20 “(1) *PLAN.*—

21 “(A) *IN GENERAL.*—*Not later than 180*
22 *days after the date of enactment of the Research*
23 *and Development, Competition, and Innovation*
24 *Act, the Secretary shall submit to the Committee*
25 *on Science, Space, and Technology of the House*
26 *of Representatives and the Committee on Energy*

1 *and Natural Resources of the Senate a 10-year*
2 *educational plan to fund and expand new or ex-*
3 *isting programs administered by the Office of*
4 *Science and sited at the National Laboratories*
5 *and Department user facilities to expand edu-*
6 *cational and workforce development opportuni-*
7 *ties for underrepresented individuals, includ-*
8 *ing—*

9 “(i) *high school, undergraduate, and*
10 *graduate students; and*

11 “(ii) *recent graduates, teachers, and*
12 *faculty in STEM fields.*

13 “(B) *CONTENTS.—The plan under subpara-*
14 *graph (A) may include paid internships, fellow-*
15 *ships, temporary employment, training pro-*
16 *grams, visiting student and faculty programs,*
17 *sabbaticals, and research support.*

18 “(2) *OUTREACH CAPACITY.—The Secretary shall*
19 *include in the plan under paragraph (1) an outreach*
20 *strategy to improve the advertising, recruitment, and*
21 *promotion of educational and workforce development*
22 *programs to community colleges, Historically Black*
23 *Colleges or Universities, Hispanic-serving institu-*
24 *tions, Tribal Colleges or Universities, minority-serv-*

1 *ing institutions, institutions in eligible jurisdictions,*
2 *and emerging research institutions.*

3 “(c) *BUILDING RESEARCH CAPACITY.*—

4 “(1) *IN GENERAL.*—*The Secretary shall develop*
5 *programs that strengthen the research capacity rel-*
6 *evant to Office of Science disciplines at emerging re-*
7 *search institutions, including minority-serving insti-*
8 *tutions, Tribal Colleges or Universities, Historically*
9 *Black Colleges or Universities, institutions in eligible*
10 *jurisdictions (as defined in section 2203(b)(3)(A) of*
11 *the Energy Policy Act of 1992 (42 U.S.C.*
12 *13503(b)(3)(A))), institutions in communities with*
13 *dislocated workers who were previously employed in*
14 *manufacturing, energy production, including coal*
15 *power plants, and mineral and material mining, and*
16 *other institutions of higher education.*

17 “(2) *INCLUSIONS.*—*The programs developed*
18 *under paragraph (1) may include—*

19 “(A) *enabling mutually beneficial and*
20 *jointly managed partnerships between research-*
21 *intensive institutions and emerging research in-*
22 *stitutions; and*

23 “(B) *soliciting research proposals, fellow-*
24 *ships, training programs, and research support*
25 *directly from emerging research institutions.*

1 “(d) *TRAINEESHIPS.*—

2 “(1) *IN GENERAL.*—*The Secretary shall establish*
3 *a university-led Traineeship Program to address*
4 *workforce development needs in STEM fields relevant*
5 *to the Department.*

6 “(2) *FOCUS.*—*The focus of the Traineeship Pro-*
7 *gram established under paragraph (1) shall be on—*

8 “(A) *supporting workforce development and*
9 *research experiences for underrepresented under-*
10 *graduate and graduate students; and*

11 “(B) *increasing participation from under-*
12 *represented populations.*

13 “(3) *INCLUSION.*—*The traineeships under the*
14 *Traineeship Program established under paragraph (1)*
15 *shall include opportunities to build the next-genera-*
16 *tion workforce in research areas critical to maintain-*
17 *ing core competencies across the programs of the Of-*
18 *fice of Science.*

19 “(e) *EVALUATION.*—

20 “(1) *IN GENERAL.*—*The Secretary shall establish*
21 *key performance indicators to measure and monitor*
22 *progress of education and workforce programs and ex-*
23 *pand Departmental activities for data collection and*
24 *analysis.*

1 “(2) *REPORT.*—Not later than 2 years after the
2 date of enactment of the Research and Development,
3 Competition, and Innovation Act, and every 2 years
4 thereafter, the Secretary shall submit to the Com-
5 mittee on Science, Space, and Technology and the
6 Committee on Education and Labor of the House of
7 Representatives and the Committee on Energy and
8 Natural Resources and the Committee on Health,
9 Education, Labor, and Pensions of the Senate a re-
10 port summarizing progress toward meeting the key
11 performance indicators established under paragraph
12 (1).

13 “(f) *DEFINITIONS.*—In this section:

14 “(1) *COMMUNITY COLLEGE.*—The term ‘commu-
15 nity college’ means—

16 “(A) a public institution of higher edu-
17 cation, including additional locations, at which
18 the highest awarded degree, or the predominantly
19 awarded degree, is an associate degree; or

20 “(B) any Tribal college or university.

21 “(2) *DISLOCATED WORKER.*—The term ‘dis-
22 located worker’ has the meaning given the term in
23 section 3 of the Workforce Innovation and Oppor-
24 tunity Act (29 U.S.C. 3102).

1 “(3) *HISPANIC-SERVING INSTITUTION*.—*The term*
2 *‘Hispanic-serving institution’ has the meaning given*
3 *the term in section 502(a) of the Higher Education*
4 *Act of 1965 (20 U.S.C. 1101a(a)).*

5 “(4) *HISTORICALLY BLACK COLLEGE OR UNIVER-*
6 *SITY*.—*The term ‘Historically Black College or Uni-*
7 *versity’ has the meaning given the term ‘part B insti-*
8 *tution’ in section 322 of the Higher Education Act of*
9 *1965 (20 U.S.C. 1061).*

10 “(5) *INSTITUTION IN AN ELIGIBLE JURISDIC-*
11 *TION*.—*The term ‘institution in an eligible jurisdic-*
12 *tion’ means an institution of higher education (as de-*
13 *finied in section 101 of the Higher Education Act of*
14 *1965 (20 U.S.C. 1001)) that is located in an eligible*
15 *jurisdiction (as defined in section 2203(b)(3)(A) of*
16 *the Energy Policy Act of 1992 (42 U.S.C.*
17 *13503(b)(3)(A)).*

18 “(6) *MINORITY-SERVING INSTITUTION*.—*The*
19 *term ‘minority-serving institution’ includes the enti-*
20 *ties described in any of paragraphs (1) through (7)*
21 *of section 371(a) of the Higher Education Act of 1965*
22 *(20 U.S.C. 1067q(a)).*

23 “(7) *STEM*.—*The term ‘STEM’ means the sub-*
24 *jects listed in section 2 of the STEM Education Act*
25 *of 2015 (42 U.S.C. 6621 note; Public Law 114–59).*

1 “(8) *TRIBAL COLLEGE OR UNIVERSITY*.—The
2 term ‘Tribal College or University’ has the meaning
3 given the term in section 316(b) of the Higher Edu-
4 cation Act of 1965 (20 U.S.C. 1059c(b)).”.

5 (2) *CLERICAL AMENDMENT*.—The table of con-
6 tents in section 2(b) of the National Defense Author-
7 ization Act for Fiscal Year 1991 (Public Law 101-
8 510; 104 Stat. 1497) is amended by striking the items
9 relating to sections 3167 and 3168 and inserting the
10 following:

“Sec. 3167. Partnerships with historically Black colleges and universities, His-
panic-serving institutions, and tribal colleges.

“Sec. 3167A. Broadening participation for teachers and scientists.

“Sec. 3167B. Expanding opportunities for highly skilled science, technology, engi-
neering, and mathematics (STEM) professionals.

“Sec. 3168. Definitions.

“Sec. 3169. Authorization of appropriations.”.

11 **SEC. 10112. HIGH INTENSITY LASER RESEARCH INITIATIVE;**
12 **HELIUM CONSERVATION PROGRAM; OFFICE**
13 **OF SCIENCE EMERGING BIOLOGICAL THREAT**
14 **PREPAREDNESS RESEARCH INITIATIVE;**
15 **MIDSCALE INSTRUMENTATION AND RE-**
16 **SEARCH EQUIPMENT PROGRAM; AUTHORIZA-**
17 **TION OF APPROPRIATIONS.**

18 (a) *IN GENERAL*.—The Department of Energy Re-
19 search and Innovation Act (42 U.S.C. 18601 et seq.) (as
20 amended by section 10111(a)) is amended by adding at the
21 end the following:

1 **“SEC. 313. HIGH INTENSITY LASER RESEARCH INITIATIVE.**

2 “(a) *IN GENERAL.*—*The Director shall establish a high*
3 *intensity laser research initiative consistent with the rec-*
4 *ommendations of the National Academies report entitled*
5 *‘Opportunities in Intense Ultrafast Lasers: Reaching for the*
6 *Brightest Light’ and the report from the Brightest Light*
7 *Initiative workshop entitled ‘The Future of Intense*
8 *Ultrafast Lasers in the U.S.’. The initiative should include*
9 *research and development of petawatt-scale and of high av-*
10 *erage power laser technologies necessary for future facility*
11 *needs in discovery science and to advance energy tech-*
12 *nologies, as well as support for a user network of academic*
13 *and National Laboratory high intensity laser facilities.*

14 “(b) *LEVERAGE.*—*The Director shall leverage new*
15 *laser technologies for more compact, less complex, and low-*
16 *cost accelerator systems needed for science applications.*

17 “(c) *COORDINATION.*—

18 “(1) *DIRECTOR.*—*The Director shall coordinate*
19 *the initiative established under subsection (a) among*
20 *all relevant programs within the Office of Science.*

21 “(2) *UNDER SECRETARY.*—*The Under Secretary*
22 *for Science shall coordinate the initiative established*
23 *under subsection (a) with other relevant programs*
24 *within the Department and other Federal agencies.*

25 “(d) *AUTHORIZATION OF APPROPRIATIONS.*—*Out of*
26 *funds authorized to be appropriated for the Office of Science*

1 *in a fiscal year, there are authorized to be appropriated*
2 *to the Secretary to carry out the activities described in this*
3 *section—*

4 “(1) \$50,000,000 for fiscal year 2023;

5 “(2) \$100,000,000 for fiscal year 2024;

6 “(3) \$150,000,000 for fiscal year 2025;

7 “(4) \$200,000,000 for fiscal year 2026; and

8 “(5) \$250,000,000 for fiscal year 2027.

9 **“SEC. 314. HELIUM CONSERVATION PROGRAM.**

10 “(a) *IN GENERAL.*—*The Secretary shall establish a*
11 *program to reduce the consumption of helium for Depart-*
12 *ment grant recipients and facilities and encourage helium*
13 *recycling and reuse. The program shall competitively award*
14 *grants for—*

15 “(1) *the purchase of equipment to capture, reuse,*
16 *and recycle helium;*

17 “(2) *the installation, maintenance, and repair of*
18 *new and existing helium capture, reuse, and recycling*
19 *equipment; and*

20 “(3) *helium alternatives research and develop-*
21 *ment activities.*

22 “(b) *REPORT.*—*Not later than 2 years after the date*
23 *of enactment of the Research and Development, Competi-*
24 *tion, and Innovation Act, and every 3 years thereafter, the*
25 *Director shall submit to the Committee on Science, Space,*

1 *and Technology of the House of Representatives and the*
2 *Committee on Energy and Natural Resources of the Senate*
3 *a report on the purchase of helium as part of research*
4 *projects and facilities supported by the Department. The re-*
5 *port shall include—*

6 “(1) *the quantity of helium purchased for*
7 *projects and facilities supported by Department*
8 *grants;*

9 “(2) *a cost-analysis for such helium;*

10 “(3) *to the maximum extent practicable, infor-*
11 *mation on whether such helium was imported from*
12 *outside the United States, and if available, the coun-*
13 *try or region of the world from which the helium was*
14 *imported;*

15 “(4) *expected or experienced impacts of helium*
16 *supply shortages or prices on the research projects*
17 *and facilities supported by the Department; and*

18 “(5) *recommendations for reducing Department*
19 *grant recipients’ exposure to volatile helium prices*
20 *and supply shortages.*

21 “(c) *COORDINATION.—In carrying out the program*
22 *under this section, the Director shall coordinate with the*
23 *National Science Foundation and other relevant Federal*
24 *agencies on helium conservation activities.*

1 “(d) *DURATION.*—*The program established under this*
2 *section shall receive support for a period of not more than*
3 *5 years, subject to the availability of appropriations.*

4 “(e) *RENEWAL.*—*Upon expiration of any period of*
5 *support of the program under this section, the Director may*
6 *renew support for the program for a period of not more*
7 *than 5 years.*

8 “**SEC. 315. OFFICE OF SCIENCE BIOLOGICAL THREAT PRE-**
9 **PAREDNESS RESEARCH INITIATIVE.**

10 “(a) *IN GENERAL.*—*The Secretary shall establish with-*
11 *in the Office of Science a cross-cutting research initiative,*
12 *to be known as the ‘Biological Threat Preparedness Re-*
13 *search Initiative’, to leverage the innovative analytical re-*
14 *sources and tools, user facilities, and advanced computa-*
15 *tional and networking capabilities of the Department in*
16 *order to support efforts that prevent, prepare for, predict,*
17 *and respond to biological threats to national security, in-*
18 *cluding infectious diseases.*

19 “(b) *COMPETITIVE, MERIT-REVIEWED PROCESS.*—*The*
20 *Secretary shall carry out the initiative established under*
21 *subsection (a) through a competitive, merit-reviewed proc-*
22 *ess, and consider applications from National Laboratories,*
23 *institutions of higher education, multi-institutional collabo-*
24 *rations, industry partners and other appropriate entities.*

1 “(c) *ACTIVITIES.*—*In carrying out the initiative estab-*
2 *lished under subsection (a), the Secretary shall—*

3 “(1) *determine a comprehensive set of technical*
4 *milestones for the research activities described in that*
5 *subsection;*

6 “(2) *prioritize the objectives of—*

7 “(A) *supporting fundamental research and*
8 *development in advanced analytics, experimental*
9 *studies, materials synthesis, and high-perform-*
10 *ance computing technologies needed in order to*
11 *more quickly and effectively characterize, model,*
12 *simulate, and predict complex natural phe-*
13 *nomena and biological materials related to*
14 *emerging biological threats;*

15 “(B) *supporting the development of tools*
16 *that inform epidemiological modeling, and ap-*
17 *plying artificial intelligence, machine learning,*
18 *and other computing tools to accelerate such*
19 *processes;*

20 “(C) *supporting research and capabilities*
21 *that enhance understanding and modeling of the*
22 *transport of pathogens in indoor and outdoor air*
23 *and water environments;*

1 “(D) identifying priority research opportu-
2 nities and capabilities for molecular design and
3 modeling for medical countermeasures;

4 “(E) ensuring that new experimental and
5 computational tools are accessible to relevant re-
6 search communities, including private sector en-
7 tities and other Federal research institutions;
8 and

9 “(F) supporting activities and projects that
10 combine computational modeling and simulation
11 with experimental research facilities and studies;

12 “(3) leverage the research infrastructure of the
13 Department, including scientific computing user fa-
14 cilities, x-ray light sources, neutron scattering facili-
15 ties, nanoscale science research centers, and sequenc-
16 ing and biocharacterization facilities;

17 “(4) leverage experience from existing modeling
18 and simulation research and work sponsored by the
19 Department and promote collaboration and data
20 sharing between National Laboratories, research enti-
21 ties, and user facilities of the Department by pro-
22 viding necessary access and secure data transfer ca-
23 pabilities; and

24 “(5) ensure that new experimental and computa-
25 tional tools are accessible to relevant research commu-

1 *nities, including private sector entities, to address*
2 *emerging biological threats.*

3 “(d) *COORDINATION.—In carrying out the initiative*
4 *established under subsection (a), the Secretary shall coordi-*
5 *nate activities with—*

6 “(1) *other relevant offices of the Department;*

7 “(2) *the National Nuclear Security Administra-*
8 *tion;*

9 “(3) *the National Laboratories;*

10 “(4) *the Director of the National Science Foun-*
11 *dation;*

12 “(5) *the Director of the Centers for Disease Con-*
13 *trol and Prevention;*

14 “(6) *the Director of the National Institutes of*
15 *Health;*

16 “(7) *the Assistant Secretary for Preparedness*
17 *and Response;*

18 “(8) *the heads of other relevant Federal agencies;*

19 “(9) *institutions of higher education; and*

20 “(10) *the private sector.*

21 “(e) *INFECTIOUS DISEASES HIGH PERFORMANCE*
22 *COMPUTING RESEARCH CONSORTIUM.—*

23 “(1) *IN GENERAL.—The Secretary, in coordina-*
24 *tion with the Director of the National Science Foun-*
25 *dation and the Director of the Office of Science and*

1 *Technology Policy, shall establish and operate an*
2 *Emerging Infectious Diseases High Performance*
3 *Computing Research Consortium (referred to in this*
4 *section as the ‘Consortium’), to support the initiative*
5 *established under subsection (a) by providing, to the*
6 *extent practicable, a centralized entity for multidisci-*
7 *plinary, collaborative, emerging infectious disease and*
8 *biosecurity research and development through high*
9 *performance computing and advanced data analytics*
10 *technologies and processes, in conjunction with the ex-*
11 *perimental research facilities and studies supported*
12 *by the Department.*

13 *“(2) MEMBERSHIP.—The members of the Consor-*
14 *tium may include representatives from relevant Fed-*
15 *eral agencies, the National Laboratories, the private*
16 *sector, and institutions of higher education, which*
17 *can each contribute relevant compute time, capabili-*
18 *ties, or other resources.*

19 *“(3) ACTIVITIES.—The Consortium shall—*

20 *“(A) match applicants with available Fed-*
21 *eral and private sector computing resources;*

22 *“(B) consider supplemental awards for com-*
23 *puting partnerships with Consortium members*
24 *to qualifying entities on a competitive merit-re-*
25 *view basis;*

1 “(C) encourage collaboration and commu-
2 nication among member representatives of the
3 Consortium and awardees;

4 “(D) provide access to the high-performance
5 computing capabilities, expertise, and user fa-
6 cilities of the Department and the National Lab-
7 oratories; and

8 “(E) submit an annual report to the Sec-
9 retary summarizing the activities of the Consor-
10 tium, including—

11 “(i) describing each project undertaken
12 by the Consortium;

13 “(ii) detailing organizational expendi-
14 tures; and

15 “(iii) evaluating contributions to the
16 achievement of technical milestones as deter-
17 mined in subsection (a).

18 “(4) COORDINATION.—The Secretary shall ensure
19 the coordination of, and avoid unnecessary duplica-
20 tion of, the activities of the Consortium with the ac-
21 tivities of other research entities of the Department,
22 other Federal research institutions, institutions of
23 higher education, and the private sector.

24 “(f) REPORT.—Not later than 2 years after the date
25 of enactment of the Research and Development, Competi-

1 *tion, and Innovation Act, the Secretary shall submit to the*
2 *Committee on Science, Space, and Technology and the Com-*
3 *mittee on Energy and Commerce of the House of Represent-*
4 *atives, and the Committee on Energy and Natural Re-*
5 *sources, the Committee on Commerce, Science, and Trans-*
6 *portation, and the Committee on Health, Education, Labor,*
7 *and Pensions of the Senate, a report detailing the effective-*
8 *ness of—*

9 “(1) *the interagency coordination among each*
10 *Federal agency involved in the initiative established*
11 *under subsection (a);*

12 “(2) *the collaborative research achievements of*
13 *that initiative, including the achievement of the tech-*
14 *anical milestones determined under that subsection;*
15 *and*

16 “(3) *potential opportunities to expand the tech-*
17 *nical capabilities of the Department.*

18 “(g) *FUNDING.—Out of funds authorized to be appro-*
19 *priated for the Office of Science in a fiscal year, there is*
20 *authorized to be appropriated to the Secretary to carry out*
21 *the activities under this section \$50,000,000 for each of fis-*
22 *cal years 2023 through 2027.*

1 **“SEC. 316. MIDSCALE INSTRUMENTATION AND RESEARCH**
2 **EQUIPMENT PROGRAM.**

3 “(a) *IN GENERAL.*—*The Director shall establish a*
4 *midscale instrumentation and research equipment program*
5 *to develop, acquire, and commercialize research instrumen-*
6 *tation and equipment needed to meet the missions of the*
7 *Department and to provide platform technologies for the*
8 *broader scientific community.*

9 “(b) *ACTIVITIES.*—*Under the program established*
10 *under subsection (a), the Director shall—*

11 “(1) *enable the development and acquisition of*
12 *novel, state-of-the-art instruments that—*

13 “(A) *range in cost from \$1,000,000 to*
14 *\$20,000,000 each; and*

15 “(B) *would significantly accelerate sci-*
16 *entific breakthroughs at user facilities; and*

17 “(2) *strongly encourage partnerships among—*

18 “(A) *National Laboratories;*

19 “(B) *user facilities; and*

20 “(C)(i) *institutions in a State receiving*
21 *funding under the Established Program to Stim-*
22 *ulate Competitive Research established under sec-*
23 *tion 2203(b)(3) of the Energy Policy Act of 1992*
24 *(42 U.S.C. 13503(b)(3));*

25 “(ii) *historically Black colleges or univer-*
26 *sities;*

1 “(iii) minority-serving institutions of high-
2 er education; or

3 “(iv) institutions of higher education in a
4 rural area.

5 “(c) *COORDINATION WITH OTHER PROGRAMS.*—The
6 Director shall coordinate the program established under
7 subsection (a) with all other programs carried out by the
8 Office of Science of the Department.

9 “(d) *RESEARCH EQUIPMENT AND TECHNOLOGY DE-*
10 *VELOPMENT COORDINATION.*—The Director shall encourage
11 *coordination among the Office of Science, the National Lab-*
12 *oratories, the Office of Technology Transitions, and relevant*
13 *academic and private sector entities to identify, dissemi-*
14 *nate, and commercialize research instruments, equipment,*
15 *and related technologies developed to aid basic science re-*
16 *search discoveries that meet the mission of the Department.*

17 “(e) *AUTHORIZATION OF APPROPRIATIONS.*—Out of
18 *funds authorized to be appropriated for the Office of Science*
19 *in a fiscal year, there is authorized to be appropriated to*
20 *carry out this section \$150,000,000 for each of fiscals years*
21 *2023 through 2027.*

22 **“SEC. 317. AUTHORIZATION OF APPROPRIATIONS.**

23 *“There are authorized to be appropriated to the Sec-*
24 *retary to carry out the activities described in this title—*

25 “(1) \$8,902,392,400 for fiscal year 2023;

- 1 “(2) \$9,541,895,744 for fiscal year 2024;
2 “(3) \$10,068,198,994 for fiscal year 2025;
3 “(4) \$10,468,916,520 for fiscal year 2026; and
4 “(5) \$10,831,342,317 for fiscal year 2027.”.

5 (b) *TABLE OF CONTENTS.*—Section 1(b) of the Depart-
6 ment of Energy Research and Innovation Act is amended
7 in the table of contents by inserting after the item relating
8 to section 309 the following:

“Sec. 310. Accelerator research and development.

“Sec. 311. Isotope research, development, and production.

“Sec. 312. Increased collaboration with teachers and scientists.

“Sec. 313. High intensity laser research initiative.

“Sec. 314. Helium conservation program.

“Sec. 315. Office of Science Biological Threat Preparedness Research Initiative.

“Sec. 316. Midscale instrumentation and research equipment program.

“Sec. 317. Authorization of appropriations.”.

9 **SEC. 10113. ESTABLISHED PROGRAM TO STIMULATE COM-**
10 **PETITIVE RESEARCH.**

11 (a) *RESEARCH AREAS.*—Section 2203(b)(3)(E) of the
12 Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(E)) is
13 amended—

14 (1) in the subparagraph heading, by striking “*IN*
15 *AREAS OF APPLIED ENERGY RESEARCH, ENVIRON-*
16 *MENTAL MANAGEMENT, AND BASIC SCIENCE*”;

17 (2) in clause (i)—

18 (A) in subclause (I), by inserting “nuclear
19 energy,” before “and”; and

20 (B) by striking subclause (V) and inserting
21 the following:

1 “(V) scientific research, includ-
2 ing—

3 “(aa) advanced scientific
4 computing research;

5 “(bb) basic energy sciences;

6 “(cc) biological and environ-
7 mental research;

8 “(dd) fusion energy sciences;

9 “(ee) high energy physics;

10 “(ff) nuclear physics;

11 “(gg) isotope research, devel-
12 opment, and production;

13 “(hh) accelerator research,
14 development, and production; and

15 “(ii) other areas of research
16 funded by the Office of Science, as
17 determined by the Secretary.”;

18 and

19 (3) in clause (ii)—

20 (A) in subclause (II), by striking “grad-
21 uate” and inserting “undergraduate scholar-
22 ships, graduate fellowships, and”;

23 (B) in subclause (III), by striking “; and”
24 and inserting “and staff;”;

25 (C) in subclause (IV)—

1 (i) by striking “biennial” and insert-
2 ing “annual”; and

3 (ii) by striking the period at the end
4 and inserting a semicolon; and

5 (D) by adding at the end the following:

6 “(V) to develop research clusters
7 for particular areas of expertise; and

8 “(VI) to diversify the future work-
9 force.”.

10 (b) *RESEARCH CAPABILITY ENHANCEMENT.*—Section
11 *2203(b)(3) of the Energy Policy Act of 1992 (42 U.S.C.*
12 *13503(b)(3)) is amended by striking subparagraph (F) and*
13 *inserting the following:*

14 “(F) *RESEARCH CAPABILITY ENHANCE-*
15 *MENT.*—

16 “(i) *SCHOLARSHIPS AND FELLOW-*
17 *SHIPS.*—

18 “(I) *IN GENERAL.*—Pursuant to
19 subparagraph (E)(ii), the Secretary
20 shall award grants to institutions of
21 higher education in eligible jurisdic-
22 tions for those institutions of higher
23 education to provide scholarships and
24 fellowships.

1 “(II) *GRANT.*—*A scholarship or*
2 *fellowship awarded by an institution of*
3 *higher education in an eligible juris-*
4 *isdiction using a grant provided under*
5 *subclause (I)—*

6 “(aa) *in the case of an un-*
7 *dergraduate scholarship—*

8 “(AA) *shall be for a pe-*
9 *riod of 1 year; and*

10 “(BB) *may be competi-*
11 *tively renewable on an an-*
12 *nual basis; and*

13 “(bb) *in the case of a grad-*
14 *uate level fellowship, shall be for a*
15 *period of not more than 5 years.*

16 “(ii) *EARLY CAREER CAPACITY DEVEL-*
17 *OPMENT.—*

18 “(I) *IN GENERAL.*—*Pursuant to*
19 *subparagraph (E)(ii), the Secretary*
20 *shall award grants to early career fac-*
21 *ulty and staff at institutions of higher*
22 *education in eligible jurisdictions—*

23 “(aa) *to support investi-*
24 *gator-initiated research, including*

1 associated research equipment and
2 instrumentation;

3 “(bb) to support activities as-
4 sociated with identifying and re-
5 sponding to funding opportuni-
6 ties;

7 “(cc) to secure technical as-
8 sistance for the pursuit of funding
9 opportunities; and

10 “(dd) to develop and enhance
11 collaboration among National
12 Laboratories, Department of En-
13 ergy programs, the private sector,
14 and other relevant entities.

15 “(II) GRANTS.—A grant awarded
16 under subclause (I) shall be—

17 “(aa) for a period of not
18 more than 5 years; and

19 “(bb) competitively renewable
20 for an additional 5-year period.

21 “(iii) RESEARCH CAPACITY DEVELOP-
22 MENT.—

23 “(I) IN GENERAL.—Pursuant to
24 subparagraph (E)(ii), the Secretary
25 shall award competitive grants to in-

1 *stitutions of higher education in eligi-*
2 *ble jurisdictions for research capacity*
3 *development and implementation, in-*
4 *cluding—*

5 *“(aa) developing expertise in*
6 *key technology areas, including*
7 *associated equipment and instru-*
8 *mentation;*

9 *“(bb) developing and acquir-*
10 *ing novel, state-of-the-art instru-*
11 *ments and equipment that range*
12 *in cost from \$500,000 to*
13 *\$20,000,000;*

14 *“(cc) enhancing collaboration*
15 *with National Laboratories, the*
16 *Department of Energy, and the*
17 *private sector through faculty or*
18 *staff placement programs; and*

19 *“(dd) supporting formal*
20 *partnership programs with insti-*
21 *tutions of higher education and*
22 *National Laboratories.*

23 *“(II) GRANTS.—A grant awarded*
24 *under subclause (I) shall be—*

1 “(aa) for a period of not
2 more than 5 years; and

3 “(bb) renewable for an addi-
4 tional 5-year period.

5 “(III) *EQUIPMENT AND INSTRU-*
6 *MENTATION.—To the maximum extent*
7 *practicable, the Secretary shall ensure*
8 *that research equipment and instru-*
9 *mentation developed or acquired pur-*
10 *suant to a grant awarded under sub-*
11 *clause (I) may sustain continued oper-*
12 *ation and be maintained without the*
13 *need for additional or subsequent fund-*
14 *ing under this section.”.*

15 (c) *PROGRAM IMPLEMENTATION UPDATE.—Section*
16 *2203(b)(3)(G) of the Energy Policy Act of 1992 (42 U.S.C.*
17 *13503(b)(3)(G)) is amended by adding at the end the fol-*
18 *lowing:*

19 “(iii) *UPDATE.—Not later than 270*
20 *days after the date of enactment of the Re-*
21 *search and Development, Competition, and*
22 *Innovation Act, the Secretary shall—*

23 “(I) *update the plan submitted*
24 *under clause (i); and*

1 “(II) submit the updated plan to
2 the committees described in that
3 clause.”.

4 (d) *PROGRAM EVALUATION REPORT.*—Section
5 2203(b)(3)(H) of the Energy Policy Act of 1992 (42 U.S.C.
6 13503(b)(3)(H)) is amended by adding at the end the fol-
7 lowing:

8 “(iv) *ANNUAL REPORT.*—At the end of
9 each fiscal year, the Secretary shall submit
10 to the Committee on Energy and Natural
11 Resources and the Committee on Appropria-
12 tions of the Senate and the Committee on
13 Energy and Commerce and the Committee
14 on Appropriations of the House of Rep-
15 resentatives a report that includes—

16 “(I) the total amount of expendi-
17 tures made by the Department to carry
18 out EPSCoR in each eligible jurisdic-
19 tion for each of the 3 most recent fiscal
20 years for which such information is
21 available;

22 “(II)(aa) the number of EPSCoR
23 awards made to institutions of higher
24 education located in eligible jurisdic-
25 tions; and

1 “(bb) the amount and type of each
2 award;

3 “(III) the number of awards that
4 are not EPSCoR awards made by the
5 Secretary to institutions of higher edu-
6 cation located in eligible jurisdictions;

7 “(IV)(aa) the number of represent-
8 atives of institutions of higher edu-
9 cation in eligible jurisdictions serving
10 on each Office of Science advisory com-
11 mittee; and

12 “(bb) for each such advisory com-
13 mittee, the percentage of committee
14 membership that those individuals con-
15 stitute; and

16 “(V) the number of individuals
17 from institutions of higher education
18 in eligible jurisdictions serving on peer
19 review committees.”.

20 (e) FUNDING.—Section 2203(b)(3) of the Energy Pol-
21 icy Act of 1992 (42 U.S.C. 13503(b)(3)) is amended by add-
22 ing at the end the following:

23 “(I) FUNDING.—

24 “(i) AUTHORIZATION OF APPROPRIA-
25 TIONS.—There are authorized to be appro-

1 *priated to the Secretary to carry out*
2 *EPSCoR, to remain available until ex-*
3 *pended—*

4 *“(I) \$50,000,000 for fiscal year*
5 *2023;*

6 *“(II) \$50,000,000 for fiscal year*
7 *2024;*

8 *“(III) \$75,000,000 for fiscal year*
9 *2025;*

10 *“(IV) \$100,000,000 for fiscal year*
11 *2026; and*

12 *“(V) \$100,000,000 for fiscal year*
13 *2027.*

14 *“(ii) GRANTS TO CONSORTIA.—In the*
15 *case of an EPSCoR grant awarded to a*
16 *consortium that contains institutions of*
17 *higher education that are not located in eli-*
18 *gible jurisdictions, the Secretary may*
19 *count—*

20 *“(I) the full amount of funds ex-*
21 *pended to provide the grant towards*
22 *meeting the funding requirement in*
23 *clause (iii) if the lead entity of the con-*
24 *sortium is an institution of higher edu-*

1 *tion located in an eligible jurisdic-*
2 *tion; and*

3 *“(II) only the funds provided to*
4 *institutions of higher education located*
5 *in eligible jurisdictions towards meet-*
6 *ing the funding requirement in clause*
7 *(iii) if the lead entity of the consor-*
8 *tium is an institution of higher edu-*
9 *cation that is not located in an eligible*
10 *jurisdiction.*

11 *“(iii) ADDITIONAL FUNDS FOR ELIGI-*
12 *BLE JURISDICTIONS.—In addition to funds*
13 *authorized to be appropriated under clause*
14 *(i), the Secretary, to the maximum extent*
15 *practicable while maintaining the competi-*
16 *tive, merit-based award processes of the Of-*
17 *fice of Science, shall ensure that, of the re-*
18 *search and development funds of the Office*
19 *of Science that are awarded by the Sec-*
20 *retary each year to institutions of higher*
21 *education, not less than 10 percent is*
22 *awarded to institutions of higher education*
23 *in eligible jurisdictions pursuant to the*
24 *evaluation and selection criteria in section*

1 605.10 of title 10, Code of Federal Regula-
2 tions (or successor regulations).

3 “(iv) *ADDITIONAL FUNDS FOR EQUIP-*
4 *MENT AND INSTRUMENTATION.*—In addition
5 to funds authorized to be appropriated
6 under clause (i), there is authorized to be
7 appropriated to the Secretary to award
8 grants under subparagraph (F)(iii)(I) for
9 the purpose described in item (bb) of that
10 subparagraph \$25,000,000 for each of fiscal
11 years 2023 through 2027, to remain avail-
12 able until expended.

13 “(v) *ACCOUNTING.*—To the maximum
14 extent practicable, the Secretary shall en-
15 sure that each program within the Depart-
16 ment of Energy that endorses an EPSCoR
17 grant awardee shall contribute funding to
18 the award to acknowledge the research bene-
19 fits to the mission of that program.”.

20 (f) *ADVISORY COMMITTEES TO THE OFFICE OF*
21 *SCIENCE.*—In order to improve the advice and guidance
22 provided to the Office of Science, the Undersecretary for
23 Science shall seek to ensure, to the maximum extent prac-
24 ticable, the robust participation of institutions of higher
25 education (as defined in section 101 of the Higher Edu-

1 *ation Act of 1965 (20 U.S.C. 1001)) located in eligible ju-*
2 *risdictions (as defined in section 2203(b)(3)(A) of the En-*
3 *ergy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(A))) on the*
4 *Office of Science Federal Advisory Committee.*

5 (g) *TECHNICAL AMENDMENTS.—Section 2203(b) of the*
6 *Energy Policy Act of 1992 (42 U.S.C. 13503(b)) is amend-*
7 *ed—*

8 (1) *in paragraph (1), by striking “(1) The Sec-*
9 *retary” and inserting the following:*

10 “(1) *UNIVERSITY RESEARCH REACTORS.—The*
11 *Secretary”; and*

12 (2) *in paragraph (2), by striking “(2) The Sec-*
13 *retary” and inserting the following:*

14 “(2) *METHOD TO EVALUATE EFFECTIVENESS OF*
15 *EDUCATION PROGRAMS.—The Secretary”.*

16 **SEC. 10114. RESEARCH SECURITY.**

17 (a) *DEFINITIONS.—In this section:*

18 (1) *COUNTRY OF RISK.—*

19 (A) *IN GENERAL.—The term “country of*
20 *risk” means a foreign country determined by the*
21 *Secretary, in accordance with subparagraph (B),*
22 *to present a risk of theft of United States intel-*
23 *lectual property or a threat to the national secu-*
24 *rity of the United States if nationals of the coun-*
25 *try, or entities owned or controlled by the coun-*

1 *try or nationals of the country, participate in*
2 *any research, development, demonstration, or de-*
3 *ployment activity authorized under this division*
4 *or division A or an amendment made by this di-*
5 *vision or division A.*

6 (B) *DETERMINATION.*—*In making a deter-*
7 *mination under subparagraph (A), the Sec-*
8 *retary, in coordination with the Director of the*
9 *Office of Intelligence and Counterintelligence,*
10 *shall take into consideration—*

11 *(i) the most recent World Wide Threat*
12 *Assessment of the United States Intelligence*
13 *Community, prepared by the Director of*
14 *National Intelligence; and*

15 *(ii) the most recent National Counter-*
16 *intelligence Strategy of the United States.*

17 (2) *COVERED SUPPORT.*—*The term “covered sup-*
18 *port” means any grant, contract, subcontract, award,*
19 *loan, program, support, or other activity authorized*
20 *under this division or division A, or an amendment*
21 *made by this division or division A.*

22 (3) *ENTITY OF CONCERN.*—*The term “entity of*
23 *concern” means any entity, including a national,*
24 *that is—*

1 (A) identified under section 1237(b) of the
2 Strom Thurmond National Defense Authoriza-
3 tion Act for Fiscal Year 1999 (50 U.S.C. 1701
4 note; Public Law 105–261);

5 (B) identified under section 1260H of the
6 William M. (Mac) Thornberry National Defense
7 Authorization Act for Fiscal Year 2021 (10
8 U.S.C. 113 note; Public Law 116–283);

9 (C) on the Entity List maintained by the
10 Bureau of Industry and Security of the Depart-
11 ment of Commerce and set forth in Supplement
12 No. 4 to part 744 of title 15, Code of Federal
13 Regulations;

14 (D) included in the list required by section
15 9(b)(3) of the Uyghur Human Rights Policy Act
16 of 2020 (Public Law 116–145; 134 Stat. 656); or

17 (E) identified by the Secretary, in coordina-
18 tion with the Director of the Office of Intelligence
19 and Counterintelligence and the applicable office
20 that would provide, or is providing, covered sup-
21 port, as posing an unmanageable threat—

22 (i) to the national security of the
23 United States; or

24 (ii) of theft or loss of United States in-
25 tellectual property.

1 (4) *NATIONAL.*—*The term “national” has the*
2 *meaning given the term in section 101 of the Immig-*
3 *ration and Nationality Act (8 U.S.C. 1101).*

4 (5) *SECRETARY.*—*The term “Secretary” means*
5 *the Secretary of Energy.*

6 (b) *SCIENCE AND TECHNOLOGY RISK ASSESSMENT.*—

7 (1) *IN GENERAL.*—*The Secretary shall develop*
8 *and maintain tools and processes to manage and*
9 *mitigate research security risks, such as a science and*
10 *technology risk matrix, informed by threats identified*
11 *by the Director of the Office of Intelligence and Coun-*
12 *terintelligence, to facilitate determinations of the risk*
13 *of loss of United States intellectual property or threat*
14 *to the national security of the United States posed by*
15 *activities carried out under any covered support.*

16 (2) *CONTENT AND IMPLEMENTATION.*—*In devel-*
17 *oping and using the tools and processes developed*
18 *under paragraph (1), the Secretary shall—*

19 (A) *deploy risk-based approaches to evalu-*
20 *ating, awarding, and managing certain research,*
21 *development, demonstration, and deployment ac-*
22 *tivities, including designations that will indicate*
23 *the relative risk of activities;*

24 (B) *assess, to the extent practicable, ongoing*
25 *high-risk activities;*

1 (C) designate an officer or employee of the
2 Department of Energy to be responsible for
3 tracking and notifying recipients of any covered
4 support of unmanageable threats to United
5 States national security or of theft or loss of
6 United States intellectual property posed by an
7 entity of concern;

8 (D) consider requiring recipients of covered
9 support to implement additional research secu-
10 rity mitigations for higher-risk activities if ap-
11 propriate; and

12 (E) support the development of research se-
13 curity training for recipients of covered support
14 on the risks posed by entities of concern.

15 (3) ANNUAL UPDATES.—The tools and processes
16 developed under paragraph (1) shall be evaluated an-
17 nually and updated as needed, with threat-informed
18 input from the Office of Intelligence and Counterintel-
19 ligence, to reflect changes in the risk designation
20 under paragraph (2)(A) of research, development,
21 demonstration, and deployment activities conducted
22 by the Department.

23 (c) ENTITY OF CONCERN.—

24 (1) PROHIBITION.—Except as provided in para-
25 graph (2), no entity of concern, or individual that

1 *owns or controls, is owned or controlled by, or is*
2 *under common ownership or control with an entity of*
3 *concern, may receive, or perform work under, any*
4 *covered support.*

5 (2) *WAIVER OF PROHIBITION.—*

6 (A) *IN GENERAL.—The Secretary may*
7 *waive the prohibition under paragraph (1) if de-*
8 *termined by the Secretary to be in the national*
9 *interest.*

10 (B) *NOTIFICATION TO CONGRESS.—Not less*
11 *than 2 weeks prior to issuing a waiver under*
12 *subparagraph (A), the Secretary shall notify the*
13 *Committee on Energy and Natural Resources of*
14 *the Senate and the Committee on Science, Space,*
15 *and Technology of the House of Representatives*
16 *of the intent to issue the waiver, including a jus-*
17 *tification for the waiver.*

18 (3) *PENALTY.—*

19 (A) *TERMINATION OF SUPPORT.—On find-*
20 *ing that any entity of concern or individual de-*
21 *scribed in paragraph (1) has received covered*
22 *support and has not received a waiver under*
23 *paragraph (2), the Secretary shall terminate all*
24 *covered support to that entity of concern or indi-*
25 *vidual, as applicable.*

1 (B) *PENALTIES.*—*An entity of concern or*
2 *individual identified under subparagraph (A)*
3 *shall be—*

4 (i) *prohibited from receiving or par-*
5 *ticipating in covered support for a period of*
6 *not less than 1 year but not more than 10*
7 *years, as determined by the Secretary; or*

8 (ii) *instead of the penalty described in*
9 *clause (i), subject to any other penalties au-*
10 *thorized under applicable law or regulations*
11 *that the Secretary determines to be in the*
12 *national interest.*

13 (C) *NOTIFICATION TO CONGRESS.*—*Prior to*
14 *imposing a penalty under subparagraph (B), the*
15 *Secretary shall notify the Committee on Energy*
16 *and Natural Resources of the Senate and the*
17 *Committee on Science, Space, and Technology of*
18 *the House of Representatives of the intent to im-*
19 *pose the penalty, including a description of and*
20 *justification for the penalty.*

21 (4) *COORDINATION.*—*The Secretary shall—*

22 (A) *share information about the unmanage-*
23 *able threats described in subsection (a)(3)(E)*
24 *with other Federal agencies; and*

1 (B) develop consistent approaches to identi-
2 fying entities of concern.

3 (d) *INTERNATIONAL AGREEMENTS.*—This section shall
4 be applied in a manner consistent with the obligations of
5 the United States under international agreements.

6 (e) *REPORT REQUIRED.*—Not later than 240 days
7 after the date of enactment of this Act, the Secretary shall
8 submit to Congress a report that—

9 (1) describes—

10 (A) the tools and processes developed under
11 subsection (b)(1) and any updates to those tools
12 and processes; and

13 (B) if applicable, the science and technology
14 risk matrix developed under that subsection and
15 how that matrix has been applied;

16 (2) includes a mitigation plan for managing
17 risks posed by countries of risk with respect to future
18 or ongoing research and development activities of the
19 Department of Energy; and

20 (3) defines critical research areas, designated by
21 risk, as determined by the Secretary.

1 **TITLE II—NATIONAL INSTITUTE**
2 **OF STANDARDS AND TECH-**
3 **NOLOGY FOR THE FUTURE**

4 **SEC. 10201. DEFINITIONS.**

5 *In this title:*

6 (1) *DIRECTOR.*—*The term “Director” means the*
7 *Director of the National Institute of Standards and*
8 *Technology.*

9 (2) *ENROLLMENT OF NEEDY STUDENTS.*—*The*
10 *term “enrollment of needy students” has the meaning*
11 *given the term in section 312(d) of the Higher Edu-*
12 *cation Act of 1965 (20 U.S.C. 1058(d)).*

13 (3) *FRAMEWORK.*—*The term “Framework”*
14 *means the Framework for Improving Critical Infra-*
15 *structure Cybersecurity developed by the National In-*
16 *stitute of Standards and Technology and referred to*
17 *in Executive Order No. 13800 issued on May 11,*
18 *2017 (82 Fed. Reg. 22391 et seq.).*

19 (4) *INSTITUTE.*—*The term “Institute” means the*
20 *National Institute of Standards and Technology.*

21 (5) *INTERNATIONAL STANDARDS ORGANIZA-*
22 *TION.*—*The term “international standards organiza-*
23 *tion” has the meaning given such term in section 451*
24 *of the Trade Agreements Act of 1979 (19 U.S.C.*
25 *2571).*

1 (6) *SECRETARY*.—The term “Secretary” means
2 the Secretary of Commerce.

3 ***Subtitle A—Authorization of***
4 ***Appropriations***

5 ***SEC. 10211. AUTHORIZATION OF APPROPRIATIONS.***

6 (a) *FISCAL YEAR 2023*.—

7 (1) *IN GENERAL*.—There are authorized to be ap-
8 propriated to the Secretary of Commerce
9 \$1,551,450,000 for the National Institute of Stand-
10 ards and Technology for fiscal year 2023.

11 (2) *SPECIFIC ALLOCATIONS*.—Of the amount au-
12 thorized by paragraph (1)—

13 (A) \$979,100,000 is authorized for scientific
14 and technical research and services laboratory
15 activities;

16 (B) \$200,000,000 is authorized for the con-
17 struction and maintenance of facilities, of which
18 \$80,000,000 is authorized to be appropriated for
19 Safety, Capacity, Maintenance, and Major Re-
20 pairs; and

21 (C) \$372,350,000 is authorized for indus-
22 trial technology services activities, of which
23 \$275,300,000 is authorized to be appropriated
24 for the Manufacturing Extension Partnership
25 program under sections 25, 25A, and 26 of the

1 *National Institute of Standards and Technology*
2 *Act (15 U.S.C. 278k, 278k-1, and 278l) (of which*
3 *\$31,000,000 is authorized to establish the Na-*
4 *tional Supply Chain Database under section*
5 *10253) and \$97,050,000 is authorized to be ap-*
6 *propriated for the Manufacturing USA Program*
7 *under section 34 of the National Institute of*
8 *Standards and Technology Act (15 U.S.C. 278s).*

9 **(b) FISCAL YEAR 2024.—**

10 **(1) IN GENERAL.—***There are authorized to be ap-*
11 *propriated to the Secretary of Commerce*
12 *\$1,651,600,000 for the National Institute of Stand-*
13 *ards and Technology for fiscal year 2024.*

14 **(2) SPECIFIC ALLOCATIONS.—***Of the amount au-*
15 *thorized by paragraph (1)—*

16 **(A)** *\$1,047,600,000 is authorized for sci-*
17 *entific and technical research and services lab-*
18 *oratory activities;*

19 **(B)** *\$200,000,000 is authorized for the con-*
20 *struction and maintenance of facilities, of which*
21 *\$80,000,000 is authorized to be appropriated for*
22 *Safety, Capacity, Maintenance, and Major Re-*
23 *pairs, including \$20,000,000 for IT infrastruc-*
24 *ture; and*

1 (C) \$404,000,000 is authorized for indus-
2 trial technology services activities, of which
3 \$300,000,000 is authorized to be appropriated
4 for the Manufacturing Extension Partnership
5 program under sections 25, 25A, and 26 of the
6 National Institute of Standards and Technology
7 Act (15 U.S.C. 278k, 278k-1, and 278l) (of which
8 \$26,000,000 is authorized to maintain, update,
9 and support Federal coordination of State sup-
10 ply chain databases maintained by the Centers
11 (as such term is defined in such section 25 of
12 such Act)) and \$104,000,000 is authorized to be
13 appropriated for the Manufacturing USA Pro-
14 gram under section 34 of the National Institute
15 of Standards and Technology Act (15 U.S.C.
16 278s).

17 (c) FISCAL YEAR 2025.—

18 (1) IN GENERAL.—There are authorized to be ap-
19 propriated to the Secretary of Commerce
20 \$2,039,900,000 for the National Institute of Stand-
21 ards and Technology for fiscal year 2025.

22 (2) SPECIFIC ALLOCATIONS.—Of the amount au-
23 thorized by paragraph (1)—

1 (A) \$1,120,900,000 is authorized for sci-
2 entific and technical research and services lab-
3 oratory activities;

4 (B) \$200,000,000 is authorized for the con-
5 struction and maintenance of facilities, of which
6 \$80,000,000 is authorized to be appropriated for
7 Safety, Capacity, Maintenance, and Major Re-
8 pairs, including \$20,000,000 for IT infrastruc-
9 ture; and

10 (C) \$719,000,000 is authorized for indus-
11 trial technology services activities, of which
12 \$550,000,000 is authorized to be appropriated
13 for the Manufacturing Extension Partnership
14 program under sections 25, 25A, and 26 of the
15 National Institute of Standards and Technology
16 Act (15 U.S.C. 278k, 278k-1, and 278l) (of which
17 \$26,000,000 is authorized to maintain, update,
18 and support Federal coordination of State sup-
19 ply chain databases maintained by the Centers
20 (as such term is defined in such section 25 of
21 such Act)) and \$169,000,000 is authorized to be
22 appropriated for the Manufacturing USA Pro-
23 gram under section 34 of the National Institute
24 of Standards and Technology Act (15 U.S.C.
25 278s).

1 (d) *FISCAL YEAR 2026.*—

2 (1) *IN GENERAL.*—*There are authorized to be ap-*
3 *propriated to the Secretary of Commerce*
4 *\$2,158,400,000 for the National Institute of Stand-*
5 *ards and Technology for fiscal year 2026.*

6 (2) *SPECIFIC ALLOCATIONS.*—*Of the amount au-*
7 *thorized by paragraph (1)—*

8 (A) *\$1,199,400,000 is authorized for sci-*
9 *entific and technical research and services lab-*
10 *oratory activities;*

11 (B) *\$200,000,000 is authorized for the con-*
12 *struction and maintenance of facilities, of which*
13 *\$80,000,000 is authorized to be appropriated for*
14 *Safety, Capacity, Maintenance, and Major Re-*
15 *pairs, including \$20,000,000 for IT infrastruc-*
16 *ture; and*

17 (C) *\$759,000,000 is authorized for indus-*
18 *trial technology services activities, of which*
19 *\$550,000,000 is authorized to be appropriated*
20 *for the Manufacturing Extension Partnership*
21 *program under sections 25, 25A, and 26 of the*
22 *National Institute of Standards and Technology*
23 *Act (15 U.S.C. 278k, 278k-1, and 278l) (of which*
24 *\$26,000,000 is authorized to maintain, update,*
25 *and support Federal coordination of State sup-*

1 *ply chain databases maintained by the Centers*
2 *(as such term is defined in such section 25 of*
3 *such Act)) and \$209,000,000 is authorized to be*
4 *appropriated for the Manufacturing USA Pro-*
5 *gram under section 34 of the National Institute*
6 *of Standards and Technology Act (15 U.S.C.*
7 *278s).*

8 *(e) FISCAL YEAR 2027.—*

9 *(1) IN GENERAL.—There are authorized to be ap-*
10 *propriated to the Secretary of Commerce*
11 *\$2,283,360,000 for the National Institute of Stand-*
12 *ards and Technology for fiscal year 2027.*

13 *(2) SPECIFIC ALLOCATIONS.—Of the amount au-*
14 *thorized by paragraph (1)—*

15 *(A) \$1,283,360,000 is authorized for sci-*
16 *entific and technical research and services lab-*
17 *oratory activities;*

18 *(B) \$200,000,000 is authorized for the con-*
19 *struction and maintenance of facilities, of which*
20 *\$80,000,000 is authorized to be appropriated for*
21 *Safety, Capacity, Maintenance, and Major Re-*
22 *pairs, including \$20,000,000 for IT infrastruc-*
23 *ture; and*

24 *(C) \$800,000,000 is authorized for indus-*
25 *trial technology services activities, of which*

1 \$550,000,000 is authorized to be appropriated
2 for the Manufacturing Extension Partnership
3 program under sections 25, 25A, and 26 of the
4 National Institute of Standards and Technology
5 Act (15 U.S.C. 278k, 278k-1, and 23 278l) (of
6 which \$26,000,000 is authorized to maintain,
7 update, and support Federal coordination of
8 State supply chain databases maintained by the
9 Centers (as such term is defined in such section
10 25 of such Act)) and \$250,000,000 is authorized
11 to be appropriated for the Manufacturing USA
12 Program under section 34 of the National Insti-
13 tute of Standards and Technology Act (15 U.S.C.
14 278s).

15 **Subtitle B—Measurement Research**

16 **SEC. 10221. ENGINEERING BIOLOGY AND BIOMETROLOGY.**

17 (a) *IN GENERAL.*—The Director, in coordination with
18 the National Engineering Biology Research and Develop-
19 ment Initiative established pursuant to title IV, shall—

20 (1) support basic measurement science and tech-
21 nology research for engineering biology, biomanufac-
22 turing, and biometrology to advance—

23 (A) measurement technologies to support
24 foundational understanding of the mechanisms of

1 *conversion of DNA information into cellular*
2 *function;*

3 *(B) technologies for measurement of such*
4 *biomolecular components and related systems;*

5 *(C) new data tools, techniques, and proc-*
6 *esses to improve engineering biology, biomanu-*
7 *facturing, and biometrology research; and*

8 *(D) other areas of measurement science and*
9 *technology research determined by the Director to*
10 *be critical to the development and deployment of*
11 *engineering biology, biomanufacturing and bio-*
12 *metrology;*

13 *(2) support activities to inform and expand the*
14 *development of measurements infrastructure needed to*
15 *develop technical standards to establish interoper-*
16 *ability and facilitate commercial development of bio-*
17 *molecular measurement technology and engineering*
18 *biology applications;*

19 *(3) convene industry, institutions of higher edu-*
20 *cation, nonprofit organizations, Federal laboratories,*
21 *and other Federal agencies engaged in engineering bi-*
22 *ology research and development to develop coordinated*
23 *technical roadmaps for authoritative measurement of*
24 *the molecular components of the cell;*

1 (4) *provide access to user facilities with ad-*
2 *vanced or unique equipment, services, materials, and*
3 *other resources to industry, institutions of higher edu-*
4 *cation, nonprofit organizations, and government*
5 *agencies to perform research and testing;*

6 (5) *establish or expand collaborative partner-*
7 *ships or consortia with other Federal agencies en-*
8 *gaged in engineering biology research and develop-*
9 *ment, institutions of higher education, Federal lab-*
10 *oratories, and industry to advance engineering biol-*
11 *ogy applications; and*

12 (6) *support graduate and postgraduate research*
13 *and training in biometrology, biomanufacturing, and*
14 *engineering biology.*

15 (b) *RULE OF CONSTRUCTION.*—*Nothing in this section*
16 *may be construed to alter the policies, processes, or practices*
17 *of individual Federal agencies in effect on the day before*
18 *the date of the enactment of this Act relating to the conduct*
19 *or support of biomedical research and advanced develop-*
20 *ment, including the solicitation and review of extramural*
21 *research proposals.*

22 (c) *CONTROLS.*—*In carrying out activities authorized*
23 *by this section, the Secretary shall ensure proper security*
24 *controls are in place to protect sensitive information, as ap-*
25 *propriate.*

1 **SEC. 10222. GREENHOUSE GAS MEASUREMENT RESEARCH.**

2 (a) *IN GENERAL.*—*The Director, in consultation with*
3 *the Administrator of the National Oceanic and Atmospheric*
4 *Administration, the Administrator of the Environmental*
5 *Protection Agency, the National Aeronautics and Space Ad-*
6 *ministration, the Director of the National Science Founda-*
7 *tion, the Secretary of Energy, and the heads of other Fed-*
8 *eral agencies, as appropriate, shall carry out a measure-*
9 *ment research program to inform the development or im-*
10 *provement of best practices, benchmarks, methodologies,*
11 *procedures, and technical standards for the measurement of*
12 *greenhouse gas emissions and to assess and improve the per-*
13 *formance of greenhouse gas emissions measurement systems*
14 *placed in situ and on space-based platforms.*

15 (b) *ACTIVITIES.*—*In carrying out such a program, the*
16 *Director may—*

17 (1) *conduct research and testing to improve the*
18 *accuracy, efficacy, and reliability of the measurement*
19 *of greenhouse gas emissions at a range of scales that*
20 *covers direct measurement at the component or proc-*
21 *ess level through atmospheric observations;*

22 (2) *conduct research to create novel measurement*
23 *technologies and techniques for the measurement of*
24 *greenhouse gas emissions;*

25 (3) *convene and engage with relevant Federal*
26 *agencies and stakeholders to establish common defini-*

1 *tions and characterizations for the measurement of*
2 *greenhouse gas emissions, taking into account any ex-*
3 *isting United States and international technical*
4 *standards and guidance;*

5 *(4) conduct outreach and coordination to share*
6 *technical expertise with relevant industry and non-*
7 *industry stakeholders and standards development or-*
8 *ganizations to—*

9 *(A) assist such entities in the development*
10 *and adoption of best practices and technical*
11 *standards for greenhouse gas emissions measure-*
12 *ments; and*

13 *(B) promote consistency and traceability in*
14 *international reference standards and central*
15 *calibration laboratories;*

16 *(5) in coordination with the Administrator of*
17 *the National Oceanic and Atmospheric Administra-*
18 *tion, the Administrator of the Environmental Protec-*
19 *tion Agency, and the Secretary of Energy, develop*
20 *such standard reference materials as the Director de-*
21 *termines is necessary to further the development of*
22 *such technical standards, taking into account any ex-*
23 *isting United States or international standards;*

24 *(6) coordinate with the National Oceanic and*
25 *Atmospheric Administration to ensure data are man-*

1 *aged, stewarded, and archived at all levels and pro-*
2 *mote full and open exchange at Federal and State lev-*
3 *els, and with academia, industry, and other users;*
4 *and*

5 *(7) coordinate with international partners, in-*
6 *cluding international standards organizations, to*
7 *maintain global greenhouse gas measurement tech-*
8 *nical standards.*

9 *(c) TESTBEDS.—In coordination with the private sec-*
10 *tor, institutions of higher education, State and local govern-*
11 *ments, the National Oceanic and Atmospheric Administra-*
12 *tion, the Environmental Protection Agency, the Department*
13 *of Energy, and other Federal agencies, as appropriate, the*
14 *Director may continue to develop and manage testbeds to*
15 *advance research and standards development for greenhouse*
16 *gas emissions measurements from in situ and space-based*
17 *platforms.*

18 *(d) CENTER FOR GREENHOUSE GAS MEASUREMENTS,*
19 *STANDARDS, AND INFORMATION.—*

20 *(1) IN GENERAL.—The Director, in collaboration*
21 *with the Administrator of the National Oceanic and*
22 *Atmospheric Administration, the Administrator of the*
23 *Environmental Protection Agency, and the heads of*
24 *other Federal agencies, as appropriate, shall establish*
25 *a Center for Greenhouse Gas Measurements, Stand-*

1 *ards, and Information (in this subsection referred to*
2 *as the “Center”).*

3 (2) *COLLABORATIONS.—The Director shall re-*
4 *quire that the activities of the Center include collabo-*
5 *ration among public and private organizations, in-*
6 *cluding institutions of higher education, nonprofit or-*
7 *ganizations, private sector entities, and State, Tribal,*
8 *territorial, and local officials.*

9 (3) *PURPOSE.—The purpose of the Center shall*
10 *be to—*

11 (A) *advance measurement science, data*
12 *analytics, and modeling at a range of scales that*
13 *covers direct measurement and estimation at the*
14 *component or process level through atmospheric*
15 *observations and at the analysis level to improve*
16 *the accuracy of spatially and temporally resolved*
17 *greenhouse gas emissions measurement, valida-*
18 *tion, and attribution to specific underlying ac-*
19 *tivities and processes;*

20 (B) *test and evaluate the performance of ex-*
21 *isting capabilities, and inform and improve best*
22 *practices, benchmarks, methodologies, procedures,*
23 *and technical standards, for the measurement*
24 *and validation of greenhouse gas emissions at*
25 *scales noted in subparagraph (A);*

1 (C) educate and train students in measure-
2 ment science, computational science, and systems
3 engineering research relevant to greenhouse gas
4 emissions measurements;

5 (D) foster collaboration among academic re-
6 searchers, private sector stakeholders, and State,
7 Tribal, territorial, and local officials in the use
8 of Institute testbeds as described in subsection
9 (c);

10 (E) conduct activities with research institu-
11 tions, industry partners, and State and local of-
12 ficials to identify research, testing, and technical
13 standards needs relevant to greenhouse gas emis-
14 sions; and

15 (F) collaborate with other Federal agencies
16 to conduct outreach and coordination to share
17 and promote technical data, tools, and expertise
18 with relevant public and private sector stake-
19 holders, including State, Tribal, territorial, and
20 local officials, to assist such in the accurate
21 measurement of greenhouse gas emissions.

1 **SEC. 10223. NIST AUTHORITY FOR CYBERSECURITY AND**
2 **PRIVACY ACTIVITIES.**

3 *Subsection (c) of section 2 of the National Institute*
4 *of Standards and Technology Act (15 U.S.C. 272) is*
5 *amended—*

6 *(1) in paragraph (16), by striking the period at*
7 *the end and inserting a semicolon;*

8 *(2) by redesignating paragraphs (16) through*
9 *(27) as paragraphs (21) through (32), respectively;*
10 *and*

11 *(3) by inserting after paragraph (15) the fol-*
12 *lowing:*

13 *“(16) support information security measures for*
14 *the development and lifecycle of software and the soft-*
15 *ware supply chain, including development of vol-*
16 *untary, consensus-based technical standards, best*
17 *practices, frameworks, methodologies, procedures,*
18 *processes, and software engineering toolkits and con-*
19 *figurations;*

20 *“(17) support information security measures, in-*
21 *cluding voluntary, consensus-based technical stand-*
22 *ards, best practices, and guidelines, for the design,*
23 *adoption, and deployment of cloud computing serv-*
24 *ices;*

1 “(18) support research, development, and prac-
2 tical application to improve the usability of cyberse-
3 curity processes and technologies;

4 “(19) facilitate and support the development of
5 a voluntary, consensus-based set of technical stand-
6 ards, guidelines, best practices, methodologies, proce-
7 dures, and processes to improve privacy protections
8 in systems, technologies, and processes used by both
9 the public and private sector;

10 “(20) support privacy measures, including vol-
11 untary, consensus-based technical standards, best
12 practices, guidelines, metrology, and testbeds for the
13 design, adoption, and deployment of privacy enhanc-
14 ing technologies;”.

15 **SEC. 10224. SOFTWARE SECURITY AND AUTHENTICATION.**

16 (a) *VULNERABILITIES IN OPEN SOURCE SOFTWARE.*—
17 The Director shall assign severity metrics to identified
18 vulnerabilities with open source software and produce vol-
19 untary guidance to assist the entities that maintain open
20 source software repositories to discover and mitigate
21 vulnerabilities.

22 (b) *ARTIFICIAL INTELLIGENCE-ENABLED DE-*
23 *FENSES.*—The Director shall carry out research and testing
24 to improve the effectiveness of artificial intelligence-enabled
25 cybersecurity, including by generating optimized data sets

1 *to train artificial intelligence defense systems and evalu-*
2 *ating the performance of varying network architectures at*
3 *strengthening network security.*

4 *(c) AUTHENTICATION OF INSTITUTE SOFTWARE.—The*
5 *Director shall ensure all software released by the Institute*
6 *is digitally signed and maintained to enable stakeholders*
7 *to verify its authenticity and integrity upon installation*
8 *and execution.*

9 *(d) ASSISTANCE TO INSPECTORS GENERAL.—Subject*
10 *to available funding, the Director shall provide technical*
11 *assistance to improve the education and training of indi-*
12 *vidual Federal agency Inspectors General and staff who are*
13 *responsible for the annual independent evaluation they are*
14 *required to perform of the information security program*
15 *and practices of Federal agencies under section 3555 of title*
16 *44, United States Code.*

17 *(e) SOFTWARE SUPPLY CHAIN SECURITY PRAC-*
18 *TICES.—*

19 *(1) IN GENERAL.—The Director shall, in coordi-*
20 *nation with industry, academia, and other Federal*
21 *agencies, as appropriate, develop a set of security out-*
22 *comes and practices, including security controls, con-*
23 *trol enhancements, supplemental guidance, or other*
24 *supporting information to enable software developers*

1 *and operators to identify, assess, and manage cyberse-*
2 *curity risks over the full lifecycle of software products.*

3 (2) *OUTREACH.—The Director shall conduct out-*
4 *reach and coordination activities to share technical*
5 *expertise with Federal agencies, relevant industry*
6 *stakeholders, and standards development organiza-*
7 *tions, as appropriate, to encourage the voluntary*
8 *adoption of the software lifecycle security practices by*
9 *Federal agencies and industry stakeholders.*

10 **SEC. 10225. DIGITAL IDENTITY MANAGEMENT RESEARCH.**

11 *Section 504 of the Cybersecurity Enhancement Act of*
12 *2014 (15 U.S.C. 7464) is amended to read as follows:*

13 **“SEC. 504. IDENTITY MANAGEMENT RESEARCH AND DEVEL-**
14 **OPMENT.**

15 “(a) *IN GENERAL.—The Director shall carry out a*
16 *program of research to support the development of vol-*
17 *untary, consensus-based technical standards, best practices,*
18 *benchmarks, methodologies, metrology, testbeds, and con-*
19 *formance criteria for identity management, taking into ac-*
20 *count appropriate user concerns to—*

21 “(1) *improve interoperability and portability*
22 *among identity management technologies;*

23 “(2) *strengthen identity proofing and*
24 *verification methods used in identity management*
25 *systems commensurate with the level of risk, including*

1 *identity and attribute validation services provided by*
2 *Federal, State, and local governments;*

3 “(3) *improve privacy protection in identity*
4 *management systems; and*

5 “(4) *improve the accuracy, usability, and*
6 *inclusivity of identity management systems.*

7 “(b) *DIGITAL IDENTITY TECHNICAL ROADMAP.—The*
8 *Director, in consultation with other relevant Federal agen-*
9 *cies and stakeholders from the private sector, shall develop*
10 *and maintain a technical roadmap for digital identity*
11 *management research and development focused on enabling*
12 *the voluntary use and adoption of modern digital identity*
13 *solutions that align with the four criteria in subsection (a).*

14 “(c) *DIGITAL IDENTITY MANAGEMENT GUIDANCE.—*

15 “(1) *IN GENERAL.—The Director shall develop,*
16 *and periodically update, in collaboration with other*
17 *public and private sector organizations, common defi-*
18 *nitions and voluntary guidance for digital identity*
19 *management systems, including identity and at-*
20 *tribute validation services provided by Federal, State,*
21 *and local governments.*

22 “(2) *GUIDANCE.—The Guidance shall—*

23 “(A) *align with the four criteria in sub-*
24 *section (a), as practicable;*

1 “(B) provide case studies of implementation
2 of guidance;

3 “(C) incorporate voluntary technical stand-
4 ards and industry best practices; and

5 “(D) not prescribe or otherwise require the
6 use of specific technology products or services.

7 “(3) CONSULTATION.—In carrying out this sub-
8 section, the Director shall consult with—

9 “(A) Federal and State agencies;

10 “(B) industry;

11 “(C) potential end-users and individuals
12 that will use services related to digital identity
13 verification; and

14 “(D) experts with relevant experience in the
15 systems that enable digital identity verification,
16 as determined by the Director.”.

17 **SEC. 10226. BIOMETRICS RESEARCH AND TESTING.**

18 (a) IN GENERAL.—The Secretary, acting through the
19 Director, shall establish a program to support measurement
20 research to inform the development of best practices, bench-
21 marks, methodologies, procedures, and voluntary, con-
22 sensus-based technical standards for biometric identifica-
23 tion systems, including facial recognition systems, to assess
24 and improve the performance of such systems. In carrying
25 out such program, the Director may—

1 (1) *conduct measurement research to support ef-*
2 *forts to improve the performance of biometric identi-*
3 *fication systems, including in areas related to con-*
4 *formity assessment, image quality and interoper-*
5 *ability, contactless biometric capture technologies, and*
6 *human-in-the-loop biometric identification systems*
7 *and processes;*

8 (2) *convene and engage with relevant stake-*
9 *holders to establish common definitions and charac-*
10 *terizations for biometric identification systems, which*
11 *may include accuracy, fairness, bias, privacy, con-*
12 *sent, and other properties, taking into account defini-*
13 *tions in relevant international technical standards*
14 *and other publications;*

15 (3) *carry out measurement research and testing*
16 *on a range of biometric modalities, such as finger-*
17 *prints, voice, iris, face, vein, behavioral biometrics,*
18 *genetics, multimodal biometrics, and emerging appli-*
19 *cations of biometric identification technology;*

20 (4) *study the use of privacy-enhancing tech-*
21 *nologies and other technical protective controls to fa-*
22 *cilitate access, as appropriate, to public data sets for*
23 *biometric research;*

24 (5) *conduct outreach and coordination to share*
25 *technical expertise with relevant industry and non-*

1 *industry stakeholders and standards development or-*
2 *ganizations to assist such entities in the development*
3 *of best practices and voluntary technical standards;*
4 *and*

5 *(6) develop such standard reference artifacts as*
6 *the Director determines is necessary to further the de-*
7 *velopment of such voluntary technical standards.*

8 *(b) BIOMETRICS TEST PROGRAM.—*

9 *(1) IN GENERAL.—The Secretary, acting through*
10 *the Director, shall carry out a test program to pro-*
11 *vide biometrics vendors the opportunity to test bio-*
12 *metric identification technologies across a range of*
13 *modalities.*

14 *(2) ACTIVITIES.—In carrying out the program*
15 *under this subsection, the Director shall—*

16 *(A) conduct research and regular testing to*
17 *improve and benchmark the accuracy, efficacy,*
18 *and bias of biometric identification technologies,*
19 *which may include research and testing on de-*
20 *mographic variations, capture devices, presen-*
21 *tation attack detection, partially occluded or*
22 *computer generated images, privacy and security*
23 *designs and controls, template protection, de-*
24 *identification, and comparison of algorithm,*

1 *human, and combined algorithm-human recogni-*
2 *tion capability;*

3 *(B) develop an approach for testing soft-*
4 *ware and cloud-based biometrics applications,*
5 *including remote systems, in Institute test facili-*
6 *ties;*

7 *(C) establish reference use cases for biomet-*
8 *ric identification technologies and performance*
9 *criteria for assessing each use case, including ac-*
10 *curacy, efficacy, and bias metrics;*

11 *(D) produce public-facing reports of the*
12 *findings from such testing for a general audi-*
13 *ence;*

14 *(E) develop policies and procedures ac-*
15 *counting for the legal and social implications of*
16 *activities under this paragraph when working*
17 *with a foreign entity of concern (as such term is*
18 *defined in section 10612);*

19 *(F) establish procedures to prioritize testing*
20 *of biometrics identification technologies devel-*
21 *oped by entities headquartered in the United*
22 *States; and*

23 *(G) conduct such other activities as deter-*
24 *mined necessary by the Director.*

1 (c) *GAO REPORT TO CONGRESS.*—Not later than 18
2 months after the date of the enactment of this Act, the
3 Comptroller General of the United States shall submit a de-
4 tailed report to Congress on the impact of biometric identi-
5 fication technologies on historically marginalized commu-
6 nities, including low-income communities and minority re-
7 ligious, racial, and ethnic groups. Such report should be
8 made publicly available on an internet website.

9 **SEC. 10227. FEDERAL BIOMETRIC PERFORMANCE STAND-**
10 **ARDS.**

11 Subsection (b) of section 20 of the National Institute
12 of Standards and Technology Act (15 U.S.C. 278g-3) is
13 amended—

14 (1) in paragraph (2), by striking “and” after the
15 semicolon;

16 (2) in paragraph (3), by striking the period and
17 inserting “; and”; and

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

19 “(4) performance standards and guidelines for
20 high risk biometric identification systems, including
21 facial recognition systems, accounting for various use
22 cases, types of biometric identification systems, and
23 relevant operational conditions.”.

1 **SEC. 10228. PROTECTING RESEARCH FROM CYBERSECURITY**

2 **THEFT.**

3 *Subparagraph (A) of section 2(e)(1) of the National*
4 *Institute of Standards and Technology Act (15 U.S.C.*
5 *272(e)(1)) is amended—*

6 *(1) in clause (viii), by striking “and” after the*
7 *semicolon;*

8 *(2) by redesignating clause (ix) as clause (x);*
9 *and*

10 *(3) by inserting after clause (viii) the following:*

11 *“(ix) consider institutions of higher*
12 *education (as such term is defined in sec-*
13 *tion 101 of the Higher Education Act of*
14 *1965 (20 U.S.C. 1001)); and”.*

15 **SEC. 10229. DISSEMINATION OF RESOURCES FOR RE-**
16 **SEARCH INSTITUTIONS.**

17 *(a) DISSEMINATION OF RESOURCES FOR RESEARCH*
18 *INSTITUTIONS.—*

19 *(1) IN GENERAL.—Not later than one year after*
20 *the date of the enactment of this Act, the Director*
21 *shall, using the authorities of the Director under sub-*
22 *sections (c)(15) and (e)(1)(A)(ix) of section 2 of the*
23 *National Institute of Standards and Technology Act*
24 *(15 U.S.C. 272), disseminate and make publicly*
25 *available tailored resources to help qualifying institu-*

1 *tions identify, assess, manage, and reduce their cyber-*
2 *security risk related to conducting research.*

3 (2) *REQUIREMENTS.—The Director shall ensure*
4 *that the resources disseminated pursuant to para-*
5 *graph (1)—*

6 (A) *are generally applicable and usable by*
7 *a wide range of qualifying institutions;*

8 (B) *vary with the nature and size of the*
9 *qualifying institutions, and the nature and sen-*
10 *sitivity of the data collected or stored on the in-*
11 *formation systems or devices of the qualifying*
12 *institutions;*

13 (C) *include elements that promote aware-*
14 *ness of simple, basic controls, a workplace cyber-*
15 *security culture, and third-party stakeholder re-*
16 *lationships, to assist qualifying institutions in*
17 *mitigating common cybersecurity risks;*

18 (D) *include case studies, examples, and sce-*
19 *narios of practical application;*

20 (E) *are outcomes-based and can be imple-*
21 *mented using a variety of technologies that are*
22 *commercial and off-the-shelf; and*

23 (F) *to the extent practicable, are based on*
24 *international technical standards.*

1 (3) *NATIONAL CYBERSECURITY AWARENESS AND*
2 *EDUCATION PROGRAM.*—*The Director shall ensure*
3 *that the resources disseminated under paragraph (1)*
4 *are consistent with the efforts of the Director under*
5 *section 303 of the Cybersecurity Enhancement Act of*
6 *2014 (15 U.S.C. 7443).*

7 (4) *UPDATES.*—*The Director shall review peri-*
8 *odically and update the resources under paragraph*
9 *(1) as the Director determines appropriate.*

10 (5) *VOLUNTARY RESOURCES.*—*The use of the re-*
11 *sources disseminated under paragraph (1) shall be*
12 *considered voluntary.*

13 (b) *OTHER FEDERAL CYBERSECURITY REQUIRE-*
14 *MENTS.*—*Nothing in this section may be construed to super-*
15 *sede, alter, or otherwise affect any cybersecurity require-*
16 *ments applicable to Federal agencies.*

17 (c) *DEFINITIONS.*—*In this section:*

18 (1) *QUALIFYING INSTITUTIONS.*—*The term*
19 *“qualifying institutions” means institutions of higher*
20 *education that are awarded in excess of \$50,000,000*
21 *per year in total Federal research funding.*

22 (2) *RESOURCES.*—*The term “resources” means*
23 *guidelines, tools, best practices, technical standards,*
24 *methodologies, and other ways of providing informa-*
25 *tion.*

1 **SEC. 10230. ADVANCED COMMUNICATIONS RESEARCH.**

2 *The National Institute of Standards and Technology*
 3 *Act (15 U.S.C. 271 et seq.) is amended—*

4 *(1) by redesignating section 35 as section 36;*

5 *and*

6 *(2) by inserting after section 34 the following:*

7 **“SEC. 35. ADVANCED COMMUNICATIONS RESEARCH ACTIVI-**
 8 **TIES.**

9 *“(a) ADVANCED COMMUNICATIONS RESEARCH.—*

10 *“(1) IN GENERAL.—The Director, in consultation*
 11 *with the Assistant Secretary for Communications and*
 12 *Information, the Director of the National Science*
 13 *Foundation, and heads of other Federal agencies, as*
 14 *appropriate, shall carry out a program of measure-*
 15 *ment research for advanced communications tech-*
 16 *nologies.*

17 *“(2) RESEARCH AREAS.—Research areas may*
 18 *include—*

19 *“(A) radio frequency emissions and inter-*
 20 *ference, including technologies and techniques to*
 21 *mitigate such emissions and interference;*

22 *“(B) advanced antenna arrays and artifi-*
 23 *cial intelligence systems capable of operating ad-*
 24 *vanced antenna arrays;*

25 *“(C) artificial intelligence systems to enable*
 26 *internet of things networks, immersive tech-*

1 *nology, and other advanced communications*
2 *technologies;*

3 “(D) *network sensing and monitoring tech-*
4 *nologies;*

5 “(E) *technologies to enable spectrum flexi-*
6 *bility and agility;*

7 “(F) *optical and quantum communications*
8 *technologies;*

9 “(G) *security of advanced communications*
10 *systems;*

11 “(H) *public safety communications;*

12 “(I) *resilient internet of things applications*
13 *for advanced manufacturing; and*

14 “(J) *other research areas determined nec-*
15 *essary by the Director.*

16 “(3) *TESTBEDS.—In coordination with the As-*
17 *stant Secretary for Communications and Informa-*
18 *tion, the private sector, and other Federal agencies as*
19 *appropriate, the Director may develop and manage*
20 *testbeds for research and development of advanced*
21 *communications technologies, avoiding duplication of*
22 *existing testbeds run by other agencies or the private*
23 *sector.*

24 “(4) *OUTREACH.—In carrying out the activities*
25 *under this subsection, the Director shall seek input*

1 *from other Federal agencies and from private sector*
2 *stakeholders, on an ongoing basis, to help inform re-*
3 *search and development priorities, including through*
4 *workshops and other multistakeholder activities.*

5 “(5) *TECHNICAL ROADMAPS.*—*In carrying out*
6 *the activities under this subsection, the Director shall*
7 *convene industry, institutions of higher education,*
8 *nonprofit organizations, Federal laboratories, and*
9 *other Federal agencies engaged in advanced commu-*
10 *nications research and development to develop, and*
11 *periodically update, coordinated technical roadmaps*
12 *for advanced communications research in priority*
13 *areas, such as those described in paragraph (2).*

14 “(b) *NATIONAL ADVANCED SPECTRUM AND COMMU-*
15 *UNICATIONS TEST NETWORK.*—

16 “(1) *IN GENERAL.*—*The Director, in coordina-*
17 *tion with the Administrator of the National Tele-*
18 *communications and Information Administration*
19 *and heads of other Federal agencies, as appropriate,*
20 *shall operate a national network of government, aca-*
21 *demie, and commercial test capabilities and facilities*
22 *to be known as the National Advanced Spectrum and*
23 *Communications Test Network (referred to in this sec-*
24 *tion as ‘NASCTN’).*

1 “(2) *PURPOSES.*—*NASCTN shall be for the pur-*
2 *poses of facilitating and coordinating the use of intel-*
3 *lectual capacity, modeling and simulation, laboratory*
4 *facilities, and test facilities to meet national spectrum*
5 *interests and challenges, including—*

6 “(A) *measurements and analyses of electro-*
7 *magnetic propagation, radio systems characteris-*
8 *tics, and operating techniques affecting the utili-*
9 *zation of the electromagnetic spectrum in coordi-*
10 *nation with specialized, related research and*
11 *analysis performed by other Federal agencies in*
12 *their areas of responsibility;*

13 “(B) *conducting research and analysis in*
14 *the general field of telecommunications sciences*
15 *in support of the Institute’s mission and in sup-*
16 *port of other Government agencies;*

17 “(C) *developing methodologies for testing,*
18 *measuring, and setting guidelines for inter-*
19 *ference;*

20 “(D) *conducting interference tests to better*
21 *understand the impact of current and proposed*
22 *Federal and commercial spectrum activities;*

23 “(E) *conducting research and testing to im-*
24 *prove spectrum interference tolerance, flexibility,*
25 *agility, and interference mitigation methods; and*

1 “(F) other activities as determined nec-
2 essary by the Director.”.

3 **SEC. 10231. NEUTRON SCATTERING.**

4 (a) *STRATEGIC PLAN FOR THE INSTITUTE NEUTRON*
5 *REACTOR.*—*The Director shall develop a strategic plan for*
6 *the future of the NIST Center for Neutron Research after*
7 *the current neutron reactor is decommissioned, including—*

8 (1) *a succession plan for the reactor, including*
9 *a roadmap with timeline and milestones;*

10 (2) *conceptual design of a new reactor and ac-*
11 *companying facilities, as appropriate; and*

12 (3) *a plan to minimize disruptions to the user*
13 *community during the transition.*

14 (b) *COORDINATION WITH THE DEPARTMENT OF EN-*
15 *ERGY.*—*The Secretary, acting through the Director, shall*
16 *coordinate with the Secretary of Energy on issues related*
17 *to Federal support for neutron science, including estimation*
18 *of long-term needs for research using neutron sources, and*
19 *planning efforts for future facilities to meet such needs.*

20 (c) *REPORT TO CONGRESS.*—*Not later than 30 months*
21 *after the date of enactment of this Act, the Director shall*
22 *submit to Congress the plan required under subsection (a),*
23 *and shall notify Congress of any substantial updates to such*
24 *plan in subsequent years.*

1 **SEC. 10232. ARTIFICIAL INTELLIGENCE.**

2 (a) *IN GENERAL.*—*The Director shall continue to sup-*
3 *port the development of artificial intelligence and data*
4 *science, and carry out the activities of the National Artifi-*
5 *cial Intelligence Initiative Act of 2020 authorized in divi-*
6 *sion E of the National Defense Authorization Act for Fiscal*
7 *Year 2021 (Public Law 116–283), including through—*

8 (1) *expanding the Institute’s capabilities, includ-*
9 *ing scientific staff and research infrastructure;*

10 (2) *supporting measurement research and devel-*
11 *opment for advanced computer chips and hardware*
12 *designed for artificial intelligence systems;*

13 (3) *supporting the development of technical*
14 *standards and guidelines that promote safe and trust-*
15 *worthy artificial intelligence systems, such as enhanc-*
16 *ing the accuracy, explainability, privacy, reliability,*
17 *robustness, safety, security, and mitigation of harmful*
18 *bias in artificial intelligence systems;*

19 (4) *creating a framework for managing risks as-*
20 *sociated with artificial intelligence systems; and*

21 (5) *developing and publishing cybersecurity*
22 *tools, encryption methods, and best practices for arti-*
23 *ficial intelligence and data science.*

24 (b) *AI TESTBEDS.*—*Section 22A of the National Insti-*
25 *tute of Standards and Technology Act (15 U.S.C. 278h–*
26 *1) is amended—*

1 (1) by redesignating subsection (g) as subsection
2 (h); and

3 (2) by inserting after subsection (f) the following:

4 “(g) *TESTBEDS*.—In coordination with other Federal
5 agencies as appropriate, the private sector, and institutions
6 of higher education (as such term is defined in section 101
7 of the *Higher Education Act of 1965* (20 U.S.C. 1001)),
8 the Director may establish testbeds, including in virtual en-
9 vironments, to support the development of robust and trust-
10 worthy artificial intelligence and machine learning sys-
11 tems, including testbeds that examine the vulnerabilities
12 and conditions that may lead to failure in, malfunction of,
13 or attacks on such systems.”.

14 **SEC. 10233. SUSTAINABLE CHEMISTRY RESEARCH AND EDU-**
15 **CATION.**

16 In accordance with section 263 of the *National Defense*
17 *Authorization Act for Fiscal Year 2021* (15 U.S.C. 9303),
18 the Director shall carry out activities in support of sustain-
19 able chemistry, including coordinating and partnering with
20 academia, industry, nonprofit organizations, and other en-
21 tities in activities to support clean, safe, and economic al-
22 ternatives, technologies, and methodologies to traditional
23 chemical products and processes.

1 **SEC. 10234. PREMISE PLUMBING RESEARCH.**

2 (a) *IN GENERAL.*—*The Secretary, acting through the*
3 *Director, shall create a program, in consultation with the*
4 *Environmental Protection Agency, for premise plumbing*
5 *research, including to—*

6 (1) *conduct metrology research on premise*
7 *plumbing in relation to water safety, security, effi-*
8 *ciency, sustainability, and resilience; and*

9 (2) *coordinate research activities with academia,*
10 *the private sector, nonprofit organizations, and other*
11 *Federal agencies.*

12 (b) *DEFINITIONS.*—*For purposes of this section, the*
13 *term “premise plumbing” means the water distribution sys-*
14 *tem located within the property lines of a property, includ-*
15 *ing all buildings and permanent structures on such prop-*
16 *erty. Such term includes building supply and distribution*
17 *pipes, fixtures, fittings, water heaters, water-treating and*
18 *water-using equipment, and all respective joints, connec-*
19 *tions, devices, and appurtenances.*

20 **SEC. 10235. DR. DAVID SATCHER CYBERSECURITY EDU-**
21 **CATION GRANT PROGRAM.**

22 (a) *AUTHORIZATION OF GRANTS.*—

23 (1) *IN GENERAL.*—*Subject to the availability of*
24 *appropriations, the Director shall carry out the Dr.*
25 *David Satcher Cybersecurity Education Grant Pro-*
26 *gram by—*

1 (A) awarding grants to assist institutions of
2 higher education that have an enrollment of
3 needy students, historically Black colleges and
4 universities, Tribal Colleges and Universities,
5 and minority-serving institutions, to establish or
6 expand cybersecurity programs, to build and up-
7 grade institutional capacity to better support
8 new or existing cybersecurity programs, includ-
9 ing cybersecurity partnerships with public and
10 private entities, and to support such institutions
11 on the path to producing qualified entrants in
12 the cybersecurity workforce or becoming a Na-
13 tional Center of Academic Excellence in Cyberse-
14 curity; and

15 (B) awarding grants to build capacity at
16 institutions of higher education that have an en-
17 rollment of needy students, historically Black col-
18 leges and universities, Tribal Colleges and Uni-
19 versities, and minority-serving institutions, to
20 expand cybersecurity education opportunities,
21 cybersecurity programs, cybersecurity research,
22 and cybersecurity partnerships with public and
23 private entities.

24 (2) *RESERVATION.*—The Director shall award
25 not less than 50 percent of the amount available for

1 *grants under this section to historically Black colleges*
2 *and universities, Tribal Colleges and Universities,*
3 *and minority-serving institutions.*

4 (3) *COORDINATION.*—*The Director shall carry*
5 *out this section in coordination with appropriate*
6 *Federal agencies, including the Departments of*
7 *Homeland Security, Education, and Labor.*

8 (4) *SUNSET.*—*The Director’s authority to award*
9 *grants under paragraph (1) shall terminate on the*
10 *date that is 5 years after the date the Director first*
11 *awards a grant under paragraph (1).*

12 (b) *APPLICATIONS.*—*An eligible institution seeking a*
13 *grant under subsection (a) shall submit an application to*
14 *the Director at such time, in such manner, and containing*
15 *such information as the Director may reasonably require,*
16 *including a statement of how the institution will use the*
17 *funds awarded through the grant to expand cybersecurity*
18 *education opportunities at the eligible institution.*

19 (c) *ACTIVITIES.*—*An eligible institution that receives*
20 *a grant under this section may use the funds awarded*
21 *through such grant for increasing research, education, tech-*
22 *nical, partnership, and innovation capacity, including*
23 *for—*

24 (1) *building and upgrading institutional capac-*
25 *ity to better support new or existing cybersecurity*

1 *programs, including cybersecurity partnerships with*
2 *public and private entities;*

3 *(2) building and upgrading institutional capac-*
4 *ity to provide hands-on research and training experi-*
5 *ences for undergraduate and graduate students; and*

6 *(3) outreach and recruitment to ensure students*
7 *are aware of such new or existing cybersecurity pro-*
8 *grams, including cybersecurity partnerships with*
9 *public and private entities.*

10 *(d) REPORTING REQUIREMENTS.—Not later than—*

11 *(1) one year after the effective date of this sec-*
12 *tion, as provided in subsection (f), and annually*
13 *thereafter until the Director submits the report under*
14 *paragraph (2), the Director shall prepare and submit*
15 *to Congress a report on the status and progress of im-*
16 *plementation of the grant program under this section,*
17 *including on the number and demographics of institu-*
18 *tions participating, the number and nature of stu-*
19 *dents served by cybersecurity programs at institutions*
20 *receiving grants, as well as the number of certificates*
21 *or degrees awarded through such cybersecurity pro-*
22 *grams, the level of funding provided to grant recipi-*
23 *ents, the types of activities being funded by the grants*
24 *program, and plans for future implementation and*
25 *development; and*

1 (2) *five years after the effective date of this sec-*
2 *tion, as provided in subsection (f), the Director shall*
3 *prepare and submit to Congress a report on the status*
4 *of cybersecurity education programming and capac-*
5 *ity-building at institutions receiving grants under*
6 *this section, including changes in the scale and scope*
7 *of these programs, associated facilities, or in accredi-*
8 *tation status, and on the educational and employment*
9 *outcomes of students participating in cybersecurity*
10 *programs that have received support under this sec-*
11 *tion.*

12 (e) *PERFORMANCE METRICS.*—*The Director shall es-*
13 *tablish performance metrics for grants awarded under this*
14 *section.*

15 (f) *EFFECTIVE DATE.*—*This section shall take effect 1*
16 *year after the date of enactment of this Act.*

17 ***Subtitle C—General Activities***

18 ***SEC. 10241. EDUCATIONAL OUTREACH AND SUPPORT FOR***

19 ***UNDERREPRESENTED COMMUNITIES.***

20 *Section 18 of the National Institute of Standards and*
21 *Technology Act (15 U.S.C. 278g–1) is amended—*

22 (1) *in subsection (a), in the second sentence—*

23 (A) *by striking “may” and inserting*
24 *“shall”; and*

1 (B) by striking “academia” and inserting
2 “diverse types of institutions of higher education,
3 including historically Black colleges and univer-
4 sities, Tribal Colleges and Universities, and mi-
5 nority-serving institutions, and community col-
6 leges”; and

7 (2) in subsection (e)—

8 (A) in paragraph (4), by striking “and” at
9 the end;

10 (B) in paragraph (5), by striking the period
11 at the end and inserting “; and”; and

12 (C) by inserting after paragraph (5) the fol-
13 lowing:

14 “(6) conduct outreach to and develop research
15 collaborations with historically Black colleges and
16 universities, Tribal Colleges or Universities, and mi-
17 nority serving institutions, including through the re-
18 cruitment of students and faculty at such institutions
19 to participate in programs developed under para-
20 graph (3);

21 “(7) conduct outreach to and develop research
22 collaborations with community colleges, including
23 through the recruitment of students and faculty at
24 such institutions to participate in programs developed
25 under paragraph (3);

1 “(8) carry out other activities to increase the
2 participation of persons historically underrepresented
3 in STEM in the Institute’s programs; and

4 “(9) conduct outreach to and develop collabora-
5 tions with nontraditional educational organizations,
6 including those that offer training through nonprofit
7 associations and professional associations or profes-
8 sional societies, to engage persons historically under-
9 represented in STEM through programs developed
10 under this subsection.”.

11 **SEC. 10242. OTHER TRANSACTIONS AUTHORITY.**

12 (a) *IN GENERAL.*—Paragraph (4) of section 2(b) of the
13 National Institute of Standards and Technology Act (15
14 U.S.C. 272(b)) is amended to read as follows:

15 “(4) to enter into and perform such contracts,
16 including cooperative research and development ar-
17 rangements and grants and cooperative agreements or
18 other transactions, as may be necessary in the con-
19 duct of its work and on such terms as it may deter-
20 mine appropriate, in furtherance of the purposes of
21 this Act;”.

22 (b) *REPORTING.*—Not later than one year after the
23 date of the enactment of this Act and not less than annually
24 thereafter, the Secretary shall submit to the Committee on
25 Science, Space, and Technology and the Committee on Ap-

1 *propriations of the House of Representatives and the Com-*
2 *mittee on Commerce, Science, and Transportation and the*
3 *Committee on Appropriations of the Senate a report on the*
4 *use of agreements, activities, and associated funding for*
5 *transactions (other than contracts, cooperative agreements,*
6 *and grants) described in paragraph (4) of section 2(b) of*
7 *the National Institute of Standards and Technology Act (as*
8 *amended by subsection (a)), including the following ele-*
9 *ments:*

10 (1) *A description of when the other transactions*
11 *authority described in such amended paragraph was*
12 *used and for what purpose.*

13 (2) *A description of why such other transactions*
14 *authority was required.*

15 (3) *Steps taken to ensure necessary and suffi-*
16 *cient oversight of Federal Government requirements*
17 *implemented using such other transactions authority.*

18 **SEC. 10243. REPORT TO CONGRESS ON COLLABORATIONS**

19 **WITH GOVERNMENT AGENCIES.**

20 *Not later than 6 months after the date of the enactment*
21 *of this Act, the Director shall submit a report to the Com-*
22 *mittee on Science, Space, and Technology and the Com-*
23 *mittee on Appropriations of the House of Representatives*
24 *and the Committee on Commerce, Science, and Transpor-*
25 *tation and the Committee on Appropriations of the Senate*

1 *describing the Institute’s challenges with respect to collabo-*
2 *ration between the Institute and other Federal agencies. The*
3 *report shall include, at a minimum—*

4 (1) *an assessment of the challenges that arise*
5 *with interagency collaboration, including transfer of*
6 *funds with a limited period of availability to the In-*
7 *stitute and issues with sharing personnel, associates,*
8 *facilities, and property with collaborating agencies;*
9 *and*

10 (2) *descriptions of projects that were disrupted*
11 *due to the challenges outlined in paragraph (1).*

12 **SEC. 10244. HIRING CRITICAL TECHNICAL EXPERTS.**

13 *Section 6 of the National Institute of Standards and*
14 *Technology Act (15 U.S.C. 275) is amended to read as fol-*
15 *lows:*

16 **“SEC. 6. HIRING CRITICAL TECHNICAL EXPERTS.**

17 “(a) *IN GENERAL.—The officers and employees of the*
18 *Institute, except the director, shall be appointed by the Sec-*
19 *retary at such time as their respective services may become*
20 *necessary.*

21 “(b) *HIRING CRITICAL TECHNICAL EXPERTS.—Not-*
22 *withstanding section 3104 of title 5 or the provisions of any*
23 *other law relating to the appointment, number, classifica-*
24 *tion, or compensation of employees, the Secretary shall have*
25 *the authority to make appointments of scientific, engineer-*

1 *ing, and professional personnel, and to fix the basic pay*
2 *of such personnel at a rate to be determined by the Sec-*
3 *retary at rates not in excess of the highest total annual com-*
4 *ensation payable at the rate determined under section 104*
5 *of title 3, United States Code. The Director shall appoint*
6 *not more than 15 personnel under this section.*

7 “(c) *SUNSET.*—*The authority under section (b) shall*
8 *expire on the date that is 5 years after the date of the enact-*
9 *ment of this section.*”.

10 **SEC. 10245. INTERNATIONAL STANDARDS DEVELOPMENT.**

11 (a) *SENSE OF CONGRESS.*—*It is the sense of Congress*
12 *that—*

13 (1) *the principles of openness, transparency, due*
14 *process, balance of interests, appeals, and consensus*
15 *in the development of international standards are*
16 *critical;*

17 (2) *voluntary consensus standards, developed*
18 *through an industry-led process, serve as the corner-*
19 *stone of the United States standardization system and*
20 *have become the basis of a sound national economy*
21 *and the key to global market access;*

22 (3) *strengthening the unique United States pub-*
23 *lic-private partnerships approach to standards devel-*
24 *opment is critical to United States economic competi-*
25 *tiveness; and*

1 (4) *the United States Government should ensure*
2 *cooperation and coordination across Federal agencies*
3 *to partner with and support private sector stake-*
4 *holders to continue to shape international dialogues*
5 *in regard to standards development for emerging tech-*
6 *nologies.*

7 (b) *INTERNATIONAL STANDARDS ENGAGEMENT.—*

8 (1) *IN GENERAL.—The Director shall lead infor-*
9 *mation exchange and coordination among Federal*
10 *agencies and communication from Federal agencies to*
11 *the private sector of the United States to ensure effec-*
12 *tive Federal engagement in the development and use*
13 *of international technical standards.*

14 (2) *REQUIREMENTS.—To support private sector-*
15 *led engagement and ensure effective Federal engage-*
16 *ment in the development and use of international*
17 *technical standards, the Director shall consider—*

18 (A) *the role and needs of the Federal Gov-*
19 *ernment with respect to international technical*
20 *standards;*

21 (B) *organizations developing international*
22 *technical standards of interest to the United*
23 *States, United States representation and influ-*
24 *ence in these organizations, and key contributors*

1 *for technical and leadership expertise in these or-*
2 *ganizations;*

3 *(C) support for persons with domain subject*
4 *matter expertise, especially from small businesses*
5 *located in the United States, to influence and en-*
6 *gage in technical standards leadership positions,*
7 *working groups and meetings;*

8 *(D) opportunities for partnerships for sup-*
9 *porting international technical standards from*
10 *across the Federal Government, Federally funded*
11 *research and development centers, university-af-*
12 *filiated research centers, institutions of higher*
13 *education, industry, industry associations, non-*
14 *profit organizations, and other key contributors;*

15 *(E) support for activities to encourage the*
16 *adoption of technical standards developed in the*
17 *United States to be adopted by international*
18 *standards organizations; and*

19 *(F) other activities determined by the Direc-*
20 *tor to be necessary to support United States par-*
21 *ticipation in international standards develop-*
22 *ment, economic competitiveness, and national se-*
23 *curity in the development and use of inter-*
24 *national technical standards.*

1 (c) *CAPACITY BUILDING GUIDANCE.*—*The Director*
2 *shall support education and workforce development efforts*
3 *to promote United States participation in international*
4 *standards organizations. The Director shall—*

5 (1) *identify and create, as appropriate, technical*
6 *standards education and training resources for inter-*
7 *ested businesses, industry associations, academia,*
8 *nonprofit organizations, Federal agencies, and other*
9 *relevant standards contributors, including activities*
10 *targeted at integrating standards content into under-*
11 *graduate and graduate curricula in science, engineer-*
12 *ing, business, public policy, and law;*

13 (2) *conduct outreach, including to private sector*
14 *leaders, to support engagement by more United States*
15 *stakeholders in international technical standards de-*
16 *velopment; and*

17 (3) *other activities determined necessary by the*
18 *Director to support increased engagement, influence,*
19 *and leadership of United States organizations in the*
20 *development of international technical standards.*

21 (d) *CAPACITY BUILDING PILOT PROGRAM.*—

22 (1) *IN GENERAL.*—*The Director, in coordination*
23 *with the Director of the National Science Foundation,*
24 *and the heads of other relevant Federal agencies, as*
25 *appropriate, shall establish or enter into cooperative*

1 *agreements with appropriate nongovernmental orga-*
2 *nizations to establish a 5-year pilot program to*
3 *award grants, on a merit-reviewed, competitive basis,*
4 *to private sector entities, institutions of higher edu-*
5 *cation, or nonprofit institutions based in the United*
6 *States to support increased participation and leader-*
7 *ship by small business and academic interests in*
8 *international standards organizations.*

9 (2) *USE OF FUNDS.—Grants awarded to eligible*
10 *entities under this subsection may be used to cover*
11 *reasonable costs, up to a specified ceiling set by the*
12 *Director, of activities to support increased engage-*
13 *ment and leadership of eligible entity employees in*
14 *international standards organizations, which may in-*
15 *clude costs associated with—*

16 (A) *travel;*

17 (B) *education and training;*

18 (C) *dues or fees related to participation in*
19 *technical standards development activities; and*

20 (D) *other such costs that the Director deter-*
21 *mines may reasonably support participation of*
22 *the eligible entity in international standards or-*
23 *ganizations.*

1 (3) *AWARD CRITERIA.*—*The Director shall ensure*
2 *that award decisions made under this subsection take*
3 *into account the extent to which the eligible entity—*

4 (A) *employs full-time an individual or in-*
5 *dividuals who demonstrate deep technical stand-*
6 *ards expertise;*

7 (B) *employs full-time an individual or in-*
8 *dividuals who demonstrate knowledge with the*
9 *processes of the standards development organiza-*
10 *tion in which the eligible entity intends to en-*
11 *gage using grant funds;*

12 (C) *proposes a feasible set of standard*
13 *deliverables to be completed over the period of the*
14 *grant;*

15 (D) *explains how the eligible entity will*
16 *fund additional standards-related activities nec-*
17 *essary to achieve the deliverables referred to in*
18 *subparagraph (C) if the grant funds are insuffi-*
19 *cient to cover all costs of such activities;*

20 (E) *commits personnel with appropriate ex-*
21 *pertise to regularly engage in relevant inter-*
22 *national organizations responsible for developing*
23 *technical standards over the period of the grant;*
24 *and*

1 (F) identifies a clearly defined current or
2 anticipated market need or gap that would be
3 addressed by their standards development pro-
4 posal.

5 (4) *ELIGIBILITY.*—A small business concern (as
6 such term is defined in section 3 of the Small Busi-
7 ness Act (15 U.S.C. 632) based in the United States,
8 an institution of higher education, or a nonprofit in-
9 stitution (as such term is defined in section 4 of the
10 Stevenson-Wydler Technology Innovation Act of 1980
11 (15 U.S.C. 3703)) shall be eligible to receive grants
12 under this program.

13 (5) *GUIDANCE ON APPLICATION AND AWARD*
14 *PROCESS.*—The Director shall develop, and periodi-
15 cally update, guidance, including eligibility, appli-
16 cant disclosure requirements, grant amount and du-
17 ration, the merit review process, priority areas for
18 standards development, and any additional require-
19 ments for how grants are awarded under this sub-
20 section.

21 (6) *MERIT REVIEW PROCESS.*—The Director
22 shall ensure that grants under this subsection are
23 awarded based on a competitive, merit review process
24 including the use of merit review panels that may in-
25 clude experts from both government, the private sec-

1 *tor, and, as appropriate, academic, nonprofit, or*
2 *other organizations as the Director determines appro-*
3 *priate.*

4 (7) *CONSULTATION.*—*In carrying out the pilot*
5 *program established under this subsection, the Direc-*
6 *tor shall consult with other Federal agencies, private*
7 *sector organizations, institutions of higher education,*
8 *and nonprofit organizations to help inform the pilot*
9 *program, including the guidance developed under*
10 *paragraph (5).*

11 (8) *REPORT TO CONGRESS.*—*The Director shall*
12 *brief Congress after the second year of the pilot pro-*
13 *gram and each year following that includes the fol-*
14 *lowing:*

15 (A) *An assessment of the effectiveness of the*
16 *pilot program for improving the participation of*
17 *United States small businesses, United States in-*
18 *stitutions of higher education, or other nonprofit*
19 *research institutions in international standards*
20 *organizations, including—*

21 (i) *the type of activities supported, in-*
22 *cluding leadership roles;*

23 (ii) *the international standards orga-*
24 *nizations participated in; and*

1 (iii) the technical areas covered by the
2 activities.

3 (B) If determined effective, a plan for per-
4 manent implementation of the pilot program.

5 **SEC. 10246. STANDARD TECHNICAL UPDATE.**

6 (a) NATIONAL INSTITUTE OF STANDARDS AND TECH-
7 NOLOGY ACT UPDATES.—The National Institute of Stand-
8 ards and Technology Act (15 U.S.C. 271) is amended—

9 (1) by amending subsection (a) of section 17 (15
10 U.S.C. 278g) to read as follows:

11 “(a) The Secretary is authorized, notwithstanding any
12 other provision of law, to expend such sums, within the
13 limit of appropriated funds, as the Secretary may deter-
14 mine desirable through direct support for activities of inter-
15 national organizations and foreign national metrology in-
16 stitutes with which the Institute cooperates to advance
17 measurement methods, technical standards, and related
18 basic technologies, for official representation, to host official
19 receptions, dinners, and similar events, and to otherwise ex-
20 tend official courtesies, including transportation of foreign
21 dignitaries and representatives of foreign national metrol-
22 ogy institutes to and from the Institute, for the purpose of
23 maintaining the standing and prestige of the Department
24 of Commerce and the Institute, through the grant of fellow-
25 ships or other appropriate form of financial or logistical

1 *assistance or support to foreign nationals not in service to*
2 *the Government of the United States while they are per-*
3 *forming scientific or engineering work at the Institute or*
4 *participating in the exchange of scientific or technical in-*
5 *formation at the Institute.”; and*

6 (2) *in section 20 (15 U.S.C. 278g-3)—*

7 (A) *in subsection (c), by amending para-*
8 *graph (3) to read as follows:*

9 “(3) *submit such standards and guidelines to the*
10 *Secretary of Commerce for promulgation under sec-*
11 *tion 11331 of title 40;” and*

12 (B) *in subsection (d)—*

13 (i) *in paragraph (1), by striking “Di-*
14 *rector of the Office of Management and*
15 *Budget” and inserting “Secretary of Com-*
16 *merce”; and*

17 (ii) *in paragraph (8), by striking “Di-*
18 *rector of Management and Budget with such*
19 *standards submitted to the Director” and*
20 *inserting “Secretary of Commerce with such*
21 *standards submitted to the Secretary”.*

22 (b) *STEVENSON-WYDLER UPDATES.—The Stevenson-*
23 *Wydlar Technology Innovation Act of 1980 (15 U.S.C. 3701*
24 *et seq.) is amended—*

1 (1) *in paragraph (1) of section 17(c) (15 U.S.C.*
2 *3711a(c))—*

3 (A) *by moving each of subparagraphs (D)*
4 *and (E) two ems to the left; and*

5 (B) *by adding at the end the following:*

6 “(G) *Community.*”; *and*

7 (2) *in subsection (m) of section 26 (15 U.S.C.*
8 *3721)—*

9 (A) *by striking paragraph (2);*

10 (B) *by redesignating paragraph (3) as*
11 *paragraph (2); and*

12 (C) *in paragraph (2), as so redesignated, by*
13 *striking “and the Comptroller General’s review*
14 *under paragraph (2)”.*

15 (c) *AMERICAN INNOVATION AND COMPETITIVENESS*
16 *ACT UPDATE.—Section 113 of the American Innovation*
17 *and Competitiveness Act (15 U.S.C. 278e note) is repealed.*

18 (d) *CLERICAL AMENDMENT.—The item relating to sec-*
19 *tion 113 in the table of contents in section 1(b) of the Amer-*
20 *ican Innovation and Competitiveness Act is repealed.*

21 (e) *FEDERAL ENERGY MANAGEMENT IMPROVEMENT*
22 *ACT UPDATE.—Section 4 of the Federal Energy Manage-*
23 *ment Improvement Act of 1988 (15 U.S.C. 5001) is amend-*
24 *ed—*

1 (1) by striking “Secretary of Commerce” and
2 “Secretary” each place either such term appears and
3 inserting “Consumer Product Safety Commission”;

4 (2) by redesignating the second subsection (c) as
5 subsection (e); and

6 (3) in subsection (g), by redesignating clauses (i)
7 and (ii) as paragraphs (1) and (2), respectively.

8 (f) TITLE 40, UNITED STATES CODE.—Section 11331
9 of title 40, United States Code, is amended by striking sub-
10 sections (a) through (d) and inserting the following:

11 “(a) STANDARDS AND GUIDELINES.—

12 “(1) AUTHORITY TO PRESCRIBE.—Except as pro-
13 vided under paragraph (2), the Secretary of Com-
14 merce shall, on the basis of standards and guidelines
15 developed by the National Institute of Standards and
16 Technology pursuant to paragraphs (2) and (3) of
17 section 20(a) of the National Institute of Standards
18 and Technology Act (15 U.S.C. 278g–3(a)), prescribe
19 standards and guidelines pertaining to Federal infor-
20 mation systems.

21 “(2) NATIONAL SECURITY SYSTEMS.—Standards
22 and guidelines for national security systems shall be
23 developed, prescribed, enforced, and overseen as other-
24 wise authorized by law and as directed by the Presi-
25 dent.

1 “(b) *MANDATORY REQUIREMENTS.*—

2 “(1) *AUTHORITY TO MAKE MANDATORY.*—*Except*
3 *as provided under paragraph (2), the Secretary of*
4 *Commerce shall make standards prescribed under sub-*
5 *section (a)(1) compulsory and binding to the extent*
6 *determined necessary by the Secretary to improve the*
7 *efficiency of operation or security of Federal informa-*
8 *tion systems.*

9 “(2) *REQUIRED MANDATORY STANDARDS.*—

10 “(A) *IN GENERAL.*—*Standards prescribed*
11 *under subsection (a)(1) shall include information*
12 *security standards that—*

13 “(i) *provide minimum information se-*
14 *curity requirements as determined under*
15 *section 20(b) of the National Institute of*
16 *Standards and Technology Act (15 U.S.C.*
17 *278g–3(b)); and*

18 “(ii) *are otherwise necessary to im-*
19 *prove the security of Federal information*
20 *and information systems.*

21 “(B) *REQUIREMENT.*—*Information security*
22 *standards described in subparagraph (A) shall be*
23 *compulsory and binding.*

24 “(c) *AUTHORITY TO DISAPPROVE OR MODIFY.*—*The*
25 *President may disapprove or modify the standards and*

1 *guidelines referred to in subsection (a)(1) if the President*
2 *determines such action to be in the public interest. The*
3 *President’s authority to disapprove or modify such stand-*
4 *ards and guidelines may not be delegated. Notice of such*
5 *disapproval or modification shall be published promptly in*
6 *the Federal Register. Upon receiving notice of such dis-*
7 *approval or modification, the Secretary of Commerce shall*
8 *immediately rescind or modify such standards or guidelines*
9 *as directed by the President.*

10 “(d) *EXERCISE OF AUTHORITY.*—*To ensure fiscal and*
11 *policy consistency, the Secretary of Commerce shall exercise*
12 *the authority conferred by this section subject to direction*
13 *by the President and in coordination with the Director of*
14 *the Office of Management and Budget.*

15 “(e) *APPLICATION OF MORE STRINGENT STAND-*
16 *ARDS.*—*The head of an executive agency may employ stand-*
17 *ards for the cost-effective information security for Federal*
18 *information systems within or under the supervision of that*
19 *agency that are more stringent than the standards the Sec-*
20 *retary prescribes under this section if the more stringent*
21 *standards—*

22 “(1) *contain at least the applicable standards*
23 *made compulsory and binding by the Secretary of*
24 *Commerce; and*

1 “(2) are otherwise consistent with policies and
2 guidelines issued under section 3553 of title 44.

3 “(f) *DECISIONS ON PROMULGATION OF STANDARDS.*—
4 *The decision by the Secretary of Commerce regarding the*
5 *promulgation of any standard under this section shall occur*
6 *not later than 6 months after the submission of the proposed*
7 *standard to the Secretary by the National Institute of*
8 *Standards and Technology, as provided under section 20*
9 *of the National Institute of Standards and Technology Act*
10 *(15 U.S.C. 278g-3).*

11 “(g) *DEFINITIONS.*—*In this section:*

12 “(1) *FEDERAL INFORMATION SYSTEM.*—*The term*
13 *‘Federal information system’ means an information*
14 *system used or operated by an executive agency, by a*
15 *contractor of an executive agency, or by another orga-*
16 *nization on behalf of an executive agency.*

17 “(2) *INFORMATION SECURITY.*—*The term ‘infor-*
18 *mation security’ has the meaning given that term in*
19 *section 3552(b)(3) of title 44.*

20 “(3) *NATIONAL SECURITY SYSTEM.*—*The term*
21 *‘national security system’ has the meaning given that*
22 *term in section 3552(b)(6) of title 44.”.*

23 “(g) *TECHNICAL AND CONFORMING AMENDMENT.*—
24 *Paragraph (2) of section 20(a) of the National Institute of*
25 *Standards and Technology Act (15 U.S.C. 278g-3(a)) is*

1 *amended by striking “section 3552(b)(5) of title 44, United*
2 *States Code” and inserting “section 3552(b)(6) of title 44,*
3 *United States Code”.*

4 *(h) NATIONAL CONSTRUCTION SAFETY TEAM ACT UP-*
5 *DATES.—Section 4 of the National Construction Safety*
6 *Team Act (15 U.S.C. 7303) is amended—*

7 *(1) in subsection (c), by adding at the end the*
8 *following:*

9 *“(5) CIVIL SUITS.—Where practicable, a Team*
10 *shall cooperate with civil litigants without compro-*
11 *miting a Team’s investigation or the evidence preser-*
12 *vation activities as described in this section.”; and*

13 *(2) in subsection (d)—*

14 *(A) in the subsection heading, by striking*
15 *“INTERAGENCY” and inserting “INVESTIGA-*
16 *TION”;* and

17 *(B) in paragraph (1), by inserting “or any*
18 *civil suit or civil action” after “Federal agency”.*

19 **SEC. 10247. GAO STUDY OF NIST RESEARCH SECURITY POLI-**
20 **CIES AND PROTOCOLS.**

21 *(a) EVALUATION.—Not later than 1 year after the date*
22 *of enactment of this Act, the Comptroller General of the*
23 *United States shall conduct a study of the Institute’s poli-*
24 *cies and protocols to protect its research and combat undue*
25 *foreign influence.*

1 (b) *MATTERS TO BE INCLUDED.*—*The study conducted*
2 *under subsection (a) shall include, to the extent practicable,*
3 *the following:*

4 (1) *An analysis of steps taken by the Institute to*
5 *address foreign threats to Institute-funded research*
6 *over the previous 5 years.*

7 (2) *An analysis of the coordination and engage-*
8 *ment between the Department of Commerce’s Office of*
9 *Inspector General, the Department of Commerce’s Of-*
10 *ice of Intelligence, the National Counterintelligence*
11 *and Security Center of the Office of the Director of*
12 *National Intelligence, and the Institute in identifying*
13 *and addressing concerning findings.*

14 (3) *An assessment of the Institute’s review proc-*
15 *ess for foreign national associates.*

16 (4) *An assessment of the Institute’s policies as it*
17 *relates to employees and associates participating in*
18 *foreign talent recruitment programs.*

19 (5) *An assessment of the Institute’s implementa-*
20 *tion of conflict of interest and disclosure policies and*
21 *requirements, including the disclosure requirements*
22 *authorized in section 223 of the National Defense Au-*
23 *thorization Act for Fiscal Year 2021 (Public Law*
24 *116–283).*

1 (6) *An assessment of the Institute’s, the Department of Commerce’s Office of Security, the Department of Commerce’s Office of Intelligence, and the Department of Commerce’s Office of Inspector General’s ability to monitor and enforce conflict of interest and disclosure policies and requirements, including the disclosure requirements authorized in section 223 of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283).*

10 (7) *An assessment of the Institute’s, the Department of Commerce’s, and the Department of Commerce’s Office of Inspector General’s ability to conduct risk assessments of research and development award applications and disclosures to the Institute.*

15 (8) *An assessment of the Institute’s research security training programs for both internal and externally-supported researchers and associates, including training focused on international collaboration, and international travel, foreign interference, and rules for proper use of funds, disclosure, conflict of commitment, and conflict of interest.*

22 (9) *An analysis and summary of incidents of undue foreign influence at Institute-supported research facilities and programs over the past 10 years.*

1 (10) *Recommendations for the Institute to bolster*
2 *its research security policies and protocols.*

3 (11) *Other matters the Comptroller General de-*
4 *termines appropriate.*

5 (c) *CONGRESSIONAL BRIEFING.*—*Not later than 180*
6 *days after the date of enactment of this Act, the Comptroller*
7 *General shall brief the Committee on Science, Space, and*
8 *Technology and the Permanent Select Committee on Intel-*
9 *ligence of the House of Representatives and the Committee*
10 *of Commerce, Science, and Transportation and the Select*
11 *Committee on Intelligence of the Senate on the findings*
12 *available from the evaluation conducted under subsection*
13 *(a).*

14 (d) *REPORT.*—*Not later than 18 months after the date*
15 *of enactment of this Act, the Comptroller General shall sub-*
16 *mit to the congressional committees specified in subsection*
17 *(c) a report on the findings and recommendations of the*
18 *evaluation conducted under subsection (a).*

19 **SEC. 10248. STANDARDS DEVELOPMENT ORGANIZATION**
20 **GRANTS.**

21 (a) *NONGOVERNMENTAL STANDARDS DEVELOPMENT*
22 *ORGANIZATION DEFINED.*—*In this section, the term “non-*
23 *governmental standards development organization” means*
24 *a nongovernmental standards development organization (as*
25 *defined in section 2(e) of the Office of Management and*

1 *Budget Circular A–119 (relating to Federal participation*
2 *in the development and use of voluntary consensus stand-*
3 *ards in conformity assessment activities), or any successor*
4 *document) that adheres to the American National Stand-*
5 *ards Institute (ANSI) Essential Requirements for Due*
6 *Process for American National Standards.*

7 (b) *GRANT AUTHORITY.*—*The Secretary of Commerce,*
8 *acting through the Director, shall establish a competitive*
9 *program of grants for nongovernmental standards develop-*
10 *ment organizations for the purposes described in subsection*
11 *(c).*

12 (c) *PURPOSES.*—*A grant awarded under subsection (b)*
13 *shall be used to develop, approve, disseminate, maintain,*
14 *and review forensic science voluntary consensus standards*
15 *and best practices that shall be available to the public free*
16 *of charge.*

17 (d) *ADDITIONAL REQUIREMENTS.*—*The Director may*
18 *promulgate such requirements, guidelines, and procedures*
19 *as may be necessary to carry out this section.*

20 (e) *AUTHORIZATION OF APPROPRIATIONS.*—*There are*
21 *authorized to be appropriated to carry out this section*
22 *\$2,000,000 for each of fiscal years 2022 through 2026.*

1 **Subtitle D—Hollings Manufacturing**
2 **Extension Partnership**

3 **SEC. 10251. ESTABLISHMENT OF EXPANSION AWARDS PILOT**
4 **PROGRAM AS A PART OF THE HOLLINGS MAN-**
5 **UFACTURING EXTENSION PARTNERSHIP.**

6 (a) *ESTABLISHMENT OF EXPANSION AWARDS PRO-*
7 *GRAM.—The National Institute of Standards and Tech-*
8 *nology Act (15 U.S.C. 271 et seq.) is amended by inserting*
9 *after section 25A (15 U.S.C. 278k–1) the following:*

10 **“SEC. 25B. EXPANSION AWARDS PILOT PROGRAM.**

11 “(a) *DEFINITIONS.—The terms used in this section*
12 *have the meanings given the terms in section 25.*

13 “(b) *ESTABLISHMENT.—The Director shall establish,*
14 *subject to the availability of appropriations, as a part of*
15 *the Hollings Manufacturing Extension Partnership under*
16 *sections 25 and 25A, a pilot program of expansion awards*
17 *among participants described in subsection (c) for the pur-*
18 *poses described in subsection (e).*

19 “(c) *PARTICIPANTS.—Participants receiving awards*
20 *under this section shall be Centers, or a consortium of Cen-*
21 *ters (as such term is defined in section 25).*

22 “(d) *AWARD AMOUNTS.—Subject to the availability of*
23 *appropriations, an award for a recipient under this section*
24 *shall be in an amount equal to the sum of the following:*

1 “(1) *Such amount as the Director considers ap-*
2 *propriate as a minimum base funding level for each*
3 *award under this section.*

4 “(2) *Such additional amount as the Director*
5 *considers in proportion to the manufacturing density*
6 *of the region of the recipient.*

7 “(3) *Such supplemental amounts as the Director*
8 *considers appropriate.*

9 “(e) *PURPOSE OF AWARDS.—An award under this sec-*
10 *tion shall be made for one or more of the following purposes:*

11 “(1) *To provide worker education, training, de-*
12 *velopment, and entrepreneurship training and to con-*
13 *nect individuals or business with such services offered*
14 *in their community, which may include employee*
15 *ownership and workforce training, including con-*
16 *necting manufacturers with career and technical edu-*
17 *cation entities, institutions of higher education (in-*
18 *cluding community colleges), workforce development*
19 *boards, labor organizations, and nonprofit job train-*
20 *ing providers to develop and support training and job*
21 *placement services, including apprenticeship and on-*
22 *line learning platforms, for new and incumbent work-*
23 *ers, programming to prevent job losses when adopting*
24 *new technologies and processes, and development of*
25 *employee ownership practices.*

1 “(2) To provide services to improve the resiliency
2 of domestic supply chains.

3 “(3) To mitigate vulnerabilities to cyberattacks,
4 including helping to offset the cost of cybersecurity
5 projects for small manufacturers.

6 “(4) To expand advanced technology services to
7 United States-based small- and medium-sized manu-
8 facturers, which may include—

9 “(A) developing technology demonstration
10 laboratories;

11 “(B) training and demonstration in areas
12 of supply chain and critical technology needs,
13 including a focus on the demonstration of tech-
14 nologies developed by companies based in the
15 United States;

16 “(C) services for the adoption of advanced
17 technologies, including smart manufacturing
18 technologies and practices; and

19 “(D) establishing partnerships, for the de-
20 velopment, demonstration, and deployment of
21 advanced technologies, with—

22 “(i) national laboratories (as defined
23 in section 2 of the Energy Policy Act of
24 2005 (42 U.S.C. 15801));

25 “(ii) Federal laboratories;

1 “(iii) *Manufacturing USA institutes*
2 *(as described in section 34(d)); and*

3 “(iv) *institutions of higher education.*

4 “(5) *To build capabilities across the Hollings*
5 *Manufacturing Extension Partnership for domestic*
6 *supply chain resiliency and optimization, includ-*
7 *ing—*

8 “(A) *assessment of domestic manufacturing*
9 *capabilities, expanded capacity for researching*
10 *and deploying information on supply chain risk,*
11 *hidden costs of reliance on offshore suppliers, re-*
12 *designing products and processes to encourage*
13 *reshoring, and other relevant topics; and*

14 “(B) *expanded services to provide industry-*
15 *wide support that assists United States manu-*
16 *facturers with reshoring manufacturing to*
17 *strengthen the resiliency of domestic supply*
18 *chains, including in critical technology areas*
19 *and foundational manufacturing capabilities*
20 *that are key to domestic manufacturing competi-*
21 *tiveness and resiliency, including forming, cast-*
22 *ing, machining, joining, surface treatment, tool-*
23 *ing, and metal or chemical refining.*

24 “(f) *REIMBURSEMENT.—The Director may reimburse*
25 *Centers for costs incurred by the Centers under this section.*

1 “(g) *APPLICATIONS.*—Applications for awards under
2 this section shall be submitted in such manner, at such
3 time, and containing such information as the Director shall
4 require in consultation with the Manufacturing Extension
5 Partnership Advisory Board.

6 “(h) *SELECTION.*—

7 “(1) *REVIEWED AND MERIT-BASED.*—The Direc-
8 tor shall ensure that awards under this section are re-
9 viewed and merit-based.

10 “(2) *GEOGRAPHIC DIVERSITY.*—The Director
11 shall endeavor to have broad geographic diversity
12 among selected proposals.

13 “(3) *CRITERIA.*—The Director shall select appli-
14 cations consistent with the purposes identified pursu-
15 ant to subsection (e) to receive awards that the Direc-
16 tor determines will achieve one or more of the fol-
17 lowing:

18 “(A) *Improvement of the competitiveness of*
19 *industries in the region in which the Center or*
20 *Centers are located.*

21 “(B) *Creation of jobs or training of newly*
22 *hired employees.*

23 “(C) *Promotion of the transfer and commer-*
24 *cialization of research and technology from insti-*
25 *tutions of higher education, national labora-*

1 *tories, or other federally funded research pro-*
2 *grams, and nonprofit research institutes.*

3 *“(D) Recruitment of a diverse manufac-*
4 *turing workforce, including through outreach to*
5 *underrepresented populations, including individ-*
6 *uals identified in section 33 or section 34 of the*
7 *Science and Engineering Equal Opportunities*
8 *Act (42 U.S.C. 1885a, 1885b).*

9 *“(E) Any other result the Director deter-*
10 *mines will advance the objective set forth in sec-*
11 *tion 25(c) or 25A.*

12 *“(i) PROGRAM CONTRIBUTION.—Recipients of awards*
13 *under this section shall not be required to provide a match-*
14 *ing contribution.*

15 *“(j) GLOBAL MARKETPLACE PROJECTS.—In making*
16 *an award under this section, the Director, in consultation*
17 *with the Manufacturing Extension Partnership Advisory*
18 *Board and the Secretary, may take into consideration*
19 *whether an application has significant potential for en-*
20 *hancing the competitiveness of small and medium-sized*
21 *United States manufacturers in the global marketplace.*

22 *“(k) DURATION.—The Director shall ensure that the*
23 *duration of an award under this section is aligned and con-*
24 *sistent with a Center’s cooperative agreement established in*
25 *section 25(e).*

1 “(l) *REPORT.*—Not later than October 1, 2025, the Di-
2 rector shall submit to Congress a report that includes—

3 “(1) a summary description of what activities
4 were funded and the measurable outcomes of such ac-
5 tivities;

6 “(2) a description of which types of activities
7 under paragraph (1) could remain as part of a per-
8 manent expansion awards program;

9 “(3) a description of which types of activities
10 under paragraph (1) could be integrated into, and
11 supported under, the program under section 25;

12 “(4) a description of which types of activities
13 under paragraph (1) could be integrated into, and
14 supported under, the competitive awards program
15 under section 25A; and

16 “(5) a recommendation, supported by a clear ex-
17 planation, as to whether the pilot program should be
18 continued.”.

19 (b) *RESOURCE OPTIMIZATION.*—Of amounts author-
20 ized for the Hollings Manufacturing Extension Partnership
21 program under section 25 of the National Institute of
22 Standards and Technology Act (15 U.S.C. 278k), the Sec-
23 retary shall optimize funding across sections 25 and 25A
24 of such Act, as well as the program established under section
25 25B of such Act (as added by subsection (a)), to the extent

1 *practicable and subject to the availability of appropri-*
2 *tions, in order to maximize Center (as such term is defined*
3 *in such section 25) participation as well as competitiveness,*
4 *productivity, and technological performance in United*
5 *States manufacturing.*

6 **SEC. 10252. UPDATE TO HOLLINGS MANUFACTURING EX-**
7 **TENSION PARTNERSHIP.**

8 *(a) ACCEPTANCE OF FUNDS.—Subsection (l) of section*
9 *25 of the National Institute of Standards and Technology*
10 *Act (15 U.S.C. 278k) is amended to read as follows:*

11 *“(l) ACCEPTANCE OF FUNDS.—*

12 *“(1) IN GENERAL.—To the extent provided in*
13 *advance in appropriations Acts, other Federal depart-*
14 *ments and agencies may transfer amounts to the In-*
15 *stitute, and the Secretary and Director may accept*
16 *and make available cash donations from the private*
17 *sector pursuant to section 2(c)(7), to be used for*
18 *strengthening United States manufacturing under*
19 *this section.*

20 *“(2) COMPETITIVE AWARDS.—Funds accepted*
21 *from other Federal departments and agencies and*
22 *from the private sector under paragraph (1) shall be*
23 *awarded competitively by the Secretary and Director*
24 *to Centers, provided that the Secretary and Director*
25 *may make noncompetitive awards, pursuant to this*

1 *section or section 25A, or as a non-competitive con-*
2 *tract, as appropriate, if the Secretary and Director*
3 *determine that—*

4 *“(A) the manufacturing market or sector*
5 *targeted is limited geographically or in scope;*

6 *“(B) the number of States (or territory, in*
7 *the case of Puerto Rico) with Centers serving*
8 *manufacturers of such market or sector is five or*
9 *fewer; and*

10 *“(C) such Center has or Centers have re-*
11 *ceived a positive evaluation in the most recent*
12 *evaluation conducted pursuant to subsection*
13 *(g).”.*

14 *(b) SUPPORTING AMERICAN MANUFACTURING.—Sec-*
15 *tion 25 of the National Institute of Standards and Tech-*
16 *nology Act (15 U.S.C. 278k) is amended—*

17 *(1) in subsection (a)(5)—*

18 *(A) by striking “or consortium thereof;”;*

19 *and*

20 *(B) by inserting “or a consortium thereof”*

21 *before the period at the end of the sentence;*

22 *(2) in subsection (c)(4), by inserting “United*
23 *States-based” before “industrial”;*

24 *(3) in subsection (d)—*

1 (A) in paragraph (1), by inserting “at
2 United States-based industrial facilities, includ-
3 ing small and medium manufacturing compa-
4 nies” before “based”;

5 (B) in paragraph (2), by inserting “United
6 States-based” before “companies”; and

7 (C) in paragraph (3), by inserting “United
8 States-based” before “small”;

9 (4) in subsection (f)(5)(B)(i), by inserting “in
10 the United States” before the semicolon at the end of
11 the clause; and

12 (5) in subsection (n)(1)(A), by inserting “United
13 States-based” before “small”.

14 (c) *AMENDING THE MEP COMPETITIVE AWARDS PRO-*
15 *GRAM.*—Section 25A(c)(2) of the National Institute of
16 *Standards and Technology Act (15 U.S.C. 278k-1(c)(2))* is
17 *amended by inserting “United States” before “manufactur-*
18 *ers”.*

19 (d) *MEP OUTREACH.*—Section 25 of the National In-
20 *stitute of Standards and Technology Act (15 U.S.C. 278k)*
21 *is amended—*

22 (1) in subsection (c)—

23 (A) in paragraph (6), by striking “commu-
24 nity colleges and area career and technical edu-
25 cation schools” and inserting the following: “sec-

1 *ondary schools, community colleges, and area ca-*
 2 *reer and technical education schools, including*
 3 *those in underserved and rural communities,”;*
 4 *and*

5 *(B) in paragraph (7)—*

6 *(i) by striking “and local colleges” and*
 7 *inserting “local secondary schools and local*
 8 *colleges, including historically Black colleges*
 9 *and universities, Tribal Colleges or Univer-*
 10 *sities, minority-serving institutions, com-*
 11 *munity colleges, and secondary schools and*
 12 *colleges in underserved and rural commu-*
 13 *nities,”; and*

14 *(ii) by inserting “or other applied*
 15 *learning opportunities” after “apprentice-*
 16 *ships”; and*

17 *(2) in subsection (d)(3), by striking “, commu-*
 18 *nity colleges, and area career and technical education*
 19 *schools,” and inserting the following: “and local high*
 20 *schools, community colleges, and area career and tech-*
 21 *nical education schools, including those in under-*
 22 *served and rural communities,”.*

23 **SEC. 10253. NATIONAL SUPPLY CHAIN DATABASE.**

24 *(a) ESTABLISHMENT OF NATIONAL SUPPLY CHAIN*
 25 *DATABASE.—The Director shall establish a voluntary Na-*

1 *tional Supply Chain Database, subject to the availability*
2 *of appropriations.*

3 **(b) PURPOSE.**—*The purpose of the voluntary National*
4 *Supply Chain Database shall be to assist the Federal Gov-*
5 *ernment and industry sectors in minimizing disruptions to*
6 *the United States supply chain by having an assessment*
7 *of United States manufacturers' capabilities.*

8 **(c) STUDY ON NATIONAL SUPPLY CHAIN DATABASE.**—
9 *In establishing the National Supply Chain Database, the*
10 *Director shall consider the findings and recommendations*
11 *from the study authorized pursuant to section 9413 of the*
12 *National Defense Authorization Act for Fiscal Year 2021*
13 *(Public Law 116–283), including measures to secure and*
14 *protect the Database from adversarial attacks and*
15 *vulnerabilities.*

16 **(d) DATABASE AND MANUFACTURING EXTENSION**
17 **PARTNERSHIP.**—

18 **(1) IN GENERAL.**—*The Director shall establish*
19 *the infrastructure for the National Supply Chain*
20 *Database through the Hollings Manufacturing Exten-*
21 *sion Partnership, established pursuant to section 25*
22 *of the National Institute of Standards and Technology*
23 *Act (15 U.S.C. 278k), by connecting information from*
24 *the Centers (as such term is defined in such section)*
25 *through the Database.*

1 (2) *NATIONAL VIEW.*—*The Director shall ensure*
2 *that connections under paragraph (1)—*

3 (A) *provide a national overview of the net-*
4 *works of supply chains of the United States; and*

5 (B) *support understanding of whether there*
6 *is a need for some manufacturers to retool in*
7 *some critical areas to meet the urgent need for*
8 *key products.*

9 (3) *INDIVIDUAL HOLLINGS MANUFACTURING EX-*
10 *TENSION PARTNERSHIP CENTER DATABASES.*—

11 (A) *IN GENERAL.*—*The Director shall en-*
12 *sure that—*

13 (i) *each Center is connected to the Na-*
14 *tional Supply Chain Database; and*

15 (ii) *each supply chain database main-*
16 *tained by a Center is interoperable with the*
17 *Database.*

18 (B) *RULE OF CONSTRUCTION.*—*Nothing in*
19 *this section may be construed to require a State*
20 *or territory of the United States to establish a*
21 *new supply chain database through the Hollings*
22 *Manufacturing Extension Partnership program.*

23 (e) *MAINTENANCE OF NATIONAL SUPPLY CHAIN DATA-*
24 *BASE.*—*The Director, acting through the Hollings Manufac-*

1 *turing Extension Partnership program or a designee of the*
2 *program—*

3 (1) *shall maintain the National Supply Chain*
4 *Database as an integration of State-level databases*
5 *from the Center of each State or territory of the*
6 *United States;*

7 (2) *may populate the Database with information*
8 *from past or current clients of Centers; and*

9 (3) *may include in the Database information*
10 *voluntarily provided by non-client private sector enti-*
11 *ties based and operating in the United States, as ap-*
12 *plicable and appropriate.*

13 (f) *DATABASE CONTENT.—The National Supply Chain*
14 *Database may include the following:*

15 (1) *Basic private sector entity information.*

16 (2) *An overview of capabilities, accreditations,*
17 *and products.*

18 (3) *Proprietary information.*

19 (g) *STANDARD CLASSIFICATION SYSTEM.—The Na-*
20 *tional Supply Chain Database may, where applicable, use*
21 *the North American Industry Classification System*
22 *(NAICS) Codes as follows:*

23 (1) *Sector 31-33 – Manufacturing.*

24 (2) *Sector 54 – Professional, Scientific, and*
25 *Technical Services.*

1 (3) *Sector 48-49 – Transportation and*
2 *Warehousing.*

3 (h) *LEVELS.—The National Supply Chain Database*
4 *shall be multi-leveled as agreed to under terms of mutual*
5 *disclosure as follows:*

6 (1) *Level 1 shall have the capability to provide*
7 *basic private sector entity information and shall be*
8 *available to the public.*

9 (2) *Level 2 shall have the capability to provide*
10 *a deeper, nonproprietary overview into capabilities,*
11 *products, and accreditations and shall be available to*
12 *all companies that contribute to the Database.*

13 (3) *Level 3 shall have the capability to hold pro-*
14 *prietary information.*

15 (i) *MATTERS RELATING TO DISCLOSURE AND AC-*
16 *CESS.—*

17 (1) *FOIA EXEMPTION.—The National Supply*
18 *Chain Database, and any information contained*
19 *therein that is not publicly released by the Institute,*
20 *shall be exempt from public disclosure under section*
21 *552(b)(3) of title 5, United States Code.*

22 (2) *LIMITATION ON ACCESS TO CONTENT.—Access*
23 *to a contributing private sector entity’s nonpublic*
24 *content in the National Supply Chain Database shall*
25 *be limited to—*

1 (A) *the contributing private sector entity,*
2 *the Institute, and staff from a Center who sign*
3 *a nondisclosure agreement, and*

4 (B) *other Federal departments and agencies,*
5 *as the Director considers appropriate.*

6 (3) *AGGREGATED INFORMATION.—The Director*
7 *may make aggregated, de-identified information*
8 *available to contributing companies, Centers, or the*
9 *public, as the Director considers appropriate, in sup-*
10 *port of the purposes of this section.*

11 (j) *COORDINATION WITH NATIONAL TECHNOLOGY AND*
12 *INDUSTRIAL BASE COUNCIL.—The Director, acting through*
13 *the Hollings Manufacturing Extension Partnership pro-*
14 *gram, may work with the National Defense Technology and*
15 *Industrial Base Council established under section 4812 of*
16 *title 10, United States Code, as the Director considers ap-*
17 *propriate, to include in the National Supply Chain Data-*
18 *base information regarding the defense manufacturing sup-*
19 *ply chain.*

20 (k) *PROTECTIONS.—*

21 (1) *IN GENERAL.—Supply chain information*
22 *that is voluntarily and lawfully submitted to the Na-*
23 *tional Supply Chain Database by a private sector en-*
24 *tity and accompanied by an express statement de-*
25 *scribed in paragraph (2)—*

1 (A) shall be exempt from disclosure under
2 section 552(b)(3) of title 5, United States Code;

3 (B) may not be made available pursuant to
4 any Federal, State, local, or Tribal authority
5 pursuant to any Federal, State, local, or Tribal
6 law requiring public disclosure of information or
7 records; and

8 (C) may not, without the written consent of
9 the private sector entity submitting such infor-
10 mation, be used directly by the Director, or any
11 other Federal, State, or local authority in any
12 civil enforcement action brought by a Federal,
13 State, Tribal, or local authority.

14 (2) *EXPRESS STATEMENT.*—The express state-
15 ment described in this paragraph, with respect to in-
16 formation or records, is—

17 (A) in the case of written information or
18 records, a written marking on the information or
19 records substantially similar to the following:
20 “This information is voluntarily submitted to
21 the Federal Government in expectation of protec-
22 tion from disclosure as provided by the provi-
23 sions of section 10253(k) of the Research and De-
24 velopment, Competition, and Innovation Act.”;
25 or

1 (B) in the case of oral information, a writ-
2 ten statement similar to the statement described
3 in subparagraph (A) submitted within a reason-
4 able period following the oral communication.

5 (l) *RULES OF CONSTRUCTION.*—

6 (1) *PRIVATE ENTITIES.*—Nothing in this section
7 may be construed to require any private sector entity
8 to share data, including proprietary information,
9 with the Director or the National Supply Chain
10 Database.

11 (2) *PROHIBITION ON NEW REGULATORY AUTHOR-*
12 *ITY.*—Nothing in this section may be construed to
13 grant the Director, or the head of any other Federal
14 agency, any authority to promulgate regulations or
15 set standards on manufacturers, based on data within
16 the National Supply Chain Database, that was not in
17 effect on the day before the date of the enactment of
18 this section.

19 **SEC. 10254. HOLLINGS MANUFACTURING EXTENSION PART-**
20 **nership Activities.**

21 Section 70924(b) of the Infrastructure Investment and
22 *Jobs Act (Public Law 117–58) is amended to read as fol-*
23 *lows:*

24 “(b) *AUTOMATIC ENROLLMENT IN GSA ADVANTAGE.*—
25 *The Administrator of the General Services Administration*

1 *and the Secretary of Commerce, acting through the Under*
2 *Secretary of Commerce for Standards and Technology, shall*
3 *jointly ensure that businesses that participate in the Hol-*
4 *lings Manufacturing Extension Partnership, and so desire,*
5 *are automatically enrolled in General Services Administra-*
6 *tion Advantage.”.*

7 **SEC. 10255. AMENDMENT TO THE HOLLINGS MANUFAC-**
8 **TURING EXTENSION PARTNERSHIP RELAT-**
9 **ING TO INSTITUTIONS OF HIGHER EDU-**
10 **CATION.**

11 *Subsection (a) of section 25 of the National Institute*
12 *of Standards and Technology Act (15 U.S.C. 278k) is*
13 *amended—*

14 *(1) by redesignating paragraph (6) (relating to*
15 *the definition of “Hollings Manufacturing Extension*
16 *Partnership or Program”)* as paragraph (7);

17 *(2) by inserting after paragraph (5) the fol-*
18 *lowing new paragraph:*

19 *“(6) HISTORICALLY BLACK COLLEGE AND UNI-*
20 *VERSITY.—The term ‘historically Black college and*
21 *university’ has the meaning given the term ‘part B*
22 *institution’ in section 322 of the Higher Education*
23 *Act of 1965 (20 U.S.C. 1061).”;*

1 (3) by redesignating the second paragraph (7)
2 (relating to the definition of “MEP Advisory Board”)
3 as paragraph (8);

4 (4) by inserting after paragraph (6) (as inserted
5 by paragraph (2), relating to the definition of “his-
6 torically Black college and university”) the following
7 new paragraph:

8 “(7) *INSTITUTION OF HIGHER EDUCATION.*—The
9 term ‘institution of higher education’ has the meaning
10 given such term in section 101 of the Higher Edu-
11 cation Act of 1965 (20 U.S.C. 1001).”; and

12 (5) by adding at the end the following new para-
13 graphs:

14 “(9) *MINORITY-SERVING INSTITUTION.*—The
15 term ‘minority-serving institution’ means a His-
16 panic-serving institution as defined in section 502(a)
17 of the Higher Education Act of 1965 (20 U.S.C.
18 1101a(a)); an Alaska Native-serving institution or
19 Native Hawaiian-serving institution as defined in
20 section 317(b) of such Act (20 U.S.C. 1059d(b)); or a
21 Predominantly Black institution, Asian American
22 and Native American Pacific Islander-serving institu-
23 tion, or Native American-serving nontribal institu-
24 tion as defined in section 371(c) of such Act (20
25 U.S.C. 1067q(c)).

1 “(10) *SECONDARY SCHOOL*.—The term ‘sec-
2 *ondary school*’ has the meaning given such term in
3 *section 8101 of the Elementary and Secondary Edu-*
4 *cation Act of 1965 (20 U.S.C. 7801).*”

5 “(11) *TRIBAL COLLEGE OR UNIVERSITY*.—The
6 term ‘*Tribal College or University*’ has the meaning
7 given the term ‘*Tribal College or University*’ in sec-
8 tion 316 of the *Higher Education Act of 1965 (20*
9 *U.S.C. 1059c)*.”

10 ***Subtitle E—Manufacturing USA***
11 ***Program***

12 ***SEC. 10261. SUPPORTING GEOGRAPHIC DIVERSITY.***

13 *Section 34(e) of the National Institute of Standards*
14 *and Technology Act (15 U.S.C. 278s(e)) is amended by add-*
15 *ing at the end the following:*

16 “(8) *DIVERSITY PREFERENCES*.—In awarding fi-
17 *nanacial assistance under paragraph (1) for planning*
18 *or establishing a Manufacturing USA institute, an*
19 *agency head shall give special consideration to Manu-*
20 *facturing USA institutes that—*

21 “(A) *contribute to the geographic diversity*
22 *of the Manufacturing USA Program;*

23 “(B) *are located in an area with a low per*
24 *capita income;*

1 “(C) are located in an area with a high
2 proportion of socially disadvantaged residents; or
3 “(D) are located in small and rural com-
4 munities.”.

5 **SEC. 10262. EXPANDING OPPORTUNITIES THROUGH THE**
6 **MANUFACTURING USA PROGRAM.**

7 (a) *IN GENERAL.*—The Secretary of Commerce, in con-
8 sultation with the Secretary of Energy, the Secretary of De-
9 fense, and the heads of such other Federal agencies as the
10 Secretary of Commerce considers relevant, shall coordinate
11 with existing and new Manufacturing USA institutes to in-
12 tegrate covered entities as active members of the Manufac-
13 turing USA institutes, including through the development
14 of preferences in selection criteria for proposals to create
15 new Manufacturing USA institutes or renew existing Man-
16 ufacturing USA institutes that include one or more covered
17 entities.

18 (b) *COVERED ENTITIES.*—For purposes of this sub-
19 section, a covered entity is—

- 20 (1) an historically Black college and university;
21 (2) a Tribal College or University;
22 (3) a minority-serving institution;
23 (4) a minority business enterprise (as such term
24 is defined in section 1400.2 of title 15, Code of Fed-
25 eral Regulations, or successor regulation); or

1 (5) a rural-serving institution of higher edu-
 2 cation (as such term is defined in section 861 of the
 3 Higher Education Act of 1965 (20 U.S.C. 1161q)).

4 **SEC. 10263. PROMOTING DOMESTIC PRODUCTION OF TECH-**
 5 **NOLOGIES DEVELOPED UNDER MANUFAC-**
 6 **TURING USA PROGRAM.**

7 (a) DEPARTMENT OF COMMERCE POLICIES TO PRO-
 8 MOTE DOMESTIC PRODUCTION OF TECHNOLOGIES DEVEL-
 9 OPED UNDER MANUFACTURING USA NETWORK.—

10 (1) POLICIES.—

11 (A) IN GENERAL.—Each agency head (as
 12 such term is defined in section 34(a) of the Na-
 13 tional Institute of Standards and Technology Act
 14 (15 U.S.C. 278s(a))) and the Secretary of De-
 15 fense shall, in consultation with the Secretary of
 16 Commerce, establish policies to promote the do-
 17 mestic production of technologies developed by
 18 the Manufacturing USA Network.

19 (B) ELEMENTS.—The policies established
 20 under subparagraph (A) shall include the fol-
 21 lowing:

22 (i) Measures to partner domestic devel-
 23 opers of goods, services, or technologies by
 24 Manufacturing USA Network activities

1 *with domestic manufacturers and sources of*
2 *financing.*

3 *(ii) Measures to develop and provide*
4 *incentives to promote transfer of intellectual*
5 *property and goods, services, or technologies*
6 *developed by Manufacturing USA Network*
7 *activities to domestic manufacturers.*

8 *(iii) Measures to assist with supplier*
9 *scouting and other supply chain develop-*
10 *ment, including the use of the Hollings*
11 *Manufacturing Extension Partnership*
12 *under section 25 of the National Institute of*
13 *Standards and Technology Act (15 U.S.C.*
14 *278k) to carry out such measures.*

15 *(iv) A process to review and approve*
16 *or deny membership in a Manufacturing*
17 *USA institute by foreign-owned entities, es-*
18 *pecially from countries of concern, includ-*
19 *ing the People's Republic of China.*

20 *(v) Measures to prioritize Federal pro-*
21 *curement of goods, services, or technologies*
22 *developed by the Manufacturing USA Net-*
23 *work activities from domestic sources, as*
24 *appropriate.*

1 (C) *PROCESSES FOR WAIVERS.*—*The poli-*
2 *cies established under this paragraph shall in-*
3 *clude processes to permit waivers, on a case by*
4 *case basis, for policies that promote domestic*
5 *production based on cost, availability, severity of*
6 *technical and mission requirements, emergency*
7 *requirements, operational needs, other legal or*
8 *international treaty obligations, or other factors*
9 *determined important to the success of the Man-*
10 *ufacturing USA Program.*

11 (2) *PROHIBITION.*—

12 (A) *IN GENERAL.*—*A company of the Peo-*
13 *ple’s Republic of China may not participate in*
14 *the Manufacturing USA Program without a*
15 *waiver, as described in paragraph (1)(C).*

16 (B) *COMPANY DEFINED.*—*In this para-*
17 *graph, the term “company” has the meaning*
18 *given such term in section 847(a) of the National*
19 *Defense Authorization Act for Fiscal Year 2020*
20 *(Public Law 116–92; 10 U.S.C. 4819 note).*

21 (b) *COORDINATION OF MANUFACTURING USA INSTI-*
22 *TUTES.*—*Subsection (h) of section 34 of the National Insti-*
23 *tute of Standards and Technology Act (15 U.S.C. 278s) is*
24 *amended by adding at the end the following:*

1 “(7) *COUNCIL FOR COORDINATION OF INSTI-*
2 *TUTES.—*—

3 “(A) *COUNCIL.—The National Program Of-*
4 *fice shall establish or designate a council of heads*
5 *of any Manufacturing USA institute receiving*
6 *Federal funding at any time to foster collabora-*
7 *tion between Manufacturing USA institutes.*

8 “(B) *MEETINGS.—The council established*
9 *or designated pursuant to subparagraph (A)*
10 *shall meet not less frequently than twice each*
11 *year.*

12 “(C) *DUTIES OF THE COUNCIL.—The coun-*
13 *cil established pursuant to subparagraph (A)*
14 *shall assist the National Program Office in car-*
15 *rying out the functions of the National Program*
16 *Office under paragraph (2).”.*

17 *(c) REQUIREMENT FOR NATIONAL PROGRAM OFFICE*
18 *TO DEVELOP STRATEGIES FOR RETAINING DOMESTIC PUB-*
19 *LIC BENEFIT AFTER CESSATION OF FEDERAL FUNDING.—*
20 *Subparagraph (C) of section 34(h)(2) of the National Insti-*
21 *tute of Standards and Technology Act (15 U.S.C.*
22 *278s(h)(2)) is amended by inserting “, including a strategy*
23 *for retaining domestic public benefits from Manufacturing*
24 *USA institutes once Federal funding has been discon-*
25 *tinued” after “Program”.*

1 (d) *MODIFICATION OF FUNCTIONS OF NATIONAL PRO-*
2 *GRAM OFFICE TO INCLUDE DEVELOPMENT OF INDUSTRY*
3 *CREDENTIALS.*—Subparagraph (J) of section 34(h)(2) of
4 *the National Institute of Standards and Technology Act (15*
5 *U.S.C. 278s(h)(2)) is amended by inserting “, including the*
6 *development of industry credentials” after “activities”.*

7 (e) *ADVICE FROM THE UNITED STATES MANUFAC-*
8 *TURING COUNCIL.*—The Secretary shall seek advice from the
9 *United States Manufacturing Council of the International*
10 *Trade Administration of the Department of Commerce on*
11 *matters concerning investment in and support of the manu-*
12 *facturing workforce within the Manufacturing USA Pro-*
13 *gram.*

14 ***TITLE III—NATIONAL SCIENCE***
15 ***FOUNDATION FOR THE FUTURE***

16 ***Subtitle A—Preliminary Matters***

17 ***SEC. 10301. SENSE OF CONGRESS.***

18 *It is the sense of Congress that—*

19 (1) *the National Science Foundation, the De-*
20 *partment of Energy and its National Laboratories,*
21 *and other key Federal agencies have carried out vital*
22 *work supporting basic and applied research to create*
23 *knowledge that is a key driver of the economy of the*
24 *United States and a critical component of national*
25 *security;*

1 (2) *openness to diverse perspectives and a focus*
2 *on freedom from censorship and political bias will*
3 *continue to make educational and research institu-*
4 *tions in the United States beacons to thousands of*
5 *students from across the world;*

6 (3) *increasing research and technology transfer*
7 *investments, building regional capacity and reducing*
8 *geographic disparity, strengthening supply chains,*
9 *and increasing capabilities in key technology focus*
10 *areas will enhance the competitive advantage and*
11 *leadership of the United States in the global economy;*

12 (4) *the Federal Government must utilize the full*
13 *talent and potential of the entire Nation by avoiding*
14 *undue geographic concentration of research and*
15 *STEM education funding, encouraging broader par-*
16 *ticipation of populations underrepresented in STEM,*
17 *and collaborating with nongovernment partners to en-*
18 *sure the leadership of the United States in techno-*
19 *logical innovation; and*

20 (5) *authorization and funding for investments in*
21 *research, education, technology transfer, intellectual*
22 *property, manufacturing, and other core strengths of*
23 *the United States innovation ecosystem, including at*
24 *the National Science Foundation and the Department*
25 *of Energy, should be done on a bipartisan basis.*

1 **SEC. 10302. DEFINITIONS.**

2 *In this title:*

3 (1) *BOARD.*—*The term “Board” means the Na-*
4 *tional Science Board.*

5 (2) *DIRECTOR.*—*The term “Director” means the*
6 *Director of the National Science Foundation.*

7 (3) *NSF INCLUDES.*—*The term “NSF IN-*
8 *CLUDES” means the initiative carried out under*
9 *section 10323.*

10 (4) *STEM ECOSYSTEM.*—*The term “STEM eco-*
11 *system” means a local, regional, or statewide network,*
12 *consortium, or multi-sector partnership, which may*
13 *be led or co-led by a nonprofit organizational entity,*
14 *that is operating in the United States with the goal*
15 *of supporting participation in STEM study, activi-*
16 *ties, and career pathways as defined in the CoSTEM*
17 *Annual Progress Report of 2020 with a broad range*
18 *of non-Federal partners.*

19 **SEC. 10303. AUTHORIZATION OF APPROPRIATIONS.**

20 (a) *FISCAL YEAR 2023.*—

21 (1) *IN GENERAL.*—*There are authorized to be ap-*
22 *propriated to the Foundation \$11,897,480,000 for fis-*
23 *cal year 2023.*

24 (2) *SPECIFIC ALLOCATIONS.*—*Of the amount au-*
25 *thorized under paragraph (1)—*

1 (A) \$9,050,000,000 is authorized to be ap-
2 propriated to carry out research and related ac-
3 tivities, of which—

4 (i) \$55,000,000 is authorized to be ap-
5 propriated for the Mid-Scale Research In-
6 frastructure Program; and

7 (ii) \$1,500,000,000 is authorized to be
8 appropriated for the Directorate for Tech-
9 nology, Innovation, and Partnerships;

10 (B) \$1,950,000,000 is authorized to be ap-
11 propriated for STEM education, of which—

12 (i) \$73,700,000 is authorized to be ap-
13 propriated for the Robert Noyce Teacher
14 Scholarship Program;

15 (ii) \$59,500,000 is authorized to be ap-
16 propriated for the NSF Research
17 Traineeship Program;

18 (iii) \$416,300,000 is authorized to be
19 appropriated for the Graduate Research
20 Fellowship Program;

21 (iv) \$70,000,000 is authorized to be
22 appropriated for the Cybercorps Scholarship
23 for Service Program; and

1 (v) \$350,000,000 is authorized to be
2 appropriated for fellowships, traineeships,
3 and scholarships described in section 10393;

4 (C) \$249,000,000 is authorized to be appro-
5 priated for major research equipment and facili-
6 ties construction, of which \$76,250,000 is author-
7 ized to be appropriated for the Mid-Scale Re-
8 search Infrastructure Program;

9 (D) \$620,000,000 is authorized to be appro-
10 priated for agency operations and award man-
11 agement;

12 (E) \$5,090,000 is authorized to be appro-
13 priated for the Office of the National Science
14 Board; and

15 (F) \$23,390,000 is authorized to be appro-
16 priated for the Office of the Inspector General.

17 (b) FISCAL YEAR 2024.—

18 (1) IN GENERAL.—There are authorized to be ap-
19 propriated to the Foundation \$15,646,930,000 for fis-
20 cal year 2024.

21 (2) SPECIFIC ALLOCATIONS.—Of the amount au-
22 thorized under paragraph (1)—

23 (A) \$12,050,000,000 is authorized to be ap-
24 propriated to carry out research and related ac-
25 tivities, of which—

1 (i) \$60,000,000 is authorized to be ap-
2 propriated for the Mid-Scale Research In-
3 frastructure Program; and

4 (ii) \$3,350,000,000 is authorized to be
5 appropriated for the Directorate for Tech-
6 nology, Innovation, and Partnerships;

7 (B) \$2,500,000,000 is authorized to be ap-
8 propriated for STEM education, of which—

9 (i) \$80,400,000 is authorized to be ap-
10 propriated for the Robert Noyce Teacher
11 Scholarship Program;

12 (ii) \$64,910,000 is authorized to be ap-
13 propriated for the NSF Research
14 Traineeship Program;

15 (iii) \$454,140,000 is authorized to be
16 appropriated for the Graduate Research
17 Fellowship Program;

18 (iv) \$72,000,000 is authorized to be
19 appropriated for the Cybercorps Scholarship
20 for Service Program; and

21 (v) \$800,000,000 is authorized to be
22 appropriated for fellowships, traineeships,
23 and scholarships described in section 10393;

24 (C) \$355,000,000 is authorized to be appro-
25 priated for major research equipment and facili-

1 *ties construction, of which \$80,000,000 is author-*
2 *ized to be appropriated for the Mid-Scale Re-*
3 *search Infrastructure Program;*

4 *(D) \$710,000,000 is authorized to be appro-*
5 *priated for agency operations and award man-*
6 *agement;*

7 *(E) \$5,320,000 is authorized to be appro-*
8 *priated for the Office of the National Science*
9 *Board; and*

10 *(F) \$26,610,000 is authorized to be appro-*
11 *priated for the Office of the Inspector General.*

12 *(c) FISCAL YEAR 2025.—*

13 *(1) IN GENERAL.—There are authorized to be ap-*
14 *propriated to the Foundation \$16,706,670,000 for fis-*
15 *cal year 2025.*

16 *(2) SPECIFIC ALLOCATIONS.—Of the amount au-*
17 *thorized under paragraph (1)—*

18 *(A) \$12,850,000,000 is authorized to be ap-*
19 *propriated to carry out research and related ac-*
20 *tivities, of which—*

21 *(i) \$70,000,000 is authorized to be ap-*
22 *propriated for the Mid-Scale Research In-*
23 *frastructure Program; and*

1 (ii) \$3,550,000,000 is authorized to be
2 appropriated for the Directorate for Tech-
3 nology, Innovation, and Partnerships;

4 (B) \$2,700,000,000 is authorized to be ap-
5 propriated for STEM education, of which—

6 (i) \$87,100,000 is authorized to be ap-
7 propriated for the Robert Noyce Teacher
8 Scholarship Program;

9 (ii) \$70,320,000 is authorized to be ap-
10 propriated for the NSF Research
11 Traineeship Program;

12 (iii) \$491,990,000 is authorized to be
13 appropriated for the Graduate Research
14 Fellowship Program;

15 (iv) \$78,000,000 is authorized to be
16 appropriated for the Cybercorps Scholarship
17 for Service Program; and

18 (v) \$900,000,000 is authorized to be
19 appropriated for fellowships, traineeships,
20 and scholarships described in section 10393;

21 (C) \$370,000,000 is authorized to be appro-
22 priated for major research equipment and facili-
23 ties construction, of which \$85,000,000 is author-
24 ized to be appropriated for the Mid-Scale Re-
25 search Infrastructure Program;

1 (D) \$750,000,000 is authorized to be appro-
2 priated for agency operations and award man-
3 agement;

4 (E) \$5,560,000 is authorized to be appro-
5 priated for the Office of the National Science
6 Board; and

7 (F) \$31,110,000 is authorized to be appro-
8 priated for the Office of the Inspector General.

9 (d) FISCAL YEAR 2026.—

10 (1) IN GENERAL.—There are authorized to be ap-
11 propriated to the Foundation \$17,832,420,000 for fis-
12 cal year 2026.

13 (2) SPECIFIC ALLOCATIONS.—Of the amount au-
14 thorized under paragraph (1)—

15 (A) \$13,800,000,000 is authorized to be ap-
16 propriated to carry out research and related ac-
17 tivities, of which—

18 (i) \$75,000,000 is authorized to be ap-
19 propriated for the Mid-Scale Research In-
20 frastructure Program; and

21 (ii) \$3,800,000,000 is authorized to be
22 appropriated for the Directorate for Tech-
23 nology, Innovation, and Partnerships;

24 (B) \$2,850,000,000 is authorized to be ap-
25 propriated for STEM education, of which—

1 (i) \$93,800,000 is authorized to be ap-
2 propriated for the Robert Noyce Teacher
3 Scholarship Program;

4 (ii) \$75,730,000 is authorized to be ap-
5 propriated for the NSF Research
6 Traineeship Program;

7 (iii) \$529,830,000 is authorized to be
8 appropriated for the Graduate Research
9 Fellowship Program;

10 (iv) \$84,000,000 is authorized to be
11 appropriated for the Cybercorps Scholarship
12 for Service Program; and

13 (v) \$950,000,000 is authorized to be
14 appropriated for fellowships, traineeships,
15 and scholarships described in section 10393;

16 (C) \$372,000,000 is authorized to be appro-
17 priated for major research equipment and facili-
18 ties construction, of which \$90,000,000 is author-
19 ized to be appropriated for the Mid-Scale Re-
20 search Infrastructure Program;

21 (D) \$770,000,000 is authorized to be appro-
22 priated for agency operations and award man-
23 agement;

1 (E) \$5,810,000 is authorized to be appro-
2 priated for the Office of the National Science
3 Board; and

4 (F) \$34,610,000 is authorized to be appro-
5 priated for the Office of the Inspector General.

6 (e) FISCAL YEAR 2027.—

7 (1) IN GENERAL.—There are authorized to be ap-
8 propriated to the Foundation \$18,919,180,000 for fis-
9 cal year 2027.

10 (2) SPECIFIC ALLOCATIONS.—Of the amount au-
11 thorized under paragraph (1)—

12 (A) \$14,700,000,000 is authorized to be ap-
13 propriated to carry out research and related ac-
14 tivities, of which—

15 (i) \$80,000,000 is authorized to be ap-
16 propriated for the Mid-Scale Research In-
17 frastructure Program; and

18 (ii) \$4,100,000,000 is authorized to be
19 appropriated for the Directorate for Tech-
20 nology, Innovation, and Partnerships;

21 (B) \$3,000,000,000 is authorized to be ap-
22 propriated for STEM education, of which—

23 (i) \$100,500,000 is authorized to be
24 appropriated for the Robert Noyce Teacher
25 Scholarship Program;

1 (ii) \$81,140,000 is authorized to be ap-
2 propriated for the NSF Research
3 Traineeship Program;

4 (iii) \$567,680,000 is authorized to be
5 appropriated for the Graduate Research
6 Fellowship Program;

7 (iv) \$90,000,000 is authorized to be
8 appropriated for the Cybercorps Scholarship
9 for Service Program; and

10 (v) \$1,000,000,000 is authorized to be
11 appropriated for fellowships, traineeships,
12 and scholarships described in section 10393;

13 (C) \$375,000,000 is authorized to be appro-
14 priated for major research equipment and facili-
15 ties construction, of which \$100,000,000 is au-
16 thorized to be appropriated for the Mid-Scale Re-
17 search Infrastructure Program;

18 (D) \$800,000,000 is authorized to be appro-
19 priated for agency operations and award man-
20 agement;

21 (E) \$6,070,000 is authorized to be appro-
22 priated for the Office of the National Science
23 Board; and

24 (F) \$38,110,000 is authorized to be appro-
25 priated for the Office of the Inspector General.

1 **Subtitle B—STEM Education**

2 **SEC. 10311. PREK–12 STEM EDUCATION.**

3 (a) *NATIONAL ACADEMIES STUDY.*—Not later than
4 120 days after the date of enactment of this Act, the Direc-
5 tor shall enter into an agreement with the National Acad-
6 emies to conduct a study to—

7 (1) *review the research literature and identify re-*
8 *search gaps regarding the interconnected factors that*
9 *foster and hinder successful implementation of prom-*
10 *ising, evidence-based PreK–12 STEM education inno-*
11 *vations at the local, regional, and national level;*

12 (2) *present a compendium of promising, evi-*
13 *dence-based PreK–12 STEM education practices,*
14 *models, programs, and technologies;*

15 (3) *identify barriers to widespread and sustained*
16 *implementation of such innovations; and*

17 (4) *make recommendations to the Foundation,*
18 *the Department of Education, the National Science*
19 *and Technology Council’s Committee on Science,*
20 *Technology, Engineering, and Mathematics Edu-*
21 *cation, State and local educational agencies, and*
22 *other relevant stakeholders on measures to address*
23 *such barriers.*

24 (b) *SUPPORTING PREK–12 INFORMAL STEM OPPOR-*
25 *TUNITIES.*—Section 3 of the *STEM Education Act of 2015*

1 *(42 U.S.C. 1862q) is amended by adding at the end the*
2 *following:*

3 *“(c) PreK–12 INFORMAL STEM.—*

4 *“(1) IN GENERAL.—The Director of the National*
5 *Science Foundation shall make awards, through exist-*
6 *ing programs where appropriate to institutions of*
7 *higher education and nonprofit organizations (or con-*
8 *sortia of such intuitions or organizations) on a merit-*
9 *reviewed, competitive basis for research on effective*
10 *approaches to engaging students in PreK–12, includ-*
11 *ing students from groups historically underrep-*
12 *resented in STEM and rural students.*

13 *“(2) PURPOSES.—The purposes of this subsection*
14 *are to—*

15 *“(A) provide effective, compelling, and en-*
16 *gaging means for teaching and reinforcing fun-*
17 *damental STEM concepts to PreK–12 students;*

18 *“(B) expand the STEM workforce pipeline*
19 *by increasing the number of youth in the United*
20 *States exposed to STEM from an early age and*
21 *encourage them to pursue careers in STEM-re-*
22 *lated fields; and*

23 *“(C) broaden participation of groups his-*
24 *torically underrepresented in STEM and rural*
25 *students, in the STEM workforce.*

1 “(3) *USE OF FUNDS.*—

2 “(A) *IN GENERAL.*—*Awards made under*
3 *this subsection shall support research and devel-*
4 *opment on innovative before-school, after-school,*
5 *out-of-school, or summer activities that are de-*
6 *signed to encourage interest, engagement, and*
7 *skills development in STEM, including for stu-*
8 *dents from groups historically underrepresented*
9 *in STEM and rural students.*

10 “(B) *PERMITTED ACTIVITIES.*—*The research*
11 *and development activities described in subpara-*
12 *graph (A) may include—*

13 “(i) *the provision of programming de-*
14 *scribed in such subparagraph for the pur-*
15 *pose of research described in such subpara-*
16 *graph;*

17 “(ii) *the use of a variety of engagement*
18 *methods, including cooperative and hands-*
19 *on learning;*

20 “(iii) *exposure of students to role mod-*
21 *els in the fields of STEM and near-peer*
22 *mentors;*

23 “(iv) *training of informal learning*
24 *educators, youth-serving professionals, and*
25 *volunteers who lead informal STEM pro-*

1 *grams in using evidence-based methods con-*
2 *sistent with the target student population*
3 *being served;*

4 “(v) *education of students on the rel-*
5 *evance and significance of STEM careers,*
6 *provision of academic advice and assist-*
7 *ance, and activities designed to help stu-*
8 *dents make real-world connections to STEM*
9 *content;*

10 “(vi) *the preparation of students to at-*
11 *tend events, competitions, and academic*
12 *programs that provide content expertise and*
13 *encourage career exposure in STEM, which*
14 *may include the purchase of parts and sup-*
15 *plies needed to prepare for participation in*
16 *such competitions;*

17 “(vii) *activities designed to engage*
18 *parents and families of students in PreK–*
19 *12 in STEM;*

20 “(viii) *innovative strategies to engage*
21 *students, such as using leadership skills and*
22 *outcome measures to impart youth with the*
23 *confidence to pursue STEM coursework and*
24 *academic study;*

1 “(ix) coordination with STEM-rich en-
2 vironments, including other nonprofit, non-
3 governmental organizations, out-of- class-
4 room settings, institutions of higher edu-
5 cation, vocational facilities, corporations,
6 museums, or science centers; and

7 “(x) the acquisition of instructional
8 materials or technology-based tools to con-
9 duct applicable award activity.

10 “(4) APPLICATION.—An applicant seeking fund-
11 ing under this subsection shall submit an application
12 at such time, in such manner, and containing such
13 information as may be required by the Director. Ap-
14 plications that include or partner with a nonprofit,
15 nongovernmental organization that has extensive ex-
16 perience and expertise in increasing the participation
17 of students in PreK–12 in STEM are encouraged. At
18 a minimum, the application shall include the fol-
19 lowing:

20 “(A) A description of the target audience to
21 be served by the research activity or activities for
22 which such funding is sought.

23 “(B) A description of the process for re-
24 cruitment and selection of students to participate
25 in such activities.

1 “(C) A description of how such activity or
2 activities may inform programming that engages
3 students in PreK–12 in STEM.

4 “(D) A description of how such activity or
5 activities may inform programming that pro-
6 motes student academic achievement in STEM.

7 “(E) An evaluation plan that includes, at a
8 minimum, the use of outcome-oriented measures
9 to determine the impact and efficacy of program-
10 ming being researched.

11 “(5) EVALUATIONS.—Each recipient of an award
12 under this subsection shall provide, at the conclusion
13 of every year during which the award funds are re-
14 ceived, a report in a form prescribed by the Director.

15 “(6) ENCOURAGE APPLICATIONS.—In making
16 awards under this subsection, the Director shall en-
17 courage applications which, for the purpose of the ac-
18 tivity or activities funded through the award, are
19 from or include eligible nonprofit programs serving
20 students that attend elementary schools or secondary
21 schools (including high schools) that—

22 “(A) are implementing comprehensive sup-
23 port and improvement activities or targeted sup-
24 port and improvement activities under para-
25 graph (1) or (2) of section 1111(d) of the Ele-

1 *mentary and Secondary Education Act of 1965*
2 *(20 U.S.C. 6311(d)); or*

3 “(B) *serve high percentages of students who*
4 *are eligible for a free or reduced-price lunch*
5 *under the Richard B. Russell National School*
6 *Lunch Act (42 U.S.C. 1751 et seq.) (which, in*
7 *the case of a high school, may be calculated using*
8 *comparable data from the schools that feed into*
9 *the high school).*

10 “(7) *ACCOUNTABILITY AND DISSEMINATION.—*

11 “(A) *EVALUATION REQUIRED.—The Direc-*
12 *tor shall evaluate the activities established under*
13 *this subsection. Such evaluation shall—*

14 “(i) *use a common set of benchmarks*
15 *and tools to assess the results of research*
16 *conducted under such awards; and*

17 “(ii) *to the extent practicable, integrate*
18 *the findings of the research resulting from*
19 *the activity or activities funded through the*
20 *award with the current research on serving*
21 *students with respect to the pursuit of de-*
22 *grees or careers in STEM, including under-*
23 *represented and rural students, in PreK–12.*

24 “(B) *REPORT ON EVALUATIONS.—Not later*
25 *than 180 days after the completion of the evalua-*

1 *tion under subparagraph (A), the Director shall*
2 *submit to Congress and make widely available to*
3 *the public a report that includes—*

4 *“(i) the results of the evaluation; and*
5 *“(ii) any recommendations for admin-*
6 *istrative and legislative action that could*
7 *optimize the effectiveness of the program*
8 *under this subsection.*

9 *“(8) COORDINATION.—In carrying out this sub-*
10 *section, the Director shall, for purposes of enhancing*
11 *program effectiveness and avoiding duplication of ac-*
12 *tivities, consult, and coordinate with other relevant*
13 *Federal agencies.”.*

14 *(c) [LOG 907 S2522] NATIONAL STEM TEACHER*
15 *CORPS PILOT.—*

16 *(1) PURPOSE.—It is the purpose of this sub-*
17 *section to elevate the profession of STEM teaching by*
18 *establishing a National STEM Teacher Corps pilot*
19 *program to recognize outstanding STEM teachers in*
20 *our Nation’s classrooms, rewards them for their ac-*
21 *complishments, elevates their public profile, and cre-*
22 *ates rewarding career paths to which all STEM*
23 *teachers can aspire, both to prepare future STEM re-*
24 *searchers and to create a scientifically literate public.*

25 *(2) DEFINITIONS.—In this subsection:*

1 (A) *ADMINISTRATOR*.—The term “Adminis-
2 trator” means the Administrator of the National
3 STEM Teacher Corps.

4 (B) *ELIGIBLE ENTITY*.—The term “eligible
5 entity” means—

6 (i) an institution of higher education;

7 or

8 (ii) a consortium consisting of an in-
9 stitution of higher education and one or
10 more of the following:

11 (I) A State educational agency
12 (as defined in section 8101 of the Ele-
13 mentary and Secondary Education Act
14 of 1965 (20 U.S.C. 7801)).

15 (II) A local educational agency
16 (as defined in section 8101 of the Ele-
17 mentary and Secondary Education Act
18 of 1965 (20 U.S.C. 7801)).

19 (III) An education nonprofit As-
20 sociation.

21 (IV) A cross sector STEM organi-
22 zation.

23 (V) A private entity, including a
24 STEM-related business.

1 (C) *HIGH-NEED SCHOOL*.—The term “high-
2 need school” has the meaning given the term in
3 section 2211(b) of the Elementary and Sec-
4 ondary Education Act of 1965 (20 U.S.C.
5 6631(b)).

6 (D) *PROFESSIONAL DEVELOPMENT*.—The
7 term “professional Development” has the mean-
8 ing given the term in section 8101 of the Ele-
9 mentary and Secondary Education Act of 1965
10 (20 U.S.C. 7801).

11 (E) *CORPS ALLIANCE*.—The term “Corps
12 Alliance” means a regionally or topically based
13 award under this subsection.

14 (F) *NATIONAL STEM TEACHER CORPS ADVI-*
15 *SORY BOARD*.—The term “National STEM
16 Teacher Corps Advisory Board” means the Advi-
17 sory Board for the National STEM Teacher
18 Corps established under paragraph (5).

19 (3) *ESTABLISHMENT OF NATIONAL STEM TEACH-*
20 *ER CORPS*.—The Director may, subject to the avail-
21 ability of appropriations, establish within the Foun-
22 dation, a National STEM Teacher Corps 10-year
23 pilot program to be administered by the Adminis-
24 trator, who shall be appointed by the Director. As ap-

1 *appropriate, the Director may use existing NSF pro-*
2 *grams to establish and execute this program.*

3 (4) *DUTIES OF THE ADMINISTRATOR.—The Ad-*
4 *ministrator shall—*

5 (A) *create a process and standards for selec-*
6 *tion of eligible applicants to become members of*
7 *the National STEM Teacher Corps, including—*

8 (i) *uniform selection criteria that in-*
9 *cludes—*

10 (I) *deep knowledge of STEM con-*
11 *tent and pedagogy;*

12 (II) *a passion for STEM subjects*
13 *and dedication to teaching, evidence of*
14 *leadership skills, and potential for con-*
15 *tinued career growth as an educator;*
16 *and*

17 (III) *demonstrated experience in-*
18 *creasing STEM student achievement*
19 *and STEM participation rates for all*
20 *students, particularly those from rural*
21 *and high-need schools; and*

22 (ii) *a uniform selection process, includ-*
23 *ing a comprehensive application that in-*
24 *cludes recommendations and other relevant*
25 *professional information;*

1 (B) promote the National STEM Teacher
2 Corps and elevate best practices that emerge from
3 the National STEM Teacher Corps to a national
4 audience;

5 (C) evaluate the operation and effectiveness
6 of the Corps alliances; and

7 (D) evaluate the overall and long-term im-
8 pact of the National STEM Teacher Corps by—

9 (i) documenting, monitoring, and as-
10 ssuming the program outcomes or impact on
11 the STEM careers of participants; and

12 (ii) documenting, monitoring, and as-
13 ssuming the program outcomes for the STEM
14 education profession nationwide, particu-
15 larly for rural and high-need schools.

16 (5) NATIONAL STEM TEACHER CORPS ADVISORY
17 BOARD.—

18 (A) ESTABLISHMENT.—There is established
19 a National STEM Teacher Corps Advisory
20 Board to advise the Director on matters per-
21 taining to the National STEM Teacher Corps for
22 the length of the pilot program.

23 (B) COMPOSITION.—

1 (i) *IN GENERAL.*—*The membership of*
2 *the National STEM Teacher Corps Advi-*
3 *sory Board shall—*

4 (I) *be appointed by the Director;*

5 (II) *include a representative from*
6 *each of the following: School leaders,*
7 *STEM researchers, STEM education*
8 *researchers, Business leaders, PreK–12*
9 *STEM educators, and Students pur-*
10 *suing a postsecondary STEM degree;*
11 *and*

12 (III) *be geographically diverse.*

13 (ii) *EXISTING COMMITTEE.*—*The Di-*
14 *rector may assign the duties of the National*
15 *STEM Teacher Corps Advisory Board to*
16 *another advisory committee of the Founda-*
17 *tion.*

18 (6) *DUTIES OF THE CORPS ALLIANCES.*—*Subject*
19 *to the availability of appropriated funds, the Admin-*
20 *istrator may make awards on a competitive, merit-re-*
21 *view basis, to establish Corps alliances at eligible en-*
22 *tities. Activities carried out by such alliances shall in-*
23 *clude—*

24 (A) *engaging local partners, which may in-*
25 *clude local educational agencies, institutions of*

1 *higher education, STEM organizations, or edu-*
2 *cation nonprofit organizations, to—*

3 *(i) develop and serve the community of*
4 *National STEM Teacher Corps members*
5 *within the region or topic area, in coordi-*
6 *nation with local partners to carry out day-*
7 *to-day activities;*

8 *(ii) coordinate professional develop-*
9 *ment activities, including activities led by*
10 *National STEM Teacher Corps members;*

11 *(iii) connect National STEM Teacher*
12 *Corps members with existing educator pro-*
13 *fessional development programs and coordi-*
14 *nate members' involvement as cooperating*
15 *teachers or mentors;*

16 *(iv) seek opportunities to involve teach-*
17 *ers who are not members of the National*
18 *STEM Teacher Corps to participate in Na-*
19 *tional STEM Teacher Corps activities; and*

20 *(v) build partnerships with existing*
21 *education organizations and other efforts by*
22 *State educational agencies and local edu-*
23 *cational agencies that operate programs rel-*
24 *evant to the National STEM Teacher Corps*
25 *and its activities;*

1 (B) recruiting eligible applicants, with a
2 focus on recruiting diverse STEM educators to
3 advance equity based on race, ethnicity, sex, so-
4 cioeconomic status, age, disability status, geog-
5 raphy, and language ability;

6 (C) screening, interviewing, and selecting
7 members of the National STEM Teacher Corps
8 using procedures and standards provided by the
9 Administrator;

10 (D) coordinating the online network that
11 supports all National STEM Teacher Corps
12 members in the region or topic area;

13 (E) convening occasional meetings of Na-
14 tional STEM Teacher Corps members in a re-
15 gion or topic area;

16 (F) creating opportunities for the profes-
17 sional growth of National STEM Teacher Corps
18 members, with a focus on increasing STEM stu-
19 dent achievement and STEM participation rates
20 for all students, particularly those from rural
21 and high-need schools; and

22 (G) supporting the retention and success of
23 National STEM Teacher Corps members in the
24 region or topic area.

1 (7) *DUTIES OF MEMBERS OF THE NATIONAL*
2 *STEM TEACHER CORPS.—An applicant that is selected*
3 *by a Corps alliance to be a member of the National*
4 *STEM Teacher Corps shall—*

5 (A) *serve a 4-year term with a possibility*
6 *of reappointment;*

7 (B) *receive an annual stipend in an*
8 *amount not less than \$10,000; and*

9 (C) *have substantial responsibilities, includ-*
10 *ing—*

11 (i) *working with other members of the*
12 *National STEM Teacher Corps to develop*
13 *and improve innovative teaching practices,*
14 *including practices such as inquiry-based*
15 *learning;*

16 (ii) *participating in professional devel-*
17 *opment in innovative teaching methodology*
18 *and mentorship; and*

19 (iii) *continuing to excel in teaching the*
20 *member's own students, with a focus on ad-*
21 *vancing equity by spending additional time*
22 *teaching and coaching underserved students*
23 *to increase STEM student achievement and*
24 *STEM participation rates for students from*
25 *rural and high-need schools.*

1 (8) *EVALUATION.*—*The Director, acting through*
2 *the Administrator, shall submit a report to Congress*
3 *after the third year of the pilot program that in-*
4 *cludes—*

5 (A) *an assessment, drawing on the evalua-*
6 *tions the Administrator shall conduct under sub-*
7 *paragraphs (C) and (D) of paragraph (4), and*
8 *other sources of information, of the effectiveness*
9 *of the pilot program in recruiting and retaining*
10 *high-quality STEM teachers in the selected re-*
11 *gions or topic areas, particularly in high-need*
12 *and rural schools; and*

13 (B) *if deemed effective, a proposal to Con-*
14 *gress for permanent implementation of the pilot*
15 *program.*

16 (9) *SUNSET.*—*The authority to carry out this*
17 *subsection shall terminate on the date that is 15 years*
18 *after the date of enactment of this Act.*

19 (10) *AUTHORIZATION OF APPROPRIATIONS.*—
20 *There are authorized to be appropriated \$60,000,000*
21 *for each of fiscal years 2023 through 2032 to carry*
22 *out this subsection.*

23 **SEC. 10312. UNDERGRADUATE STEM EDUCATION.**

24 (a) *RESEARCH ON STEM EDUCATION AND WORKFORCE*
25 *NEEDS.*—*The Director shall make awards, on a competitive*

1 *basis, to four-year institutions of higher education or non-*
2 *profit organizations (or consortia of such institutions or or-*
3 *ganizations) to support research and development activities*
4 *to—*

5 (1) *encourage greater collaboration and coordi-*
6 *nation between institutions of higher education and*
7 *industry to enhance education, foster hands-on learn*
8 *experiences, and improve alignment with workforce*
9 *needs;*

10 (2) *understand the current composition of the*
11 *STEM workforce and the factors that influence*
12 *growth, retention, and development of that workforce;*

13 (3) *increase the size, diversity, capability, and*
14 *flexibility of the STEM workforce; and*

15 (4) *increase dissemination and widespread adop-*
16 *tion of effective practices in undergraduate education*
17 *and workforce development.*

18 (b) *ADVANCED TECHNOLOGICAL EDUCATION PROGRAM*
19 *UPDATE.—Section 3(b) of the Scientific and Advanced-*
20 *Technology Act of 1992 (42 U.S.C. 1862i(b)) is amended*
21 *to read as follows:*

22 “(b) *CENTERS OF SCIENTIFIC AND TECHNICAL EDU-*
23 *CATION.—*

24 “(1) *IN GENERAL.—The Director shall make*
25 *awards for the establishment of centers of excellence,*

1 *in advanced-technology fields, among associate-degree-*
2 *granting colleges. Centers shall meet one or both of the*
3 *following criteria:*

4 “(A) *Exceptional instructional programs in*
5 *advanced-technology fields.*

6 “(B) *Excellence in undergraduate STEM*
7 *education.*

8 “(2) *PURPOSES.—The centers shall serve as na-*
9 *tional and regional clearinghouses and models for the*
10 *benefit of both colleges and secondary schools, and*
11 *shall provide seminars and programs to disseminate*
12 *model curricula and model teaching methods and in-*
13 *structional materials to other associate-degree-grant-*
14 *ing colleges.*

15 “(3) *NETWORKS.—The centers may enter into*
16 *partnerships with other institutions of higher edu-*
17 *cation, nonprofit organizations, and stakeholder*
18 *groups, or a consortium thereof, to develop networks*
19 *to—*

20 “(A) *coordinate research, training, and edu-*
21 *cation activities funded by awards under sub-*
22 *section (a);*

23 “(B) *share information and best practices;*

24 *or*

1 “(C) promote collaboration between aca-
2 demic institutions, workforce development pro-
3 grams, labor organizations, and industry to com-
4 municate and meet workforce education and
5 training needs.”.

6 (c) *INNOVATIONS IN STEM EDUCATION AT COMMU-*
7 *NITY COLLEGES.*—

8 (1) *IN GENERAL.*—*The Director shall make*
9 *awards on a merit-reviewed, competitive basis to in-*
10 *stitutions of higher education or nonprofit organiza-*
11 *tions (or consortia of such institutions or organiza-*
12 *tions) to advance research on the nature of learning*
13 *and teaching at community colleges and to improve*
14 *outcomes for students who enter the workforce upon*
15 *completion of their STEM degree or credential or*
16 *transfer to 4-year institutions, including by—*

17 (A) *examining how to scale up successful*
18 *programs at community colleges that are im-*
19 *proving student outcomes in foundational STEM*
20 *courses;*

21 (B) *supporting research on effective STEM*
22 *teaching practices in community college settings;*

23 (C) *designing and developing new STEM*
24 *curricula;*

1 (D) providing STEM students with hands-
2 on training and research experiences, intern-
3 ships, and other experiential learning opportuni-
4 ties;

5 (E) increasing access to high quality STEM
6 education through new technologies;

7 (F) re-skilling or up-skilling incumbent
8 workers for new STEM jobs;

9 (G) building STEM career and seamless
10 transfer pathways; and

11 (H) developing novel mechanisms to iden-
12 tify and recruit talent into STEM programs, in
13 particular talent from groups historically under-
14 represented in STEM.

15 (2) PARTNERSHIPS.—In carrying out activities
16 under this subsection, the Director shall encourage ap-
17 plications to develop, enhance, or expand cooperative
18 STEM education and training partnerships between
19 institutions of higher education, industry, and labor
20 organizations.

21 (d) IMPROVING ACCESS TO STEM EDUCATION AT CA-
22 REER AND TECHNICAL EDUCATION INSTITUTIONS.—

23 (1) IN GENERAL.—The Director shall make
24 awards, on a competitive basis, to institutions of
25 higher education (including postsecondary vocational

1 *institutions) to support career and technical edu-*
2 *cation in STEM and computer science related fields.*

3 (2) *PRIORITY.—In making awards under this*
4 *subsection, the Director shall give priority to institu-*
5 *tions that demonstrate effective strategies to recruit*
6 *and provide career and technical education to vet-*
7 *erans and members of the Armed Forces transitioning*
8 *to the private sector workforce.*

9 (3) *CAREER AND TECHNICAL EDUCATION DE-*
10 *FINED.—In this subsection, the term “career and tech-*
11 *nical education” has the meaning given that term in*
12 *section 3 of the Carl D. Perkins Career and Technical*
13 *Education Act of 2006 (20 U.S.C. 2302).*

14 (e) *COURSE-BASED UNDERGRADUATE RESEARCH EX-*
15 *PERIENCES.—*

16 (1) *IN GENERAL.—The Director shall carry out*
17 *a 4-year pilot program under which the Director*
18 *shall make awards, on a competitive basis, to institu-*
19 *tions of higher education and nonprofit organizations*
20 *(or consortia of such institutions or organizations) to*
21 *establish a total of not fewer than five Centers to de-*
22 *velop and scale up successful models for providing un-*
23 *dergraduate students with hands-on, course-based re-*
24 *search experiences.*

1 (2) *USE OF FUNDS.*—Awards made under this
2 paragraph shall be used to—

3 (A) *develop, assess, and disseminate models*
4 *for providing undergraduate students with*
5 *course-based research experiences across STEM*
6 *disciplines and education levels;*

7 (B) *identify and address opportunities and*
8 *challenges in facilitating implementation across*
9 *a broad range of institution types, including his-*
10 *torically Black colleges and universities, Tribal*
11 *Colleges or Universities, minority serving insti-*
12 *tutions and community colleges;*

13 (C) *identify and develop best practices to*
14 *address barriers for faculty, including institu-*
15 *tional culture, resources, and incentive struc-*
16 *tures;*

17 (D) *identify and address factors that may*
18 *facilitate or discourage participation by students*
19 *from all backgrounds;*

20 (E) *provide faculty with curriculum, profes-*
21 *sional development, training, networking oppor-*
22 *tunities, and other support to enable the develop-*
23 *ment, adaptation, or expansion of a course-based*
24 *research experience; and*

1 (F) collect data and carry out research to
2 evaluate the impacts of course- based under-
3 graduate research experiences on the STEM
4 workforce.

5 (3) *PARTNERSHIPS.*—In making awards under
6 this paragraph, the Director shall consider the extent
7 to which the proposed Center will establish partner-
8 ships among multiple types of academic institutions,
9 including community colleges, emerging research in-
10 stitutions, EPSCoR institutions, historically Black
11 colleges and universities, Tribal Colleges or Univer-
12 sities, and minority-serving institutions, the private
13 sector, and other relevant stakeholders in supporting
14 programs and activities to facilitate faculty training
15 and the widespread and sustained implementation of
16 promising, evidence-based practices, models, pro-
17 grams, and curriculum.

18 (4) *REPORT.*—Not later than 180 days after the
19 date on which the pilot program is completed, the Di-
20 rector shall submit to Congress a report that in-
21 cludes—

22 (A) an assessment, that includes feedback
23 from the research community, of the effectiveness
24 of the pilot program in increasing the number,

1 *diversity, and workforce readiness of STEM*
2 *graduates; and*

3 *(B) if determined to be effective, a plan for*
4 *permanent implementation of the pilot program.*

5 (f) *ADVANCED TECHNOLOGICAL MANUFACTURING*
6 *ACT.—*

7 (1) *FINDINGS AND PURPOSE.—Section 2 of the*
8 *Scientific and Advanced-Technology Act of 1992 (42*
9 *U.S.C. 1862h) is amended—*

10 *(A) in subsection (a)—*

11 *(i) in paragraph (3), by striking*
12 *“science, mathematics, and technology” and*
13 *inserting “science, technology, engineering,*
14 *and mathematics or STEM”;*

15 *(ii) in paragraph (4), by inserting*
16 *“educated” and before “trained”; and*

17 *(iii) in paragraph (5), by striking*
18 *“scientific and technical education and*
19 *training” and inserting “STEM education*
20 *and training”; and*

21 *(B) in subsection (b)—*

22 *(i) in paragraph (2), by striking*
23 *“mathematics and science” and inserting*
24 *“STEM fields”; and*

1 (ii) in paragraph (4), by striking
2 “mathematics and science instruction” and
3 inserting “STEM instruction”.

4 (2) *MODERNIZING REFERENCES TO STEM.*—Sec-
5 tion 3 of the Scientific and Advanced-Technology Act
6 of 1992 (42 U.S.C. 1862i) is amended—

7 (A) in the section heading, by striking
8 “**SCIENTIFIC AND TECHNICAL EDUCATION**”
9 and inserting “**STEM EDUCATION**”;

10 (B) in subsection (a)—

11 (i) in the subsection heading, by strik-
12 ing “**SCIENTIFIC AND TECHNICAL EDU-**
13 **CATION**” and inserting “**STEM EDU-**
14 **CATION**”;

15 (ii) in the matter preceding paragraph
16 (1)—

17 (I) by inserting “and education to
18 prepare the skilled technical workforce
19 to meet workforce demands” before “,
20 and to improve”;

21 (II) by striking “core education
22 courses in science and mathematics”
23 and inserting “core education courses
24 in STEM fields”;

1 (III) by inserting “veterans and
2 individuals engaged in” before “work
3 in the home”; and

4 (IV) by inserting “and on build-
5 ing a pathway from secondary schools
6 to associate-degree-granting institu-
7 tions, to careers that require technical
8 training” before “, and shall be de-
9 signed”;

10 (iii) in paragraph (1)—

11 (I) by inserting “and study” after
12 “development”; and

13 (II) by striking “core science and
14 mathematics courses” and inserting
15 “core STEM courses”;

16 (iv) in paragraph (2), by striking
17 “science, mathematics, and advanced-tech-
18 nology fields” and inserting “STEM and
19 advanced- technology fields”;

20 (v) in paragraph (3)(A), by inserting
21 “to support the advanced- technology indus-
22 tries that drive the competitiveness of the
23 United States in the global economy” before
24 the semicolon at the end;

1 (vi) in paragraph (4), by striking “sci-
2 entific and advanced- technology fields” and
3 inserting “STEM and advanced-technology
4 fields”; and

5 (vii) in paragraph (5), by striking
6 “advanced scientific and technical edu-
7 cation” and inserting “advanced STEM
8 and advanced- technology”;

9 (C) in subsection (c)—

10 (i) in paragraph (1)—

11 (I) in subparagraph (A)—

12 (aa) in the matter preceding
13 clause (i), by striking “to encour-
14 age” and all that follows through
15 “such means as—” and inserting
16 “to encourage the development of
17 career and educational pathways
18 with multiple entry and exit
19 points leading to credentials and
20 degrees, and to assist students
21 pursuing pathways in STEM
22 fields to transition from associate-
23 degree-granting colleges to
24 bachelor- degree-granting institu-
25 tions, through such means as—”;

1 (bb) in clause (i), by striking
2 “to ensure” and inserting “to de-
3 velop articulation agreements that
4 ensure”; and

5 (cc) in clause (ii), by strik-
6 ing “courses at the bachelor-de-
7 gree-granting institution” and in-
8 serting “the career and edu-
9 cational pathways supported by
10 the articulation agreements”;

11 (II) in subparagraph (B)—

12 (aa) in clause (i), by insert-
13 ing “veterans and individuals en-
14 gaged in” before “work in the
15 home”;

16 (bb) in clause (iii)—

17 (AA) by striking “bach-
18 elor’s-degree- granting insti-
19 tutions” and inserting “in-
20 stitutions or work sites”; and

21 (BB) by inserting “or
22 industry internships” after
23 “summer programs”; and

24 (cc) by striking the flush text
25 following clause (iv); and

1 (III) by striking subparagraph
2 (C);

3 (ii) in paragraph (2)—

4 (I) by striking “mathematics and
5 science programs” and inserting
6 “STEM programs”;

7 (II) by inserting “and, as appro-
8 priate, elementary schools,” after “with
9 secondary schools”;

10 (III) by striking “mathematics
11 and science education” and inserting
12 “STEM education”;

13 (IV) by striking “secondary school
14 students” and inserting “students at
15 these schools”;

16 (V) by striking “science and ad-
17 vanced-technology fields” and inserting
18 “STEM and advanced-technology
19 fields”; and

20 (VI) by striking “agreements with
21 local educational agencies” and insert-
22 ing “articulation agreements or dual
23 credit courses with local secondary
24 schools, or other means as the Director
25 determines appropriate,”; and

1 (iii) in paragraph (3)—

2 (I) by striking subparagraph (B);

3 (II) by striking “shall—” and all
4 that follows through “establish a” and
5 inserting “shall establish a”;

6 (III) by striking “the fields of
7 science, technology, engineering, and
8 mathematics” and inserting “STEM
9 fields”; and

10 (IV) by striking “; and” and in-
11 serting “, including jobs at Federal
12 and academic laboratories.”;

13 (D) in subsection (d)(2)—

14 (i) in subparagraph (D), by striking
15 “and” after the semicolon;

16 (ii) in subparagraph (E), by striking
17 the period at the end and inserting a “;
18 and”; and

19 (iii) by adding at the end the fol-
20 lowing:

21 “(F) as appropriate, applications that
22 apply the best practices for STEM education and
23 technical skills education through distance learn-
24 ing or in a simulated work environment, as de-

1 *terminated by research described in subsection (f);*
2 *and”;*

3 *(E) in subsection (g), by striking the second*
4 *sentence;*

5 *(F) in subsection (h)(1)—*

6 *(i) in subparagraph (A), by striking*
7 *“2022” and inserting “2026”;*

8 *(ii) in subparagraph (B), by striking*
9 *“2022” and inserting “2026”; and*

10 *(iii) in subparagraph (C)—*

11 *(I) by striking “up to \$2,500,000”*
12 *and inserting “not less than*
13 *\$3,000,000”; and*

14 *(II) by striking “2022” and in-*
15 *serting “2026”;*

16 *(G) in subsection (i)—*

17 *(i) by striking paragraph (3); and*

18 *(ii) by redesignating paragraphs (4)*
19 *and (5) as paragraphs (3) and (4), respec-*
20 *tively; and*

21 *(H) in subsection (j)—*

22 *(i) by striking paragraph (1) and in-*
23 *serting the following:*

24 *“(1) the term advanced-technology includes tech-*
25 *nological fields such as advanced manufacturing, ag-*

1 *ricultural-, biological- and chemical-technologies, en-*
2 *ergy and environmental technologies, engineering*
3 *technologies, information technologies, micro and*
4 *nano-technologies, cybersecurity technologies,*
5 *geospatial technologies, and new, emerging technology*
6 *areas;”;*

7 *(ii) in paragraph (4), by striking “sep-*
8 *arate bachelor-degree- granting institutions”*
9 *and inserting “other entities”;*

10 *(iii) by striking paragraph (7);*

11 *(iv) by redesignating paragraphs (8)*
12 *and (9) as paragraphs (7) and (8), respec-*
13 *tively;*

14 *(v) in paragraph (7), as redesignated*
15 *by clause (iv), by striking “and” after the*
16 *semicolon;*

17 *(vi) in paragraph (8), as redesignated*
18 *by clause (iv)—*

19 *(I) by striking “mathematics,*
20 *science, engineering, or technology”*
21 *and inserting “science, technology, en-*
22 *gineering, or mathematics”; and*

23 *(II) by striking the period at the*
24 *end and inserting “; and”; and*

1 (vii) by adding at the end the fol-
2 lowing:

3 “(9) the term skilled technical workforce has the
4 meaning given such term in section 4(b) of the Inno-
5 vations in Mentoring, Training, and Apprenticeships
6 Act (42 U.S.C. 1862p).”.

7 (3) *AUTHORIZATION OF APPROPRIATIONS.*—Sec-
8 tion 5 of the Scientific and Advanced-Technology Act
9 of 1992 (42 U.S.C. 1862j) is amended to read as fol-
10 lows:

11 **“SEC. 5. AUTHORIZATION OF APPROPRIATIONS.**

12 “*There are authorized to be appropriated to the Direc-*
13 *tor for carrying out sections 2 through 4 \$150,000,000 for*
14 *each of fiscal years 2023 through 2027.*”.

15 **SEC. 10313. GRADUATE STEM EDUCATION.**

16 (a) *MENTORING AND PROFESSIONAL DEVELOP-*
17 *MENT.*—

18 (1) *MENTORING PLANS.*—

19 (A) *UPDATE.*—Section 7008(a) of the Amer-
20 *ica Creating Opportunities to Meaningfully Pro-*
21 *mote Excellence in Technology, Education, and*
22 *Science Act (42 U.S.C. 1862o(a)) is amended*
23 *by—*

24 (i) inserting “and graduate student”
25 after “postdoctoral”; and

1 (ii) inserting “The requirement may be
2 satisfied by providing such individuals with
3 access to mentors, including individuals not
4 listed on the award.” after “review cri-
5 terion.”.

6 (B) *EVALUATION.*—Not later than 120 days
7 after the date of enactment of this Act, the Direc-
8 tor shall enter into an agreement with a quali-
9 fied independent organization to evaluate the ef-
10 fectiveness of the postdoctoral mentoring plan re-
11 quirement for improving mentoring for Founda-
12 tion-supported postdoctoral researchers.

13 (2) *CAREER EXPLORATION.*—

14 (A) *IN GENERAL.*—The Director shall make
15 awards, on a competitive basis, to institutions of
16 higher education and nonprofit organizations (or
17 consortia of such institutions or organizations)
18 to develop innovative approaches for facilitating
19 career exploration of academic and nonacademic
20 career options and for providing opportunity-
21 broadening experiences, including work-inte-
22 grated opportunities, for graduate students and
23 postdoctoral scholars that can then be considered,
24 adopted, or adapted by other institutions and to

1 *carry out research on the impact and outcomes*
2 *of such activities.*

3 *(B) REVIEW OF PROPOSALS.—In selecting*
4 *award recipients under this subparagraph, the*
5 *Director shall consider, at a minimum—*

6 *(i) the extent to which the administra-*
7 *tors of the institution are committed to*
8 *making the proposed activity a priority;*
9 *and*

10 *(ii) the likelihood that the institution*
11 *or organization will sustain or expand the*
12 *proposed activity effort beyond the period of*
13 *the award.*

14 *(3) DEVELOPMENT PLANS.—The Director shall*
15 *require that annual project reports for awards that*
16 *support graduate students and postdoctoral scholars*
17 *include certification by the principal investigator that*
18 *each graduate student and postdoctoral scholar receiv-*
19 *ing substantial support from such award, as deter-*
20 *mined by has developed and annually updated an in-*
21 *dividual development plan to map educational goals,*
22 *career exploration, and professional development.*

23 *(4) PROFESSIONAL DEVELOPMENT SUPPLE-*
24 *MENT.—The Director shall carry out a five-year pilot*
25 *initiative to award up to 2,500 administrative sup-*

1 plements of up to \$2,000 to existing research awards
2 annually, on a competitive basis, to support profes-
3 sional development experiences for graduate students
4 and postdoctoral researchers who receive a substantial
5 portion of their support under such award, as deter-
6 mined by the Director. Not more than 10 percent of
7 supplements awarded under this subparagraph may
8 be used to support professional development experi-
9 ences for postdoctoral researchers.

10 (5) *GRADUATE EDUCATION RESEARCH.*—The Di-
11 rector shall make awards, on a competitive basis, to
12 institutions of higher education or nonprofit organi-
13 zations (or consortia of such institutions or organiza-
14 tions) to support research on the graduate education
15 system and outcomes of various interventions and
16 policies, including—

17 (A) the effects of traineeships, fellowships,
18 internships, and teaching and research
19 assistantships on outcomes for graduate students;

20 (B) the effects of graduate education and
21 mentoring policies and procedures on degree
22 completion, including differences by—

23 (i) sex, race and ethnicity, and citizen-
24 ship; and

25 (ii) student debt load;

1 (C) the development and assessment of new
2 or adapted interventions, including approaches
3 that improve mentoring relationships, develop
4 conflict management skills, and promote healthy
5 research teams; and

6 (D) research, data collection, and assess-
7 ment of the state of graduate student mental
8 health and wellbeing, factors contributing to and
9 consequences of poor graduate student mental
10 health, and the development, adaptation, and as-
11 sessment of evidence-based strategies and policies
12 to support emotional wellbeing and mental
13 health.

14 (b) *GRADUATE RESEARCH FELLOWSHIP PROGRAM*
15 *UPDATE.*—

16 (1) *SENSE OF CONGRESS.*—*It is the sense of*
17 *Congress that the Foundation should increase the*
18 *number of new graduate research fellows supported*
19 *annually over the next 5 years to no fewer than 3,000*
20 *fellows.*

21 (2) *PROGRAM UPDATE.*—*Section 10 of the Na-*
22 *tional Science Foundation Act of 1950 (42 U.S.C.*
23 *1869) is amended—*

24 (A) in subsection (a), by inserting “and as
25 will address national workforce demand in crit-

1 *ical STEM fields” after “throughout the United*
2 *States”;*

3 *(B) in subsection (b), by striking “of*
4 *\$12,000” and inserting “of at least \$16,000”;*
5 *and*

6 *(C) by adding at the end the following:*

7 *“(c) OUTREACH.—The Director shall ensure program*
8 *outreach to recruit fellowship applicants from fields of*
9 *study that are in areas of critical national need from all*
10 *regions of the country, and from historically underrep-*
11 *resented populations in STEM.”.*

12 *(3) CYBERSECURITY SCHOLARSHIPS AND GRAD-*
13 *UATE FELLOWSHIPS.—The Director shall ensure that*
14 *students pursuing master’s degrees and doctoral de-*
15 *grees in fields relating to cybersecurity are eligible to*
16 *apply for scholarships and graduate fellowships under*
17 *the Graduate Research Fellowship Program under*
18 *section 10 of the National Science Foundation Act of*
19 *1950 (42 U.S.C. 1869).*

20 *(c) STUDY ON GRADUATE STUDENT FUNDING.—*

21 *(1) IN GENERAL.—Not later than 120 days after*
22 *the date of enactment of this Act, the Director shall*
23 *enter into an agreement with a qualified independent*
24 *organization to evaluate—*

1 (A) *the role of the Foundation in sup-*
2 *porting graduate student education and training*
3 *through fellowships, traineeships, and other fund-*
4 *ing models; and*

5 (B) *the impact of different funding mecha-*
6 *nisms on graduate student experiences and out-*
7 *comes, including whether such mechanisms have*
8 *differential impacts on subsets of the student*
9 *population.*

10 (2) *REPORT.—Not later than 1 year after the*
11 *date of enactment of this Act, the Director shall pub-*
12 *lish the results of the evaluation carried out under*
13 *paragraph (1), including a recommendation for the*
14 *appropriate balance between fellowships, traineeships,*
15 *and other funding models.*

16 (d) *[LOG 165 H10304(G)/S2208] AI SCHOLARSHIP-*
17 *FOR-SERVICE.—*

18 (1) *DEFINITION OF EXECUTIVE AGENCY.—In this*
19 *subsection, the term “executive agency” has the mean-*
20 *ing given the term “Executive agency” in section 105*
21 *of title 5, United States Code.*

22 (2) *AI SCHOLARSHIP-FOR-SERVICE INITIATIVE*
23 *REPORT.—Not later than 1 year after the date of en-*
24 *actment of this Act, the Director, in coordination*
25 *with the Office of Personnel Management, shall sub-*

1 *mit to the Committee on Commerce, Science, and*
2 *Transportation of the Senate, the Committee on*
3 *Science, Space, and Technology of the House of Rep-*
4 *resentatives, the Committee on Homeland Security*
5 *and Governmental Affairs of the Senate, and the*
6 *Committee on Oversight and Reform of the House of*
7 *Representatives a report on the need and feasibility,*
8 *and if appropriate, plans to implement a program to*
9 *recruit and train the next generation of artificial in-*
10 *telligence professionals to meet the needs of Federal,*
11 *State, local, and Tribal governments. The report shall*
12 *include—*

13 *(A) recent statistical data on the size, com-*
14 *position, and educational requirements of the*
15 *Federal AI workforce, including an assessment of*
16 *current and future demand for additional AI*
17 *professionals across the Federal Government;*

18 *(B) an assessment of the capacity of institu-*
19 *tions of higher education to produce graduates*
20 *with degrees, certifications, and relevant skills*
21 *related to artificial intelligence that meet the*
22 *current and future needs of the Federal work-*
23 *force; and*

24 *(C) an evaluation of the need for and feasi-*
25 *bility of establishing a scholarship-for-service*

1 *program to recruit and train the next generation*
2 *of artificial intelligence professionals to meet the*
3 *needs of Federal, State, local, and Tribal govern-*
4 *ments, including opportunities for leveraging ex-*
5 *isting processes and resources for administering*
6 *the Federal Cyber Scholarship-for-Service Pro-*
7 *gram established under section 302 of the Cyber-*
8 *security Enhancement Act of 2014 (15 U.S.C.*
9 *7442) in standing up such a program.*

10 (3) *PROGRAM ESTABLISHMENT.*—Upon submit-
11 *ting the report required in paragraph (2), the Direc-*
12 *tor, in coordination with the Director of the Office of*
13 *Personnel Management, the Director of the National*
14 *Institute of Standards and Technology, and the heads*
15 *of other agencies with appropriate scientific knowl-*
16 *edge, is authorized to establish a Federal artificial in-*
17 *telligence scholarship-for-service program (referred to*
18 *in this section as the Federal AI Scholarship-for-Serv-*
19 *ice Program) to recruit and train artificial intel-*
20 *ligence professionals to lead and support the applica-*
21 *tion of artificial intelligence to the missions of Fed-*
22 *eral, State, local, and Tribal governments.*

23 (4) *QUALIFIED INSTITUTION OF HIGHER EDU-*
24 *CATION.*—The Director, in coordination with the
25 *heads of other agencies with appropriate scientific*

1 *knowledge, shall establish criteria to designate quali-*
2 *fied institutions of higher education that shall be eli-*
3 *gible to participate in the Federal AI Scholarship-for-*
4 *Service program. Such criteria shall include—*

5 *(A) measures of the institution’s dem-*
6 *onstrated excellence in the education of students*
7 *in the field of artificial intelligence; and*

8 *(B) measures of the institution’s ability to*
9 *attract and retain a diverse and nontraditional*
10 *student population in the fields of science, tech-*
11 *nology, engineering, and mathematics, which*
12 *may include the ability to attract women, mi-*
13 *norities, and individuals with disabilities.*

14 *(5) PROGRAM DESCRIPTION AND COMPONENTS.—*
15 *The Federal AI Scholarship-for-Service Program*
16 *shall—*

17 *(A) provide scholarships through qualified*
18 *institutions of higher education to students who*
19 *are enrolled in programs of study at institutions*
20 *of higher education leading to degrees or con-*
21 *centrations in or related to the artificial intel-*
22 *ligence field;*

23 *(B) provide the scholarship recipients with*
24 *summer internship opportunities or other mean-*

1 *ingful temporary appointments in the Federal*
2 *workforce focusing on AI projects or research;*

3 *(C) prioritize the employment placement of*
4 *scholarship recipients in executive agencies;*

5 *(D) identify opportunities to promote*
6 *multi-disciplinary programs of study that inte-*
7 *grate basic or advanced AI training with other*
8 *fields of study, including those that address the*
9 *social, economic, legal, and ethical implications*
10 *of human interaction with AI systems;*

11 *(E) support capacity-building education re-*
12 *search programs that will enable postsecondary*
13 *educational institutions to expand their ability*
14 *to train the next-generation AI workforce, in-*
15 *cluding AI researchers and practitioners;*

16 *(F) create courses or training programs in*
17 *technology ethics for students receiving scholar-*
18 *ships; and*

19 *(G) award fellowships to masters and doc-*
20 *toral students who are pursuing degrees or re-*
21 *search in artificial intelligence and related fields,*
22 *including in the field of technology ethics.*

23 *(6) SCHOLARSHIP AMOUNTS.—Each scholarship*
24 *under paragraph (5) shall be in an amount that cov-*
25 *ers the student’s tuition and fees at the institution for*

1 *not more than 3 years and provides the student with*
2 *an additional stipend.*

3 (7) *POST-AWARD EMPLOYMENT OBLIGATIONS.—*
4 *Each scholarship recipient, as a condition of receiving*
5 *a scholarship under the program, shall enter into an*
6 *agreement under which the recipient agrees to work*
7 *for a period equal to the length of the scholarship, fol-*
8 *lowing receipt of the student’s degree, in the AI mis-*
9 *sion of—*

10 (A) *an executive agency;*

11 (B) *Congress, including any agency, entity,*
12 *office, or commission established in the legisla-*
13 *tive branch;*

14 (C) *an interstate agency;*

15 (D) *a State, local, or Tribal government,*
16 *which may include instruction in AI-related skill*
17 *sets in a public school system; or*

18 (E) *a State, local, or Tribal government-af-*
19 *filiated nonprofit entity that is considered to be*
20 *critical infrastructure (as defined in section*
21 *1016(e) of the USA Patriot Act (42 U.S.C.*
22 *5195c(e))).*

23 (8) *HIRING AUTHORITY.—*

24 (A) *APPOINTMENT IN EXCEPTED SERV-*
25 *ICE.—Notwithstanding any provision of chapter*

1 33 of title 5, United States Code, governing ap-
2 pointments in the competitive service, an execu-
3 tive agency may appoint an individual who has
4 completed the eligible degree program for which
5 a scholarship was awarded to a position in the
6 excepted service in the executive agency.

7 (B) *NONCOMPETITIVE CONVERSION.*—*Ex-*
8 *cept as provided in subparagraph (D), upon ful-*
9 *fillment of the service term, an employee ap-*
10 *pointed under subparagraph (A) may be con-*
11 *verted noncompetitively to term, career-condi-*
12 *tional, or career appointment.*

13 (C) *TIMING OF CONVERSION.*—*An executive*
14 *agency may noncompetitively convert a term em-*
15 *ployee appointed under subparagraph (B) to a*
16 *career-conditional or career appointment before*
17 *the term appointment expires.*

18 (D) *AUTHORITY TO DECLINE CONVER-*
19 *SION.*—*An executive agency may decline to make*
20 *the noncompetitive conversion or appointment*
21 *under subparagraph (B) for cause.*

22 (9) *ELIGIBILITY.*—*To be eligible to receive a*
23 *scholarship under this section, an individual shall—*

24 (A) *be a citizen or lawful permanent resi-*
25 *dent of the United States;*

1 (B) demonstrate a commitment to a career
2 in advancing the field of AI;

3 (C) be—

4 (i) a full-time student in an eligible
5 degree program at a qualified institution of
6 higher education, as determined by the Di-
7 rector;

8 (ii) a student pursuing a degree on a
9 less than full-time basis, but not less than
10 half-time basis; or

11 (iii) an AI faculty member on sab-
12 batical to advance knowledge in the field;
13 and

14 (D) accept the terms of a scholarship under
15 this section.

16 (10) CONDITIONS OF SUPPORT.—

17 (A) IN GENERAL.—As a condition of receiv-
18 ing a scholarship under this section, a recipient
19 shall agree to provide the qualified institution of
20 higher education with annual verifiable docu-
21 mentation of post-award employment and up-to-
22 date contact information.

23 (B) TERMS.—A scholarship recipient under
24 this section shall be liable to the United States

1 *as provided in paragraph (12) if the indi-*
2 *vidual—*

3 *(i) fails to maintain an acceptable*
4 *level of academic standing at the applicable*
5 *institution of higher education, as deter-*
6 *mined by the Director;*

7 *(ii) is dismissed from the applicable*
8 *institution of higher education for discipli-*
9 *nary reasons;*

10 *(iii) withdraws from the eligible degree*
11 *program before completing the program;*

12 *(iv) declares that the individual does*
13 *not intend to fulfill the post- award employ-*
14 *ment obligation under this section; or*

15 *(v) fails to fulfill the post-award em-*
16 *ployment obligation of the individual under*
17 *this section.*

18 *(11) MONITORING COMPLIANCE.—As a condition*
19 *of participating in the program, a qualified institu-*
20 *tion of higher education shall—*

21 *(A) enter into an agreement with the Direc-*
22 *tor to monitor the compliance of scholarship re-*
23 *ipients with respect to their post-award employ-*
24 *ment obligations; and*

1 (B) provide to the Director, on an annual
2 basis, the post-award employment documentation
3 required under paragraph (10) for scholarship
4 recipients through the completion of their post-
5 award employment obligations.

6 (12) AMOUNT OF REPAYMENT.—

7 (A) LESS THAN 1 YEAR OF SERVICE.—If a
8 circumstance described in paragraph (10) occurs
9 before the completion of 1 year of a post-award
10 employment obligation under this section, the
11 total amount of scholarship awards received by
12 the individual under this section shall—

13 (i) be repaid; or

14 (ii) be treated as a loan to be repaid
15 in accordance with paragraph (13).

16 (B) 1 OR MORE YEARS OF SERVICE.—If a
17 circumstance described in clause (iv) or (v) of
18 paragraph (10)(B) occurs after the completion of
19 1 or more years of a post-award employment ob-
20 ligation under this section, the total amount of
21 scholarship awards received by the individual
22 under this section, reduced by the ratio of the
23 number of years of service completed divided by
24 the number of years of service required, shall—

25 (i) be repaid; or

1 (ii) be treated as a loan to be repaid
2 in accordance with paragraph (13).

3 (13) *REPAYMENTS.*—A loan described in para-
4 graph (12) shall—

5 (A) be treated as a Federal Direct Unsub-
6 sidized Stafford Loan under part D of title IV
7 of the Higher Education Act of 1965 (20 U.S.C.
8 1087a et seq.); and

9 (B) be subject to repayment, together with
10 interest thereon accruing from the date of the
11 scholarship award, in accordance with terms and
12 conditions specified by the Director (in consulta-
13 tion with the Secretary of Education).

14 (14) *COLLECTION OF REPAYMENT.*—

15 (A) *IN GENERAL.*—In the event that a schol-
16 arship recipient is required to repay the scholar-
17 ship award under this section, the qualified in-
18 stitution of higher education providing the schol-
19 arship shall—

20 (i) determine the repayment amounts
21 and notify the recipient and the Director of
22 the amounts owed; and

23 (ii) collect the repayment amounts
24 within a period of time as determined by
25 the Director, or the repayment amounts

1 *shall be treated as a loan in accordance*
2 *with paragraph (13).*

3 *(B) RETURNED TO TREASURY.—Except as*
4 *provided in subparagraph (C), any repayment*
5 *under this subsection shall be returned to the*
6 *Treasury of the United States.*

7 *(C) RETAIN PERCENTAGE.—A qualified in-*
8 *stitution of higher education may retain a per-*
9 *centage of any repayment the institution collects*
10 *under this subsection to defray administrative*
11 *costs associated with the collection. The Director*
12 *shall establish a fixed percentage that will apply*
13 *to all eligible entities, and may update this per-*
14 *centage as needed, in the determination of the*
15 *Director.*

16 *(15) EXCEPTIONS.—The Director may provide*
17 *for the partial or total waiver or suspension of any*
18 *service or payment obligation by an individual under*
19 *this section whenever compliance by the individual*
20 *with the obligation is impossible or would involve ex-*
21 *treme hardship to the individual, or if enforcement of*
22 *such obligation with respect to the individual would*
23 *be unconscionable.*

24 *(16) PUBLIC INFORMATION.—*

1 (A) *EVALUATION.*—*The Director, in coordi-*
2 *nation with the Director of the Office of Per-*
3 *sonnel Management, shall annually evaluate and*
4 *make public, in a manner that protects the per-*
5 *sonally identifiable information of scholarship*
6 *recipients, information on the success of recruit-*
7 *ing individuals for scholarships under this sec-*
8 *tion and on hiring and retaining those individ-*
9 *uals in the public sector AI workforce, including*
10 *information on—*

11 (i) *placement rates;*

12 (ii) *where students are placed, includ-*
13 *ing job titles and descriptions;*

14 (iii) *salary ranges for students not re-*
15 *leased from obligations under this section;*

16 (iv) *how long after graduation students*
17 *are placed;*

18 (v) *how long students stay in the posi-*
19 *tions they enter upon graduation;*

20 (vi) *how many students are released*
21 *from obligations; and*

22 (vii) *what, if any, remedial training is*
23 *required.*

24 (B) *REPORTS.*—*The Director, in coordina-*
25 *tion with the Office of Personnel Management,*

1 shall submit, not less frequently than once every
2 3 years, to the Committee on Homeland Security
3 and Governmental Affairs of the Senate, the
4 Committee on Commerce, Science, and Transpor-
5 tation of the Senate, the Committee on Science,
6 Space, and Technology of the House of Rep-
7 resentatives, and the Committee on Oversight
8 and Reform of the House of Representatives a re-
9 port, including the results of the evaluation
10 under subparagraph (A) and any recent statis-
11 tics regarding the size, composition, and edu-
12 cational requirements of the Federal AI work-
13 force.

14 (C) *RESOURCES*.—The Director, in coordi-
15 nation with the Director of the Office of Per-
16 sonnel Management, shall provide consolidated
17 and user-friendly online resources for prospective
18 scholarship recipients, including, to the extent
19 practicable—

20 (i) searchable, up-to-date, and accurate
21 information about participating institu-
22 tions of higher education and job opportuni-
23 ties related to the AI field; and

24 (ii) a modernized description of AI ca-
25 reers.

1 (17) *REFRESH.*—Not less than once every 2
2 years, the Director, in coordination with the Director
3 of the Office of Personnel Management, shall review
4 and update the Federal AI Scholarship-for-Service
5 Program to reflect advances in technology.

6 **SEC. 10314. STEM WORKFORCE DATA.**

7 (a) *SKILLED TECHNICAL WORKFORCE PORTFOLIO RE-*
8 *VIEW.*—

9 (1) *IN GENERAL.*—Not later than 1 year after
10 the date of enactment of this Act, the Director shall
11 conduct a full portfolio analysis of the Foundation's
12 skilled technical workforce investments across all Di-
13 rectorates in the areas of education, research, infra-
14 structure, data collection, and analysis.

15 (2) *REPORT.*—Not later than 180 days after the
16 date of the review under paragraph (1) is complete,
17 the Director shall submit to Congress and make wide-
18 ly available to the public a summary report of the
19 portfolio review.

20 (b) *SURVEY DATA.*—

21 (1) *ROTATING TOPIC MODULES.*—To meet evol-
22 ving needs for data on the state of the science and en-
23 gineering workforce, the Director shall assess, through
24 coordination with other Federal statistical agencies
25 and drawing on input from relevant stakeholders, the

1 *feasibility and benefits of incorporating questions or*
2 *topic modules to existing National Center for Science*
3 *and Engineering Statistics surveys that would vary*
4 *from cycle to cycle.*

5 (2) *NEW DATA.*—*Not later than 1 year after the*
6 *date of enactment of this Act, the Director shall sub-*
7 *mit to Congress and the Board the results of an as-*
8 *essment, carried out in coordination with other Fed-*
9 *eral agencies and with input from relevant stake-*
10 *holders, of the feasibility and benefits of incorporating*
11 *new questions or topic modules to existing National*
12 *Center for Science and Engineering Statistics surveys*
13 *on—*

14 (A) *the skilled technical workforce;*

15 (B) *working conditions and work-life bal-*
16 *ance;*

17 (C) *harassment and discrimination;*

18 (D) *immigration and emigration; and*

19 (E) *any other topics at the discretion of the*
20 *Director.*

21 (3) *LONGITUDINAL DESIGN.*—*The Director shall*
22 *continue and accelerate efforts to enhance the useful-*
23 *ness of National Center for Science and Engineering*
24 *Statistics survey data for longitudinal research and*
25 *analysis.*

1 (4) *GOVERNMENT ACCOUNTABILITY OFFICE RE-*
2 *VIEW.*—*Not later than 1 year after the date of enact-*
3 *ment of this Act, the Comptroller General of the*
4 *United States shall submit a report to Congress*
5 *that—*

6 (A) *evaluates Foundation processes for en-*
7 *sureing the data and analysis produced by the*
8 *National Center for Science and Engineering*
9 *Statistics meets current and future needs; and*

10 (B) *includes such recommendations as the*
11 *Comptroller General determines are appropriate*
12 *to improve such processes.*

13 **SEC. 10315. CYBER WORKFORCE DEVELOPMENT RESEARCH**
14 **AND DEVELOPMENT.**

15 (a) *IN GENERAL.*—*The Director shall make awards on*
16 *a merit-reviewed, competitive basis to institutions of higher*
17 *education or nonprofit organizations (or consortia of such*
18 *institutions or organizations) to carry out research on the*
19 *cyber workforce.*

20 (b) *RESEARCH.*—*In carrying out research pursuant to*
21 *subsection (a), the Director shall support research and de-*
22 *velopment activities to—*

23 (1) *understand the current state of the cyber*
24 *workforce, including factors that influence growth, re-*
25 *tention, and development of that workforce;*

1 (2) *examine paths to entry and re-entry into the*
2 *cyber workforce;*

3 (3) *understand trends of the cyber workforce, in-*
4 *cluding demographic representation, educational and*
5 *professional backgrounds present, competencies avail-*
6 *able, and factors that shape employee recruitment, de-*
7 *velopment, and retention and how to increase the size,*
8 *diversity, and capability of the cyber workforce;*

9 (4) *examine and evaluate training practices,*
10 *models, programs, and technologies; and*

11 (5) *other closely related topics as the Director de-*
12 *termines appropriate.*

13 (c) *REQUIREMENTS.—In carrying out the activities*
14 *described in subsection (b), the Director shall—*

15 (1) *collaborate with the National Institute of*
16 *Standards and Technology, including the National*
17 *Initiative for Cybersecurity Education, the Depart-*
18 *ment of Homeland Security, the Department of De-*
19 *fense, the Office of Personnel Management, and other*
20 *Federal departments and agencies, as appropriate;*

21 (2) *align with or build on the National Initia-*
22 *tive on Cybersecurity Education Cybersecurity Work-*
23 *force Framework wherever practicable and applicable;*

1 (3) *leverage the collective body of knowledge from*
2 *existing cyber workforce development research and*
3 *education activities; and*

4 (4) *engage with other Federal departments and*
5 *agencies, research communities, and potential users of*
6 *information produced under this subsection.*

7 **SEC. 10316. FEDERAL CYBER SCHOLARSHIP-FOR-SERVICE**
8 **PROGRAM.**

9 (a) *SENSE OF CONGRESS.—It is the sense of Congress*
10 *that—*

11 (1) *since cybersecurity risks are constant in the*
12 *growing digital world, it is critical that the United*
13 *States stay ahead of malicious cyber activity with a*
14 *workforce that can safeguard our innovation, re-*
15 *search, and work environments; and*

16 (2) *Federal investments in the Federal Cyber*
17 *Scholarship-for-Service Program at the National*
18 *Science Foundation play a critical role in preparing*
19 *and sustaining a strong, talented, and much-needed*
20 *national cybersecurity workforce and should be*
21 *strengthened.*

22 (b) *IN GENERAL.—Section 302(b)(1) of the Cybersecu-*
23 *rity Enhancement Act of 2014 (15 U.S.C. 7442(b)(1)) is*
24 *amended by striking the semicolon at the end and inserting*
25 *the following “and cybersecurity-related aspects of other re-*

1 *lated fields as appropriate, including artificial intelligence,*
2 *quantum computing and aerospace;”.*

3 **SEC. 10317. CYBERSECURITY WORKFORCE DATA INITIATIVE.**

4 *The Director, acting through the National Center for*
5 *Science and Engineering Statistics established in section*
6 *505 of the America COMPETES Reauthorization Act of*
7 *2010 (42 U.S.C. 1862p) and in coordination with the Di-*
8 *rector of the National Institute of Standards and Tech-*
9 *nology and other appropriate Federal statistical agencies,*
10 *shall establish a cybersecurity workforce data initiative*
11 *that—*

12 *(1) assesses the feasibility of providing nation-*
13 *ally representative estimates and statistical informa-*
14 *tion on the cybersecurity workforce;*

15 *(2) utilizes the National Initiative for Cybersecu-*
16 *rity Education (NICE) Cybersecurity Workforce*
17 *Framework (NIST Special Publication 800–181), or*
18 *other frameworks, as appropriate, to enable a con-*
19 *sistent measurement of the cybersecurity workforce;*

20 *(3) utilizes and complements existing data on*
21 *employer requirements and unfilled positions in the*
22 *cybersecurity workforce;*

23 *(4) consults key stakeholders and the broader*
24 *community of practice in cybersecurity workforce de-*

1 *velopment to determine data requirements needed to*
2 *strengthen the cybersecurity workforce;*

3 *(5) evaluates existing Federal survey data for in-*
4 *formation pertinent to developing national estimates*
5 *of the cybersecurity workforce;*

6 *(6) evaluates administrative data and other sup-*
7 *plementary data sources, as available, to describe and*
8 *measure the cybersecurity workforce; and*

9 *(7) collects statistical data, to the greatest extent*
10 *practicable, on credential attainment and employ-*
11 *ment outcomes information for the cybersecurity*
12 *workforce.*

13 **SEC. 10318. MICROELECTRONICS WORKFORCE DEVELOP-**
14 **MENT ACTIVITIES.**

15 *(a) CREATING HELPFUL INITIATIVES TO PRODUCE*
16 *PERSONNEL IN NEEDED GROWTH INDUSTRIES.—*

17 *(1) IN GENERAL.—The Director shall make*
18 *awards to institutions of higher education, non-profit*
19 *organizations, or consortia thereof, for research, devel-*
20 *opment, and related activities to advance innovative*
21 *approaches to developing, improving, and expanding*
22 *evidence-based education and workforce development*
23 *activities and learning experiences at all levels of edu-*
24 *cation in fields and disciplines related to microelec-*
25 *tronics.*

1 (2) *PURPOSES.*—Activities carried out under
2 this section shall be for the purpose of supporting the
3 growth, retention, and development of a diverse and
4 sustainable microelectronics workforce to meet the re-
5 quirements of the programs established in section
6 9906(c)(2)(C) of the William M. (Mac) Thornberry
7 National Defense Authorization Act for Fiscal Year
8 2021 in support of the evolving needs of industry,
9 academia, government, and Federal laboratories.

10 (3) *USES OF FUNDS.*—Awards made under this
11 section shall be used to support activities, such as—

12 (A) development of industry-oriented cur-
13 ricula and teaching modules for topics relevant
14 to microelectronics, including those that provide
15 meaningful hands-on learning experiences;

16 (B) dissemination of materials developed in
17 subparagraph (A), including through the cre-
18 ation and maintenance of a publicly-accessible
19 database and online portal;

20 (C) development and implementation of
21 training, research, and professional development
22 programs for teachers, including innovative pre-
23 service and in-service programs, in microelec-
24 tronics and related fields;

1 (D) support for learning activities and ex-
 2 periences that provide physical, simulated, or re-
 3 mote access to training facilities and industry-
 4 standard processes and tools, including equip-
 5 ment and software for the design, development,
 6 manufacturing, and testing of microelectronics;

7 (E) increasing the integration of microelec-
 8 tronics content into STEM curricula at all edu-
 9 cation levels;

10 (F) Growing academic research capacity in
 11 microelectronics by incentivizing the hiring of
 12 faculty in fields critical to microelectronics;

13 (G) support for innovative industry path-
 14 way programs that connect high school, voca-
 15 tional, military, college, and graduate programs;
 16 and

17 (H) providing informal hands-on microelec-
 18 tronics learning opportunities for PreK-12 stu-
 19 dents in different learning environments, includ-
 20 ing competitions.

21 (4) ADVANCED MICROELECTRONICS
 22 TRAINEESHIPS.—

23 (A) IN GENERAL.—The Director shall make
 24 awards to institutions of higher education or
 25 nonprofit organizations (or consortia of such in-

1 stitutions and organizations) to establish
2 traineeship programs for graduate students who
3 pursue microelectronics research leading to a
4 masters or doctorate degree by providing funding
5 and other assistance, and by providing graduate
6 students with opportunities for research experi-
7 ences in government or industry related to the
8 students' microelectronics studies.

9 (B) USE OF FUNDS.—Institutions of higher
10 education or non-profit organizations (or con-
11 sortia of such institutions and organizations)
12 shall use award funds provided under subpara-
13 graph (A) for the purposes of—

14 (i) paying tuition and fees, and pro-
15 viding stipends, for students receiving
16 traineeships who are citizens, nationals, or
17 aliens lawfully admitted for permanent res-
18 idence;

19 (ii) facilitating opportunities for sci-
20 entific internship programs for students re-
21 ceiving traineeships in microelectronics at
22 private industry, nonprofit research institu-
23 tions, or Federal laboratories; and

24 (iii) such other costs associated with
25 the administration of the program.

1 (5) *MICROELECTRONICS SKILLED TECHNICAL*
2 *WORKFORCE PROGRAMS.*—*The Director shall make*
3 *awards under the Scientific and Advanced-Technology*
4 *Act of 1992 (42 U.S.C. 1862h-j) to support programs*
5 *for skilled technical workers in STEM disciplines that*
6 *are aligned with skilled workforce needs of the micro-*
7 *electronics industry and lead to an associate’s degree,*
8 *or equivalent certification, by providing funding and*
9 *other assistance, including opportunities for intern-*
10 *ships and other hands-on experiences in industry re-*
11 *lated to the students’ microelectronics studies.*

12 (6) *MICROELECTRONICS RESEARCH EXPERI-*
13 *ENCES THROUGH EXISTING PROGRAMS.*—*The Director*
14 *shall seek to increase opportunities for microelec-*
15 *tronics research for students and trainees at all levels*
16 *by encouraging proposals in microelectronics through*
17 *existing programs including—*

18 (A) *research experiences for undergraduates*
19 *pursuant to section 514 of the America COM-*
20 *PETES Reauthorization Act of 2010 (42 U.S.C.*
21 *1862p–6);*

22 (B) *postdoctoral fellowship programs estab-*
23 *lished pursuant to section 522 of the America*
24 *COMPETES Act of 2010 (42 U.S.C. 1862p–11);*

1 (C) graduate fellowships established pursu-
2 ant to section 10 of the National Science Foun-
3 dation Act of 1950 (42 U.S.C. 1869);

4 (D) informal STEM education programs es-
5 tablished pursuant to section 3 of the STEM
6 Education Act of 2015 (42 U.S.C. 1862q);

7 (E) the Robert Noyce Teacher Scholarship
8 Program established pursuant to section 10 of
9 the National Science Foundation Authorization
10 Act of 2002 (42 U.S.C. 1862n–1);

11 (F) major research instrumentation pro-
12 grams established pursuant to section 7036 of the
13 America COMPETES Act (42 U.S.C. 1862o–14);
14 and

15 (G) low-income scholarship program estab-
16 lished pursuant to section 414(d) of the Amer-
17 ican Competitiveness and Workforce Improve-
18 ment Act of 1998 (42 U.S.C. 1869c).

19 (7) *INDUSTRY PARTNERSHIPS.*—*In carrying out*
20 *the activities under this section, the Director shall en-*
21 *courage awardees to partner with industry and other*
22 *private sector organizations to facilitate the expan-*
23 *sion of workforce pipelines and enable access to indus-*
24 *try-standard equipment and software for use in un-*

1 *dergraduate and graduate microelectronics education*
2 *programs.*

3 (8) *INTERAGENCY COORDINATION.*—*In carrying*
4 *out activities under this section, the Director shall*
5 *collaborate with the Subcommittee on Microelectronics*
6 *Leadership of the National Science and Technology*
7 *Council, established in subsection (a) of section 9906*
8 *of the William M. (Mac) Thornberry National Defense*
9 *Authorization Act for Fiscal Year 2021 and the Na-*
10 *tional Semiconductor Technology Center established*
11 *in subsection (c) of section 9906 of such Act, and*
12 *other relevant Federal agencies to maintain the effec-*
13 *tiveness of microelectronics workforce development ac-*
14 *tivities across the agencies.*

15 (b) *NATIONAL NETWORK FOR MICROELECTRONICS*
16 *EDUCATION.*—

17 (1) *IN GENERAL.*—*The Director, in coordination*
18 *with the Secretary of Commerce, shall on a competi-*
19 *tive, merit-reviewed basis, make awards to institu-*
20 *tions of higher education and non-profit organiza-*
21 *tions (or consortia of such institutions and organiza-*
22 *tions) to establish partnerships to enhance and broad-*
23 *en participation in microelectronics education.*

24 (2) *ACTIVITIES.*—*Awards made under this sub-*
25 *section shall be used for the following:*

1 (A) To conduct training and education ac-
2 tivities funded by awards under paragraph (1)
3 and in coordination with the Network Coordina-
4 tion Hub established in paragraph (3), including
5 curricula design, development, dissemination,
6 and assessment, and the sharing of information
7 and best practices across the network of award-
8 ees.

9 (B) To develop regional partnerships among
10 associate-degree-granting colleges, bachelor-de-
11 gree-granting institutions, workforce development
12 programs, labor organizations, and industry to
13 create a diverse national technical workforce
14 trained in microelectronics and ensure education
15 and training is meeting the evolving needs of in-
16 dustry.

17 (C) To develop local workforce pipelines
18 that align with capacity investments made by
19 industry and the Federal government, including
20 vocational and high school training programs,
21 community college degrees and certificates, vet-
22 eran post service opportunities, and mentoring.

23 (D) To facilitate partnerships with employ-
24 ers, employer consortia or other private sector or-
25 ganizations that offer apprenticeships, intern-

1 *ships, or applied learning experiences in the field*
2 *of microelectronics.*

3 *(E) To develop shared infrastructure avail-*
4 *able to institutions of higher education, two-year*
5 *colleges, and private organizations to enable ex-*
6 *periential learning activities and provide phys-*
7 *ical or digital access to training facilities and*
8 *industry-standard tools and processes.*

9 *(F) To create and disseminate public out-*
10 *reach to support awareness of microelectronics*
11 *education and career opportunities, including*
12 *through outreach to PreK–12 schools and STEM-*
13 *related organizations.*

14 *(G) To collaborate and coordinate with in-*
15 *dustry and existing public and private organiza-*
16 *tions conducting microelectronics education and*
17 *workforce development activities, as practicable.*

18 (3) *NETWORK COORDINATION HUB.—The Direc-*
19 *tor shall make an award on a competitive, merit-re-*
20 *viewed basis to an institution of higher education or*
21 *nonprofit organization (or a consortium thereof) to*
22 *establish a national network of partnerships (referred*
23 *to in this section as the “National Network for Micro-*
24 *electronics Education”)* to coordinate activities, best
25 *practice sharing, and access to facilities across the*

1 *partnerships established in accordance with para-*
2 *graph (1).*

3 (4) *INCENTIVIZING PARTICIPATION.*—*To the ex-*
4 *tent practicable, the Director shall encourage partici-*
5 *pation in the National Network for Microelectronics*
6 *Education through the coordination of activities and*
7 *distribution of awards described in subsection (a).*

8 (5) *PARTNERSHIPS.*—*The Director shall encour-*
9 *age the submission of proposals that are led by his-*
10 *torically Black colleges and universities, Tribal Col-*
11 *leges or Universities, and minority-serving institu-*
12 *tions or that include partnerships with or among*
13 *such institutions to increase the recruitment of stu-*
14 *dents from groups historically underrepresented in*
15 *STEM to pursue graduate studies in microelectronics.*

16 (6) *OUTREACH.*—*In addition to any other re-*
17 *quirements as determined appropriate by the Direc-*
18 *tor, the Director shall require that proposals for*
19 *awards under this section shall include a description*
20 *of how the applicant will develop and implement out-*
21 *reach activities to increase the participation of*
22 *women and other students from groups historically*
23 *underrepresented in STEM.*

24 (7) *COORDINATION ACROSS FOUNDATION PRO-*
25 *GRAMS.*—*In carrying out the activities under this sec-*

1 *tion, the Director shall ensure awardees coordinate*
2 *with, and avoid unnecessary duplication of, the ac-*
3 *tivities carried out under this Section with the activi-*
4 *ties of the 21st Century Nanotechnology Research and*
5 *Development Act (Public Law 108–153), the National*
6 *Quantum Initiative Act (Public Law 115-368), and*
7 *Division E of the William M. (Mac) Thornberry Na-*
8 *tional Defense Authorization Act for Fiscal Year*
9 *2021, and other related programs, as appropriate.*

10 (8) *INTERAGENCY COORDINATION.—In carrying*
11 *out activities under this section, the Director shall*
12 *collaborate with the Subcommittee on Microelectronics*
13 *Leadership of the National Science and Technology*
14 *Council, established in subsection (a) of section 9906*
15 *of the William M. (Mac) Thornberry National Defense*
16 *Authorization Act for Fiscal Year 2021 and the Na-*
17 *tional Semiconductor Technology Center established*
18 *in subsection (c) of section 9906 of such Act.*

19 **SEC. 10319. INCORPORATION OF ART AND DESIGN INTO**
20 **CERTAIN STEM EDUCATION.**

21 (a) *NATIONAL SCIENCE FOUNDATION AUTHORIZATION*
22 *ACT.—Section 9(a) of the National Science Foundation Au-*
23 *thorization Act of 2002 (42 U.S.C. 1862n(a)) is amended*
24 *in paragraph (3)—*

1 (1) *in subparagraph (M), by striking “and” at*
2 *the end;*

3 (2) *by redesignating subparagraph (N) as sub-*
4 *paragraph (O); and*

5 (3) *after subparagraph (M), by inserting the fol-*
6 *lowing new subparagraph:*

7 *“(N) developing science, technology, engi-*
8 *neering, and mathematics educational cur-*
9 *riculum that incorporates art and design to pro-*
10 *mote creativity and innovation; and”.*

11 (b) *STEM EDUCATION ACT [LOG 169 H10304(K)].—*
12 *Section 3 of the STEM Education Act of 2015 (42 U.S.C.*
13 *1862q) is amended—*

14 (1) *in subsection (a)—*

15 (A) *in paragraph (2), by striking “and” at*
16 *the end;*

17 (B) *in paragraph (3), by striking the period*
18 *and inserting “; and”; and*

19 (C) *by adding at the end the following:*

20 *“(4) the integration of art and design in STEM*
21 *educational programs.”; and*

22 (2) *in subsection (b)—*

23 (A) *in paragraph (3), by striking “and” at*
24 *the end;*

1 (B) in paragraph (4), by striking the period
2 and inserting “; and”; and

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

4 “(5) design and testing of programming that in-
5 tegrates art and design in STEM education to pro-
6 mote creativity and innovation.”.

7 **SEC. 10320. MANDATORY COST-SHARING.**

8 (a) *WAIVER.*—The cost-sharing requirements under
9 section 7036(c) of the America Creating Opportunities to
10 Meaningfully Promote Excellence in Technology, Edu-
11 cation, and Science Act (42 U.S.C. 1862o-14(c)) for the
12 Major Research Instrumentation Program and under sec-
13 tion 10A(i) of the National Science Foundation Authoriza-
14 tion Act of 2002 (42 U.S.C. 1862n-1a(i)) for teaching fel-
15 lowships administered within the Robert Noyce Teacher
16 Scholarship Program are waived for a period of 5 years
17 following the date of enactment of this Act.

18 (b) *ASSESSMENT.*—Not later than 5 years following
19 the date of enactment of this Act, the Director shall submit
20 to Congress an assessment, that includes feedback from the
21 research community, of the impacts of the waivers provided
22 under subsection (a), including—

23 (1) programmatic and scientific goals;

24 (2) institutional commitment and stewardship of
25 Federal resources;

1 (3) *institutional strategic planning and admin-*
2 *istrative burden;*

3 (4) *equity among recipient institutions; and*

4 (5) *recommendations for or against extending or*
5 *making permanent such waivers.*

6 **SEC. 10321. PROGRAMS TO ADDRESS THE STEM WORK-**
7 **FORCE.**

8 (a) *IN GENERAL.—The Director shall issue under-*
9 *graduate scholarships, including at community colleges,*
10 *graduate fellowships and traineeships, postdoctoral awards,*
11 *and, as appropriate, other awards, to address STEM work-*
12 *force gaps, including for programs that recruit, retain, and*
13 *advance students to a bachelor’s degree in a STEM dis-*
14 *cipline concurrent with a secondary school diploma, such*
15 *as through existing and new partnerships with State edu-*
16 *cational agencies.*

17 (b) *POSTDOCTORAL PROFESSIONAL DEVELOPMENT.—*
18 *In carrying out this section, the Director shall encourage*
19 *innovation in postdoctoral professional development, sup-*
20 *port the development and diversity of the STEM workforce,*
21 *and study the impacts of such innovation and support. To*
22 *do so, the Director may use postdoctoral awards established*
23 *under subsection (a) or leveraged under subsection (d)(1)*
24 *for fellowships or other temporary rotational postings of not*

1 *more than 2 years. Such fellowships or temporary rota-*
2 *tional postings shall be awarded—*

3 *(1) to qualified individuals who have a doctoral*
4 *degree and received such degree not earlier than 5*
5 *years before the date that the fellowship or temporary*
6 *rotational posting begins; and*

7 *(2) to carry out research at Federal, State, local,*
8 *and Tribal government research facilities.*

9 *(c) DIRECT HIRE AUTHORITY.—*

10 *(1) IN GENERAL.—The head of any Federal*
11 *agency may appoint, without regard to the provisions*
12 *of subchapter I of chapter 33 of title 5, United States*
13 *Code, other than sections 3303 and 3328 of that title,*
14 *a qualified candidate described in paragraph (2) di-*
15 *rectly to a position in the competitive service with the*
16 *Federal agency for which the candidate meets Office*
17 *of Personnel Management qualification standards.*

18 *(2) FELLOWSHIP OR TEMPORARY ROTATIONAL*
19 *POSTING.—Paragraph (1) applies with respect to a*
20 *former recipient of an award under this subsection*
21 *who—*

22 *(A) earned a doctoral degree in a STEM*
23 *field from an institution of higher education;*
24 *and*

1 (B) successfully fulfilled the requirements of
2 the fellowship or temporary rotational posting
3 within a Federal agency.

4 (3) *LIMITATION.*—The direct hire authority
5 under this subsection shall be exercised with respect to
6 a specific qualified candidate not later than 2 years
7 after the date that the candidate completed the re-
8 quirements related to the fellowship or temporary ro-
9 tational posting described under this subsection.

10 (d) *EXISTING PROGRAMS.*—In carrying out this sec-
11 tion, the Director may leverage existing programs, includ-
12 ing programs that issue—

13 (1) postdoctoral awards;

14 (2) graduate fellowships and traineeships, inclu-
15 sive of the NSF Research Traineeships and fellow-
16 ships awarded under the Graduate Research Fellow-
17 ship Program;

18 (3) scholarships, research experiences, and in-
19 ternships, including—

20 (A) scholarships to attend community col-
21 leges; and

22 (B) research experiences and internships
23 under sections 513, 514, and 515 of the America
24 COMPETES Reauthorization Act of 2010 (42

1 U.S.C. 1862p-5; 1862p-6; 42 U.S.C. 1862p-7);
 2 and
 3 (4) awards to institutions of higher education to
 4 enable the institutions to fund innovation in under-
 5 graduate and graduate education, increased edu-
 6 cational capacity, and the development and establish-
 7 ment of new or specialized programs of study for
 8 graduate, undergraduate, or technical college students,
 9 and the evaluation of the effectiveness of the programs
 10 of study.

11 **Subtitle C—Broadening**
 12 **Participation**

13 **SEC. 10321. PRESIDENTIAL AWARDS FOR EXCELLENCE IN**
 14 **MATHEMATICS AND SCIENCE.**

15 (a) *IN GENERAL.*—Section 117(a) of the National
 16 Science Foundation Authorization Act of 1988 (42 U.S.C.
 17 1881b(a)) is amended—

18 (1) in subparagraph (B)—

19 (A) by striking “108” and inserting “110”;

20 (B) by striking clause (iv);

21 (C) in clause (v), by striking the period at
 22 the end and inserting “; and”;

23 (D) by redesignating clauses (i), (ii), (iii),
 24 and (v) as subclauses (I), (II), (III), and (IV),
 25 respectively, and moving the margins of such

1 *subclauses (as so redesignated) two ems to the*
2 *right; and*

3 *(E) by striking “In selecting teachers” and*
4 *all that follows through “two teachers—” and in-*
5 *serting the following:*

6 *“(C) In selecting teachers for an award au-*
7 *thorized by this subsection, the President shall*
8 *select—*

9 *“(i) at least two teachers—”; and*

10 *(2) in subparagraph (C), as so designated by*
11 *paragraph (1)(E) of this subsection, by adding at the*
12 *end the following:*

13 *“(ii) at least one teacher—*

14 *“(I) from the Commonwealth of*
15 *the Northern Mariana Islands;*

16 *“(II) from American Samoa;*

17 *“(III) from the Virgin Islands of*
18 *the United States; and*

19 *“(IV) from Guam.”.*

20 *(b) EFFECTIVE DATE.—The amendments made by sub-*
21 *section (a) shall apply with respect to awards made on or*
22 *after the date of the enactment of this Act.*

1 **SEC. 10322. ROBERT NOYCE TEACHER SCHOLARSHIP PRO-**
2 **GRAM UPDATE.**

3 (a) *SENSE OF CONGRESS.*—*It is the sense of Congress*
4 *that over the next five years the Foundation should increase*
5 *the number of scholarships awarded under the Robert Noyce*
6 *Teacher Scholarship program established under section 10*
7 *of the National Science Foundation Authorization Act of*
8 *2002 (42 U.S.C. 1862n–1) by 50 percent.*

9 (b) *OUTREACH.*—*To increase the diversity of partici-*
10 *pants, the Director shall support symposia, forums, con-*
11 *ferences, and other activities to expand and enhance out-*
12 *reach to—*

- 13 (1) *historically Black colleges and universities;*
14 (2) *Tribal Colleges or Universities;*
15 (3) *minority-serving institutions;*
16 (4) *institutions of higher education that are lo-*
17 *cated near or serve rural communities, including*
18 *EPSCoR institutions;*
19 (5) *labor organizations;*
20 (6) *emerging research institutions; and*
21 (7) *higher education programs that serve or sup-*
22 *port veterans.*

23 **SEC. 10323. NSF EDDIE BERNICE JOHNSON INCLUDES INI-**
24 **TIATIVE.**

25 (a) *IN GENERAL.*—*The Director shall make awards,*
26 *on a competitive basis, to institutions of higher education*

1 *or non-profit organizations (or consortia of such institu-*
 2 *tions or organizations) to carry out a comprehensive na-*
 3 *tional initiative to facilitate the development of networks*
 4 *and partnerships to build on and scale up effective practices*
 5 *in broadening participation in STEM studies and careers*
 6 *of groups historically underrepresented in such studies and*
 7 *careers.*

8 (b) *CHANGE OF NAME.—The initiative under sub-*
 9 *section (a) shall be known as the “Eddie Bernice Johnson*
 10 *Inclusion across the Nation of Communities of Learners of*
 11 *Underrepresented Discoverers in Engineering and Science*
 12 *Initiative” or the “Eddie Bernice Johnson INCLUDES Ini-*
 13 *tiative”.*

14 **SEC. 10324. BROADENING PARTICIPATION ON MAJOR FA-**
 15 **CILITIES AWARDS.**

16 *The Director shall require organizations seeking a co-*
 17 *operative agreement for the management of the operations*
 18 *and maintenance of a Foundation project to demonstrate*
 19 *prior experience and current capabilities in or to have a*
 20 *plan for employing best practices in broadening participa-*
 21 *tion in science and engineering and ensure implementation*
 22 *of such practices is considered in oversight of the award.*

23 **SEC. 10325. EXPANDING GEOGRAPHIC AND INSTITUTIONAL**
 24 **DIVERSITY IN RESEARCH.**

25 (a) *CONTINUING SUPPORT FOR EPSCoR .—*

1 (1) *SENSE OF CONGRESS.*—*It is the sense of*
2 *Congress that—*

3 (A) *because maintaining the Nation’s sci-*
4 *entific and economic leadership requires the par-*
5 *ticipation of talented individuals nationwide,*
6 *EPSCoR investments into State research and*
7 *education capacities are in the Federal interest*
8 *and should be sustained;*

9 (B) *EPSCoR should maintain its experi-*
10 *mental component by supporting innovative*
11 *methods for improving research capacity and*
12 *competitiveness; and*

13 (C) *the Director should carry out this sub-*
14 *section while maintaining or increasing proposal*
15 *success rates at emerging research institutions*
16 *throughout the United States and without pre-*
17 *cluding access to awards for such institutions.*

18 (2) *UPDATE OF EPSCOR.*—*Section 517(f)(2) of*
19 *the America COMPETES Reauthorization Act of*
20 *2010 (42 U.S.C. 1862p–9(f)(2)) is amended—*

21 (A) *in subparagraph (A), by striking “and”*
22 *at the end; and*

23 (B) *by adding at the end the following:*

24 “*(C) to increase the capacity of rural com-*
25 *munities to provide quality STEM education*

1 *and STEM workforce development programming*
2 *to students, and teachers; and”.*

3 (3) *GEOGRAPHIC DIVERSITY AND INCLUSION.*—

4 (A) *IN GENERAL.*—*To the maximum extent*
5 *practicable, not less than—*

6 (i) *15.5 percent in fiscal year 2023,*

7 (ii) *16 percent in fiscal year 2024,*

8 (iii) *16.5 percent in fiscal year 2025,*

9 (iv) *17 percent in fiscal year 2026,*

10 (v) *18 percent in fiscal year 2027,*

11 (vi) *19 percent in fiscal year 2028,*

12 *and*

13 (vii) *20 percent in fiscal year 2029,*

14 *of the amounts appropriated to the Foundation*
15 *for research and related activities, and science,*
16 *mathematics, and engineering education and*
17 *human resources programs and activities, ex-*
18 *cluding those amounts made available for polar*
19 *research and operations support (and operations*
20 *and maintenance of research facilities), shall be*
21 *awarded to EPSCoR institutions.*

22 (B) *SCHOLARSHIPS.*—*To the maximum ex-*
23 *tent practicable, not less than—*

24 (i) *16 percent in fiscal year 2023,*

25 (ii) *18 percent in fiscal year 2024, and*

1 (iii) 20 percent in each of fiscal years
2 2025 through 2029,
3 of the amounts appropriated to the Foundation
4 for scholarships (including at community col-
5 leges), graduate fellowships and traineeships,
6 and postdoctoral awards shall be used to support
7 EPSCoR institutions.

8 (C) CONSIDERATIONS.—The Director shall
9 consider prioritizing funding and activities that
10 enable sustainable growth in the competitiveness
11 of EPSCoR jurisdictions, including—

12 (i) infrastructure investments to build
13 research capacity in EPSCoR jurisdictions;

14 (ii) scholarships, fellowships, and
15 traineeships within new and existing pro-
16 grams, to promote the development of sus-
17 tainable research and academic personnel;

18 (iii) partnerships between eligible orga-
19 nizations in EPSCoR and non-EPSCoR ju-
20 risdictions, to develop administrative, grant
21 management, and proposal writing capa-
22 bilities in EPSCoR jurisdictions;

23 (iv) capacity building activities for
24 emerging research institutions, historically
25 Black colleges and universities, Tribal Col-

1 leges or Universities, and minority serving
2 institutions, consistent with this section and
3 section 10524 of this division; and

4 (v) leveraging the Partnerships for In-
5 novation program, as well as the Founda-
6 tion coordination role in the Department of
7 Commerce technology and innovation hub
8 program under section 28 of the Stevenson-
9 Wydler Technology Innovation Act of 1980
10 as added by section 10621, to build sustain-
11 able innovation ecosystems in EPSCoR ju-
12 risdictions.

13 (D) *MERIT REVIEW.*—The Director shall
14 achieve the percentages specified in this para-
15 graph to the maximum extent practicable, con-
16 sistent with the National Science Foundation
17 merit review process.

18 (E) *CONSORTIA.*—In the case of an award
19 to a consortium, the Director may count the en-
20 tire award toward meeting the funding require-
21 ments of subparagraph (A) if the lead entity of
22 the consortium is located in an EPSCoR institu-
23 tion

1 (F) *ANNUAL REPORTING.*—Beginning with
2 the fiscal year 2023, the Director shall submit to
3 Congress a report describing—

4 (i) the Foundation’s implementation of
5 this paragraph;

6 (ii) progress in building research ca-
7 pacity, including both infrastructure and
8 personnel, in EPSCoR jurisdictions, includ-
9 ing at historically Black colleges and uni-
10 versities, Tribal Colleges or Universities,
11 minority-serving institutions, and emerging
12 research institutions; and

13 (iii) if the Foundation does not meet
14 the requirement described in subparagraph
15 (A), an explanation relating thereto and a
16 plan for compliance in the following fiscal
17 year and remediation.

18 (G) *ANALYSIS AND SUSTAINABILITY RE-*
19 *PORT.*—Not later than December 31, 2026, the
20 Director shall submit to Congress a report con-
21 taining an analysis of the impacts of the re-
22 quirements under subparagraphs (A) and (B).
23 The report shall include—

24 (i) an analysis of how the requirements
25 under this paragraph affected the balance of

1 total funding awarded by the Foundation to
2 states and territories across the United
3 States;

4 (ii) an analysis of any changes in
5 award success and total funding awarded to
6 Historically black colleges and universities,
7 Tribal Colleges or Universities, minority-
8 serving institutions, and emerging research
9 institutions between the date of enactment
10 and December 31, 2026;

11 (iii) an analysis of the gains in aca-
12 demic research capacity, quality, and com-
13 petitiveness and in science and technology
14 human resource development in EPSCoR
15 jurisdictions made between the enactment of
16 this Act and December 31, 2026;

17 (iv) an assessment of EPSCoR eligi-
18 bility criteria and determination on wheth-
19 er new eligibility criteria should be devel-
20 oped based on the findings from clauses (i),
21 (ii), and (iii); and

22 (v) a plan to sustain and grow im-
23 provements in research capacity and com-
24 petitiveness in EPSCoR jurisdictions.

25 (H) EPSCoR ELIGIBILITY.—

1 (i) *IN GENERAL.*—*The Director shall*
2 *ensure eligibility for current EPSCoR juris-*
3 *dictions for five years from the date of en-*
4 *actment of this Act, after which the Director*
5 *shall determine whether new eligibility cri-*
6 *teria should be developed based on the find-*
7 *ings in the report required under subpara-*
8 *graph (G).*

9 (ii) *REPORT.*—*Not later than Decem-*
10 *ber 31, 2028, the Director shall report to*
11 *Congress regarding any new eligibility cri-*
12 *teria determined under clause (i), any*
13 *changes to jurisdictional eligibility based on*
14 *such criteria, and the necessity and practi-*
15 *cality of continuing or modifying the re-*
16 *quirement under subparagraph (A) given*
17 *any such changes to eligibility. The report*
18 *shall include an analysis of options to sup-*
19 *port regions in non-EPSCoR jurisdictions,*
20 *adjacent to EPSCoR jurisdictions, that his-*
21 *torically receive disproportionately low lev-*
22 *els of funding from the Foundation, includ-*
23 *ing, if appropriate, options to expand the*
24 *EPSCoR program or to establish new pro-*
25 *grams.*

1 **(b) FOSTERING STEM RESEARCH DIVERSITY AND CA-**
2 **PACITY PROGRAM.—**

3 **(1) IN GENERAL.—***The Director shall make*
4 *awards on a competitive, merit-reviewed basis to eli-*
5 *gible institutions to implement and study innovative*
6 *approaches for building research capacity in order to*
7 *engage and retain students from a range of institu-*
8 *tions and diverse backgrounds in STEM.*

9 **(2) ELIGIBLE INSTITUTION DEFINED.—***In this*
10 *subsection the term “eligible institution” means an*
11 *institution of higher education that, according to the*
12 *data published by the National Center for Science*
13 *and Engineering Statistics, is not, on average, among*
14 *the top 100 institutions in Federal research and de-*
15 *velopment expenditures during the 3-year period*
16 *prior to the year of the award.*

17 **(3) PURPOSE.—***The activities under this sub-*
18 *section shall be focused on achieving simultaneous im-*
19 *pacts at the student, faculty, and institutional levels*
20 *by increasing the research capacity at eligible institu-*
21 *tions and the number of undergraduate and graduate*
22 *students pursuing STEM degrees from eligible insti-*
23 *tutions.*

24 **(4) REQUIREMENTS.—***In carrying out this pro-*
25 *gram, the Director shall—*

1 (A) *require eligible institutions seeking*
2 *funding under this subsection to submit an ap-*
3 *plication to the Director at such time, in such*
4 *manner, containing such information and assur-*
5 *ances as the Director may require. The applica-*
6 *tion shall include, at a minimum a description*
7 *of how the eligible institution plans to sustain*
8 *the proposed activities beyond the duration of the*
9 *award;*

10 (B) *require applicants to identify dis-*
11 *ciplines and focus areas in which the eligible in-*
12 *stitution can excel, and explain how the appli-*
13 *cant will use the award to build capacity to bol-*
14 *ster the institutional research competitiveness of*
15 *eligible entities to support awards made by the*
16 *Foundation and increase regional and national*
17 *capacity in STEM;*

18 (C) *require the awards funded under this*
19 *subsection to support research and related activi-*
20 *ties, which may include—*

21 (i) *development or expansion of re-*
22 *search programs in disciplines and focus*
23 *areas in subparagraph (B);*

24 (ii) *faculty recruitment and profes-*
25 *sional development in disciplines and focus*

1 *areas in subparagraph (B), including for*
2 *early-career researchers;*

3 *(iii) stipends for undergraduate and*
4 *graduate students participating in research*
5 *in disciplines and focus areas in subpara-*
6 *graph (B);*

7 *(iv) acquisition of instrumentation*
8 *necessary to build research capacity at an*
9 *eligible institution in disciplines and focus*
10 *areas in subparagraph (B);*

11 *(v) an assessment of capacity-building*
12 *and research infrastructure needs;*

13 *(vi) administrative research develop-*
14 *ment support; and*

15 *(vii) other activities necessary to build*
16 *research capacity; and*

17 *(D) require that no eligible institution*
18 *should receive more than \$10,000,000 in any*
19 *single year of funds made available under this*
20 *section.*

21 *(5) ADDITIONAL CONSIDERATIONS.—In making*
22 *awards under this subsection, the Director may also*
23 *consider—*

1 (A) *the extent to which the applicant will*
2 *support students from diverse backgrounds, in-*
3 *cluding first-generation undergraduate students;*

4 (B) *the geographic and institutional diver-*
5 *sity of the applying institutions; and*

6 (C) *how the applicants can leverage public-*
7 *private partnerships and existing partnerships*
8 *with Federal Research Agencies.*

9 (6) *DUPLICATION.—The Director shall ensure the*
10 *awards made under this subsection are complemen-*
11 *tary and not duplicative of existing programs.*

12 (7) *REPORT.—The Director shall submit a re-*
13 *port to Congress after the third year of the program*
14 *that includes—*

15 (A) *an assessment of the effectiveness of the*
16 *program for growing the geographic and institu-*
17 *tional diversity of institutions of higher edu-*
18 *cation receiving research awards from the Foun-*
19 *dation;*

20 (B) *an assessment of the quality, quantity,*
21 *and geographic and institutional diversity of in-*
22 *stitutions of higher education conducting*
23 *Foundation- sponsored research since the estab-*
24 *lishment of the program in this subsection;*

1 (C) *an assessment of the quantity and di-*
2 *versity of undergraduate and graduate students*
3 *graduating from eligible institutions with STEM*
4 *degrees; and*

5 (D) *statistical summary data on the pro-*
6 *gram, including the geographic and institutional*
7 *allocation of award funding, the number and di-*
8 *versity of supported graduate and undergraduate*
9 *students, and how it contributes to capacity*
10 *building at eligible entities.*

11 (8) *AUTHORIZATION OF APPROPRIATIONS.—*

12 *There is authorized to be appropriated to the Director*
13 *\$150,000,000 for each of the fiscal years 2023 through*
14 *2027 to carry out the activities under this subsection.*

15 (c) *PARTNERSHIPS WITH EMERGING RESEARCH IN-*
16 *STITUTIONS.—*

17 (1) *IN GENERAL.—The Director shall establish a*
18 *five-year pilot program for awards to research part-*
19 *nerships that involve emerging research institutions*
20 *and may involve institutions classified as very high*
21 *research activity by the Carnegie Classification of In-*
22 *stitutions of Higher Education at the time of applica-*
23 *tion.*

24 (2) *REQUIREMENTS.—In carrying out this pro-*
25 *gram, the Director shall—*

1 (A) require that each proposal submitted by
2 a multi-institution collaboration for an award,
3 including those under subtitle G of this title, that
4 exceeds \$1,000,000, as appropriate, specify how
5 the applicants will support substantive, mean-
6 ingful, sustainable, and mutually beneficial
7 partnerships with one or more emerging research
8 institutions;

9 (B) require recipients funded under this
10 subsection to direct no less than 35 percent of the
11 total award to one or more emerging research in-
12 stitutions;

13 (C) require recipients funded under this
14 subsection to report on the partnership activities
15 as part of the annual reporting requirements of
16 the Foundation; and

17 (D) solicit feedback on the partnership di-
18 rectly from partner emerging research institu-
19 tions, in such form as the Director deems appro-
20 priate.

21 (3) *CAPACITY BUILDING.*—Funds awarded to
22 emerging research institutions under this subsection
23 may be used to build research capacity, including
24 through support for faculty salaries and training,
25 field and laboratory research experiences for under-

1 *graduate and graduate students, and maintenance*
2 *and repair of research equipment and instrumenta-*
3 *tion.*

4 (4) *REPORT.—The Director shall submit a re-*
5 *port to Congress after the third year of the pilot pro-*
6 *gram that includes—*

7 (A) *an assessment, drawing on feedback*
8 *from the research community and other sources*
9 *of information, of the effectiveness of the pilot*
10 *program for improving the quality of partner-*
11 *ships with emerging research institutions; and*

12 (B) *if deemed effective, a plan for perma-*
13 *nent implementation of the pilot program.*

14 **SEC. 10326. DIVERSITY IN TECH RESEARCH.**

15 *The Director shall make awards, on a competitive*
16 *basis, to institutions of higher education or nonprofit orga-*
17 *nizations (or consortia of such institutions or organiza-*
18 *tions) to support basic, applied, and use-inspired research*
19 *that yields a scientific evidence base for improving the de-*
20 *sign and emergence, development and deployment, and*
21 *management and ultimate effectiveness of entities involved*
22 *in technology research, including research related to diver-*
23 *sity and inclusion in the technology sector.*

24 **SEC. 10327. CHIEF DIVERSITY OFFICER OF THE NSF.**

25 (a) *CHIEF DIVERSITY OFFICER.—*

1 (1) *APPOINTMENT.*—*The Director shall appoint*
2 *a senior agency official within the Office of the Direc-*
3 *tor as a Chief Diversity Officer.*

4 (2) *QUALIFICATIONS.*—*The Chief Diversity Offi-*
5 *cer shall have significant experience, within the Fed-*
6 *eral Government and the science community, with*
7 *diversity- and inclusion-related matters, including—*

8 (A) *civil rights compliance;*

9 (B) *harassment policy, reviews, and inves-*
10 *tigations;*

11 (C) *equal employment opportunity; and*

12 (D) *disability policy.*

13 (b) *DUTIES.*—*The Chief Diversity Officer is respon-*
14 *sible for providing advice on policy, oversight, guidance,*
15 *and coordination with respect to matters of the Foundation*
16 *related to diversity and inclusion, including ensuring the*
17 *geographic diversity of the Foundation programs. Other du-*
18 *ties may include—*

19 (1) *establishing and maintaining a strategic*
20 *plan that publicly states a diversity definition, vi-*
21 *sion, and goals for the Foundation;*

22 (2) *defining a set of strategic metrics that are—*

23 (A) *directly linked to key organizational*
24 *priorities and goals;*

25 (B) *actionable; and*

1 (C) actively used to implement the strategic
2 plan under paragraph (1);

3 (3) advising in the establishment of a strategic
4 plan for diverse participation by individuals and in-
5 stitutions of higher education, including community
6 colleges, historically Black colleges and universities,
7 Tribal Colleges or Universities, minority serving in-
8 stitutions, institutions of higher education with an es-
9 tablished STEM capacity building program focused
10 on Native Hawaiians or Alaska Natives, and
11 EPSCoR institutions);

12 (4) advising in the establishment of a strategic
13 plan for outreach to, and recruiting from, untapped
14 locations and underrepresented populations;

15 (5) advising on a diversity and inclusion strat-
16 egy for the Foundation’s portfolio of PreK–12 STEM
17 education focused programs and activities, including
18 goals for addressing barriers to participation;

19 (6) advising on the application of the Founda-
20 tion’s broader impacts review criterion; and

21 (7) performing such additional duties and exer-
22 cise such powers as the Director may prescribe.

23 (c) *AUTHORIZATION OF APPROPRIATIONS.*—To carry
24 out this section, there are authorized to be appropriated
25 \$5,000,000 for each of fiscal years 2023 through 2027.

1 **SEC. 10328. RESEARCH AND DISSEMINATION TO INCREASE**
2 **THE PARTICIPATION OF WOMEN AND UNDER-**
3 **REPRESENTED MINORITIES IN STEM FIELDS.**

4 (a) *IN GENERAL.*—*The Director shall make awards on*
5 *a competitive, merit-reviewed basis, to institutions of higher*
6 *education or non-profit organizations (or consortia of such*
7 *institutions or organizations), to enable such entities to in-*
8 *crease the participation of women and underrepresented*
9 *minorities in STEM studies and careers.*

10 (b) *USE OF FUNDS.*—*An eligible entity that receives*
11 *an award under this subsection shall use such award funds*
12 *to carry out one or more of the following activities designed*
13 *to increase the participation of women or minorities his-*
14 *torically underrepresented in STEM, or both:*

15 (1) *Research to analyze the record-level data col-*
16 *lected under sections 10502 and 10504, consistent*
17 *with policies to ensure the privacy of individuals*
18 *identifiable by such data.*

19 (2) *Research to study best practices for work-life*
20 *accommodation.*

21 (3) *Research to study the impact of policies and*
22 *practices that are implemented or are otherwise con-*
23 *sistent with the purposes of this section.*

24 (4) *Mentoring programs that facilitate engage-*
25 *ment of STEM professionals with students.*

1 (5) *Research experiences for undergraduate and*
2 *graduate students in STEM fields.*

3 (6) *Outreach to elementary school and secondary*
4 *school students to provide opportunities to increase*
5 *their exposure to STEM fields.*

6 (c) *DISSEMINATION ACTIVITIES.—The Director shall*
7 *carry out dissemination activities consistent with the pur-*
8 *poses of this section, including—*

9 (1) *collaboration with other Federal research*
10 *agencies and professional associations to exchange*
11 *best practices, harmonize work-life accommodation*
12 *policies and practices, and overcoming common bar-*
13 *riers to work-life accommodation; and*

14 (2) *collaboration with institutions of higher edu-*
15 *cation in order to clarify and catalyze the adoption*
16 *of a coherent and consistent set of work-life accommo-*
17 *dation policies and practices.*

18 (d) *AUTHORIZATION OF APPROPRIATIONS.—There are*
19 *authorized to be appropriated to carry out this section*
20 *\$5,000,000 for each of fiscal years 2023, 2024, 2025, 2026,*
21 *and 2027.*

22 **SEC. 10329. ACTIVITIES TO EXPAND STEM OPPORTUNITIES.**

23 (a) *NATIONAL SCIENCE FOUNDATION SUPPORT FOR*
24 *INCREASING DIVERSITY AMONG STEM FACULTY AT INSTI-*
25 *TUTIONS OF HIGHER EDUCATION.—Section 305 of the*

1 *American Innovation and Competitiveness Act (42 U.S.C.*
2 *1862s–5) is amended—*

3 (1) *by redesignating subsections (e) and (f) as*
4 *subsections (g) and (h), respectively; and*

5 (2) *by inserting after subsection (d) the fol-*
6 *lowing:*

7 “(e) *SUPPORT FOR INCREASING DIVERSITY AMONG*
8 *STEM FACULTY AT INSTITUTIONS OF HIGHER EDU-*
9 *CATION.—*

10 “(1) *IN GENERAL.—The Director of the Founda-*
11 *tion shall make awards to institutions of higher edu-*
12 *cation (or consortia thereof) for the development and*
13 *assessment of innovative reform efforts designed to in-*
14 *crease the recruitment, retention, and advancement of*
15 *individuals from underrepresented minority groups*
16 *in academic STEM careers, which may include im-*
17 *plementing or expanding successful evidence-based*
18 *practices.*

19 “(2) *MERIT REVIEW; COMPETITION.—Awards*
20 *shall be made under this subsection on a merit-re-*
21 *viewed, competitive basis.*

22 “(3) *USE OF FUNDS.—Activities supported by*
23 *awards under this subsection may include—*

24 “(A) *institutional assessment activities,*
25 *such as data analyses and policy review, in*

1 *order to identify and address specific issues in*
2 *the recruitment, retention, and advancement of*
3 *faculty members from underrepresented minority*
4 *groups;*

5 “(B) assessments of distribution of men-
6 toring and advising responsibilities among fac-
7 ulty, particularly for faculty from underrep-
8 resented minority groups, that may detract from
9 time spent on research, publishing papers, and
10 other activities required to achieve tenure status
11 or promotion (or equivalents for non-tenure
12 track faculty) and run a productive research
13 program;

14 “(C) development and assessment of train-
15 ing courses for administrators and search com-
16 mittee members designed to ensure unbiased eval-
17 uation of candidates from underrepresented mi-
18 nority groups;

19 “(D) development and hosting of intra- or
20 inter-institutional workshops to propagate best
21 practices in recruiting, retaining, and advancing
22 faculty members from underrepresented minority
23 groups;

1 “(E) professional development opportunities
2 for faculty members from underrepresented mi-
3 nority groups;

4 “(F) activities aimed at making under-
5 graduate STEM students from underrepresented
6 minority groups aware of opportunities for aca-
7 demic careers in STEM fields; and

8 “(G) activities to identify and engage excep-
9 tional graduate students and postdoctoral re-
10 searchers from underrepresented minority groups
11 at various stages of their studies and to encour-
12 age them to enter academic careers.

13 “(4) SELECTION PROCESS.—

14 “(A) APPLICATION.—An institution of high-
15 er education (or a consortium of such institu-
16 tions) seeking funding under this subsection shall
17 submit an application to the Director of the
18 Foundation at such time, in such manner, and
19 containing such information and assurances as
20 such Director may require. The application shall
21 include, at a minimum, a description of—

22 “(i) the reform effort that is being pro-
23 posed for implementation by the institution
24 of higher education;

1 “(ii) any available evidence of specific
2 difficulties in the recruitment, retention,
3 and advancement of faculty members from
4 underrepresented minority groups in STEM
5 academic careers within the institution of
6 higher education submitting an application,
7 and how the proposed reform effort would
8 address such issues;

9 “(iii) support for the proposed reform
10 effort by administrators of the institution,
11 which may include details on previous or
12 ongoing reform efforts;

13 “(iv) how the proposed reform effort
14 may contribute to change in institutional
15 culture and policy such that a greater value
16 is placed on the recruitment, retention, and
17 advancement of faculty members from
18 underrepresented minority groups;

19 “(v) how the institution of higher edu-
20 cation submitting an application plans to
21 sustain the proposed reform effort beyond
22 the duration of the award, if the effort
23 proved successful; and

24 “(vi) how the success and effectiveness
25 of the proposed reform effort will be evalu-

1 *ated and assessed in order to contribute to*
2 *the national knowledge base about models*
3 *for catalyzing institutional change.*

4 *“(B) AWARD DISTRIBUTION.—The Director*
5 *of the Foundation shall ensure, to the extent*
6 *practicable, that awards under this section are*
7 *made to a variety of types of institutions of*
8 *higher education.*

9 *“(5) AUTHORIZATION OF APPROPRIATIONS.—*
10 *There are authorized to be appropriated to carry out*
11 *this subsection \$8,000,000 for each of fiscal years*
12 *2023 through 2027.”.*

13 *(b) NATIONAL SCIENCE FOUNDATION SUPPORT FOR*
14 *BROADENING PARTICIPATION IN UNDERGRADUATE STEM*
15 *EDUCATION.—Section 305 of the American Innovation and*
16 *Competitiveness Act (42 U.S.C. 1862s–5), as amended by*
17 *subsection (b), is further amended by inserting after sub-*
18 *section (e) the following:*

19 *“(f) SUPPORT FOR BROADENING PARTICIPATION IN*
20 *UNDERGRADUATE STEM EDUCATION.—*

21 *“(1) IN GENERAL.—The Director of the Founda-*
22 *tion shall make awards to institutions of higher edu-*
23 *cation (or a consortium of such institutions) to imple-*
24 *ment or expand research-based reforms in under-*
25 *graduate STEM education for the purpose of recruit-*

1 *ing and retaining students from minority groups who*
2 *are underrepresented in STEM fields.*

3 “(2) *MERIT REVIEW; COMPETITION.*—*Awards*
4 *shall be made under this subsection on a merit-re-*
5 *viewed, competitive basis.*

6 “(3) *USE OF FUNDS.*—*Activities supported by*
7 *awards under this subsection may include—*

8 “(A) *implementation or expansion of inno-*
9 *vative, research-based approaches to broaden*
10 *participation of underrepresented minority*
11 *groups in STEM fields;*

12 “(B) *implementation or expansion of suc-*
13 *cessful, research-based bridge, cohort, tutoring, or*
14 *mentoring programs, including those involving*
15 *community colleges and technical schools, de-*
16 *signed to enhance the recruitment and retention*
17 *of students from underrepresented minority*
18 *groups in STEM fields;*

19 “(C) *implementation or expansion of out-*
20 *reach programs linking institutions of higher*
21 *education and PreK–12 school systems in order*
22 *to heighten awareness among precollege students*
23 *from underrepresented minority groups of oppor-*
24 *tunities in college-level STEM fields and STEM*
25 *careers;*

1 “(D) implementation or expansion of fac-
2 ulty development programs focused on improving
3 retention of undergraduate STEM students from
4 underrepresented minority groups;

5 “(E) implementation or expansion of mech-
6 anisms designed to recognize and reward faculty
7 members who demonstrate a commitment to in-
8 creasing the participation of students from
9 underrepresented minority groups in STEM
10 fields;

11 “(F) expansion of successful reforms aimed
12 at increasing the number of STEM students from
13 underrepresented minority groups beyond a sin-
14 gle course or group of courses to achieve reform
15 within an entire academic unit, or expansion of
16 successful reform efforts beyond a single aca-
17 demic unit or field to other STEM academic
18 units or fields within an institution of higher
19 education;

20 “(G) expansion of opportunities for students
21 from underrepresented minority groups to con-
22 duct STEM research in industry, at Federal
23 labs, and at international research institutions
24 or research sites;

1 “(H) provision of stipends for students from
2 underrepresented minority groups participating
3 in research;

4 “(I) development of research collaborations
5 between research-intensive universities and pri-
6 marily undergraduate historically Black colleges
7 and universities, Tribal Colleges or Universities,
8 and minority serving institutions;

9 “(J) support for graduate students and
10 postdoctoral fellows from underrepresented mi-
11 nority groups to participate in instructional or
12 assessment activities at primarily undergraduate
13 institutions, including primarily undergraduate
14 historically Black colleges and universities, Trib-
15 al Colleges or Universities, and minority serving
16 institutions and 2-year institutions of higher
17 education; and

18 “(K) other activities consistent with para-
19 graph (1), as determined by the Director of the
20 Foundation.

21 “(4) SELECTION PROCESS.—

22 “(A) APPLICATION.—An institution of high-
23 er education (or a consortium thereof) seeking an
24 award under this subsection shall submit an ap-
25 plication to the Director of the Foundation at

1 *such time, in such manner, and containing such*
2 *information and assurances as such Director*
3 *may require. The application shall include, at a*
4 *minimum—*

5 “(i) *a description of the proposed re-*
6 *form effort;*

7 “(ii) *a description of the research find-*
8 *ings that will serve as the basis for the pro-*
9 *posed reform effort or, in the case of appli-*
10 *cations that propose an expansion of a pre-*
11 *viously implemented reform, a description*
12 *of the previously implemented reform effort,*
13 *including data about the recruitment, reten-*
14 *tion, and academic achievement of students*
15 *from underrepresented minority groups;*

16 “(iii) *evidence of an institutional com-*
17 *mitment to, and support for, the proposed*
18 *reform effort, including a long-term com-*
19 *mitment to implement successful strategies*
20 *from the current reform beyond the aca-*
21 *demie unit or units included in the award*
22 *proposal;*

23 “(iv) *a description of how the proposed*
24 *reform effort may contribute to, or in the*
25 *case of applications that propose an expan-*

1 *sion of a previously implemented reforms*
2 *has contributed to, change in institutional*
3 *culture and policy such that a greater value*
4 *is placed on the recruitment, retention and*
5 *academic achievement of students from*
6 *underrepresented minority groups;*

7 *“(v) a description of existing or*
8 *planned institutional policies and practices*
9 *regarding faculty hiring, promotion, tenure,*
10 *and teaching assignment that reward fac-*
11 *ulty contributions to improving the edu-*
12 *cation of students from underrepresented*
13 *minority groups in STEM; and*

14 *“(vi) how the success and effectiveness*
15 *of the proposed reform effort will be evalu-*
16 *ated and assessed in order to contribute to*
17 *the national knowledge base about models*
18 *for catalyzing institutional change,*

19 *“(B) AWARD DISTRIBUTION.—The Director*
20 *of the Foundation shall ensure, to the extent*
21 *practicable, that awards under this subsection*
22 *are made to a variety of types of institutions of*
23 *higher education, including historically Black*
24 *colleges and universities, Tribal Colleges or Uni-*

1 *versities, minority serving institutions, and 2-*
2 *year institutions of higher education.*

3 “(5) *EDUCATION RESEARCH.*—

4 “(A) *IN GENERAL.*—*All awards made under*
5 *this subsection shall include an education re-*
6 *search component that will support the design*
7 *and implementation of a system for data collec-*
8 *tion and evaluation of proposed reform efforts in*
9 *order to build the knowledge base on promising*
10 *models for increasing recruitment and retention*
11 *of students from underrepresented minority*
12 *groups in STEM education at the undergraduate*
13 *level across a diverse set of institutions.*

14 “(B) *DISSEMINATION.*—*The Director of the*
15 *Foundation shall coordinate with the Committee*
16 *on STEM Education of the National Science*
17 *and Technology Council in disseminating the re-*
18 *sults of the research under this paragraph to en-*
19 *sure that best practices in broadening participa-*
20 *tion in STEM education at the undergraduate*
21 *level are made readily available to all institu-*
22 *tions of higher education, other Federal agencies*
23 *that support STEM programs, non-Federal*
24 *fundors of STEM education, and the general*
25 *public.*

1 “(6) *AUTHORIZATION OF APPROPRIATIONS.*—
 2 *There are authorized to be appropriated to carry out*
 3 *this subsection \$15,000,000 for each of fiscal years*
 4 *2023 through 2027.”.*

5 **SEC. 10330. INTRAMURAL EMERGING RESEARCH INSTITU-**
 6 **TIONS PILOT PROGRAM.**

7 (a) *ESTABLISHMENT.*—*The Director may conduct*
 8 *multiple pilot programs, including through existing pro-*
 9 *grams or other programs authorized in this division or di-*
 10 *vision A, within the Foundation to expand the number of*
 11 *institutions of higher education (including such institutions*
 12 *that are community colleges), and other eligible entities that*
 13 *the Director determines appropriate, that are able to suc-*
 14 *cessfully compete for Foundation awards.*

15 (b) *COMPONENTS.*—*Pilot programs under this section*
 16 *may include—*

17 (1) *a mentorship program;*

18 (2) *award application writing technical assist-*
 19 *ance;*

20 (3) *targeted outreach, including to a historically*
 21 *Black college or university, a Tribal college or univer-*
 22 *sity, or a minority-serving institution (including a*
 23 *Hispanic-serving institution or an institution of*
 24 *higher education with an established STEM capacity*

1 *building program focused on Native Hawaiians or*
2 *Alaska Natives);*

3 *(4) programmatic support or solutions for insti-*
4 *tutions or entities that do not have an experienced*
5 *award management office;*

6 *(5) an increase in the number of award proposal*
7 *reviewers from institutions of higher education that*
8 *have not traditionally received funds from the Foun-*
9 *dation; or*

10 *(6) an increase of the term and funding, for a*
11 *period of 3 years or less, as appropriate, for awards*
12 *with a first-time principal investigator, when paired*
13 *with regular mentoring on the administrative aspects*
14 *of award management.*

15 *(c) LIMITATION.—As appropriate, each pilot program*
16 *under this section shall work to reduce administrative bur-*
17 *dens for recipients and award personnel.*

18 *(d) AGENCY-WIDE PROGRAMS.—Not later than 5 years*
19 *after the date of enactment of this Act, the Director shall—*

20 *(1) review the results of the pilot programs under*
21 *this section; and*

22 *(2) develop agencywide best practices from the*
23 *pilot programs for implementation across the Foun-*
24 *dation, in order to fulfill the requirement under sec-*

1 *tion 3(e) of the National Science Foundation Act of*
2 *1950 (42 U.S.C. 1862(e)).*

3 ***Subtitle D—NSF Research Security***

4 ***SEC. 10331. OFFICE OF RESEARCH SECURITY AND POLICY.***

5 *The Director shall maintain a Research Security and*
6 *Policy office within the Office of the Director with not fewer*
7 *than four full-time equivalent positions, in addition to the*
8 *Chief of Research Security established pursuant to section*
9 *10332. The functions of the Research Security and Policy*
10 *office shall be to coordinate all research security policy*
11 *issues across the Foundation, including by—*

12 *(1) consulting and coordinating with the Foun-*
13 *ation Office of Inspector General, with other Federal*
14 *research agencies, and intelligence and law enforce-*
15 *ment agencies, and the National Science and Tech-*
16 *nology Council, as appropriate, in accordance with*
17 *the authority provided under section 1746 of the Na-*
18 *tional Defense Authorization Act for Fiscal Year 2020*
19 *(Public Law 116–92; 42 U.S.C. 6601 note), to iden-*
20 *tify and address potential security risks that threaten*
21 *research integrity and other risks to the research en-*
22 *terprise and to develop research security policy and*
23 *best practices, taking into account the policy guide-*
24 *lines to be issued by the Director of the Office of*

1 *Science and Technology Policy under section 10631 of*
2 *this division;*

3 (2) *serving as a resource at the Foundation for*
4 *all issues related to the security and integrity of the*
5 *conduct of Foundation-supported research;*

6 (3) *conducting outreach and education activities*
7 *for recipients on research policies and potential secu-*
8 *rity risks and on policies and activities to protect in-*
9 *tellectual property and information about critical*
10 *technologies relevant to national security, consistent*
11 *with the controls relevant to the grant or award;*

12 (4) *educating Foundation program managers*
13 *and other directorate staff on evaluating Foundation*
14 *awards and recipients for potential security risks;*

15 (5) *communicating reporting and disclosure re-*
16 *quirements to recipients and applicants for funding;*

17 (6) *performing risk assessments, in consultation,*
18 *as appropriate, with other Federal agencies, of Foun-*
19 *dition proposals and awards using analytical tools to*
20 *assess nondisclosures of required information;*

21 (7) *establishing policies and procedures for iden-*
22 *tifying, communicating, and addressing security risks*
23 *that threaten the integrity of Foundation-supported*
24 *research and development, working in consultation, as*
25 *appropriate, with other Federal agencies, to ensure*

1 *compliance with National Security Presidential*
2 *Memorandum–33 (relating to strengthening protec-*
3 *tions of United States Government-supported research*
4 *and development against foreign government inter-*
5 *ference and exploitation) or a successor policy docu-*
6 *ment; and*

7 (8) *in accordance with relevant policies of the*
8 *agency, conducting or facilitating due diligence with*
9 *regard to applications for research and development*
10 *awards from the Foundation prior to making such*
11 *awards.*

12 **SEC. 10332. CHIEF OF RESEARCH SECURITY.**

13 *The Director shall appoint a senior agency official*
14 *within the Office of the Director as a Chief of Research Se-*
15 *curity, whose primary responsibility shall be to manage the*
16 *office established under section 10331.*

17 **SEC. 10333. REPORTING TO CONGRESS.**

18 (a) *REPORT ON RESOURCE NEEDS.*—*Not later than*
19 *180 days after the date of the enactment of this Act, the*
20 *Director shall provide a report to the Committee on Science,*
21 *Space, and Technology of the House of Representatives, the*
22 *Committee on Commerce, Science, and Transportation of*
23 *the Senate, the Committee on Appropriations of the House*
24 *of Representatives, and the Committee on Appropriations*
25 *of the Senate on the resources and the number of full time*

1 *employees needed to carry out the functions of the office es-*
2 *tablished in section 10331.*

3 *(b) ANNUAL REPORT ON OFFICE ACTIVITIES.—*

4 *(1) IN GENERAL.—Not later than one year after*
5 *the date of the enactment of this Act and annually*
6 *thereafter, the Director shall submit to Congress a re-*
7 *port on the activities carried out by the Office of Re-*
8 *search Security, detailing—*

9 *(A) a description of the activities conducted*
10 *by the Office, including administrative actions*
11 *taken;*

12 *(B) such recommendations as the Director*
13 *may have for legislative or administrative action*
14 *relating to improving research security;*

15 *(C) identification and discussion of the gaps*
16 *in legal authorities that need to be improved to*
17 *enhance the security of institutions of higher*
18 *education performing research supported by the*
19 *Foundation; and*

20 *(D) information on Foundation Inspector*
21 *General cases, as appropriate, relating to undue*
22 *influence and security threats to research and de-*
23 *velopment activities funded by the Foundation,*
24 *including theft of property or intellectual prop-*

1 *erty relating to a project funded by the Founda-*
2 *tion at an institution of higher education.*

3 (2) *FORM.—The report submitted under para-*
4 *graph (1) shall be submitted in both unclassified and*
5 *classified formats, as appropriate.*

6 **SEC. 10334. ONLINE RESOURCE.**

7 *The Director shall develop an online resource hosted*
8 *on the Foundation’s website containing up-to-date informa-*
9 *tion, tailored for institutions and individual researchers,*
10 *including—*

11 (1) *an explanation of Foundation research secu-*
12 *rity policies;*

13 (2) *unclassified guidance on potential security*
14 *risks that threaten research integrity and other risks*
15 *to the research enterprise;*

16 (3) *examples of beneficial international collabo-*
17 *rations and how such collaborations differ from for-*
18 *foreign government interference efforts that threaten re-*
19 *search integrity;*

20 (4) *best practices for mitigating security risks*
21 *that threaten research integrity; and*

22 (5) *additional reference materials, including*
23 *tools that assist organizations seeking Foundation*
24 *funding and awardees in information disclosure to*
25 *the Foundation.*

1 **SEC. 10335. RESEARCH AWARDS.**

2 *The Director shall continue to make awards, on a com-*
3 *petitive basis, to institutions of higher education or non-*
4 *profit organizations (or consortia of such institutions or or-*
5 *ganizations) to support research on the conduct of research*
6 *and the research environment, including research on re-*
7 *search misconduct or breaches of research integrity and det-*
8 *rimental research practices.*

9 **SEC. 10336. AUTHORITIES.**

10 *In addition to existing authorities for preventing*
11 *waste, fraud, abuse, and mismanagement of Federal funds,*
12 *the Director, acting through the Office of Research Security*
13 *and Policy and in coordination with the Foundation’s Of-*
14 *fice of Inspector General, shall have the authority to conduct*
15 *risk assessments, including through the use of open-source*
16 *analysis and analytical tools, of research and development*
17 *award applications and disclosures to the Foundation.*

18 **SEC. 10337. RESPONSIBLE CONDUCT IN RESEARCH TRAIN-**
19 **ING.**

20 *Section 7009 of the America Creating Opportunities*
21 *to Meaningfully Promote Excellence in Technology, Edu-*
22 *cation, and Science Act (42 U.S.C. 1862o–1) is amended*
23 *by—*

24 *(1) striking “and postdoctoral researchers” and*
25 *inserting “postdoctoral researchers, faculty, and other*
26 *senior personnel”; and*

1 (2) *by striking the period and inserting the fol-*
2 *lowing: “, including—*

3 *“(1) mentor training and mentorship;*

4 *“(2) training to raise awareness of potential re-*
5 *search security threats; and*

6 *“(3) Federal export control, disclosure, and re-*
7 *porting requirements.”.*

8 **SEC. 10338. RESEARCH SECURITY AND INTEGRITY INFOR-**
9 **MATION SHARING ANALYSIS ORGANIZATION.**

10 (a) *ESTABLISHMENT.—The Director shall enter into*
11 *an agreement with a qualified independent organization to*
12 *establish a research security and integrity information*
13 *sharing analysis organization (referred to in this section*
14 *as the “RSI-ISAO”), which shall include members described*
15 *in subsection (d) and carry out the duties described in sub-*
16 *section (b).*

17 (b) *DUTIES.—The RSI-ISAO shall—*

18 (1) *serve as a clearinghouse for information to*
19 *help enable the members and other entities in the re-*
20 *search community to understand the context of their*
21 *research and identify improper or illegal efforts by*
22 *foreign entities to obtain research results, know how,*
23 *materials, and intellectual property;*

24 (2) *develop a set of standard risk assessment*
25 *frameworks and best practices, relevant to the re-*

1 search community, to assess research security risks in
2 different contexts;

3 (3) share information concerning security threats
4 and lessons learned from protection and response ef-
5 forts through forums and other forms of communica-
6 tion;

7 (4) provide timely reports on research security
8 risks to provide situational awareness tailored to the
9 research and STEM education community;

10 (5) provide training and support, including
11 through webinars, for relevant faculty and staff em-
12 ployed by institutions of higher education on topics
13 relevant to research security risks and response;

14 (6) enable standardized information gathering
15 and data compilation, storage, and analysis for com-
16 piled incident reports;

17 (7) support analysis of patterns of risk and iden-
18 tification of bad actors and enhance the ability of
19 members to prevent and respond to research security
20 risks; and

21 (8) take other appropriate steps to enhance re-
22 search security.

23 (c) FUNDING.—The Foundation may provide initial
24 funds toward the RSI-ISAO but shall seek to have the fees

1 *authorized in subsection (d)(2) cover the costs of operations*
2 *at the earliest practicable time.*

3 *(d) MEMBERSHIP.—*

4 *(1) IN GENERAL.—The RSI-ISAO shall serve*
5 *and include members representing institutions of*
6 *higher education, nonprofit research institutions, and*
7 *small and medium-sized businesses.*

8 *(2) FEES.—As soon as practicable, members of*
9 *the RSI-ISAO shall be charged an annual rate to en-*
10 *able the RSI-ISAO to cover its costs. Rates shall be*
11 *set on a sliding scale based on research and develop-*
12 *ment expenditures to ensure that membership is acces-*
13 *sible to a diverse community of stakeholders and en-*
14 *sure broad participation. The RSI-ISAO shall develop*
15 *a plan to sustain the RSI-ISAO without Federal*
16 *funding, as practicable.*

17 *(e) BOARD OF DIRECTORS.—The RSI-ISAO may es-*
18 *tablish a board of directors to provide guidance for policies,*
19 *legal issues, and plans and strategies of the entity’s oper-*
20 *ations. The board shall include a diverse group of stake-*
21 *holders representing the research community, including*
22 *academia, industry, and experienced research security ad-*
23 *ministrators.*

24 *(f) STAKEHOLDER ENGAGEMENT.—In establishing the*
25 *RSI-ISAO under this section, the Director shall take nec-*

1 *essary steps to ensure the services provided are aligned with*
2 *the needs of the research community, including by—*

3 *(1) convening a series of workshops or other*
4 *multi-stakeholder events; or*

5 *(2) publishing a description of the services the*
6 *RSI-ISAO intends to provide and the requirements*
7 *for membership in the Federal Register and provide*
8 *an opportunity for submission of public comments for*
9 *a period of not less than 60 days.*

10 **SEC. 10339. PLAN WITH RESPECT TO CONTROLLED INFOR-**
11 **MATION AND BACKGROUND SCREENING.**

12 *(a) IN GENERAL.—Not later than 180 days after the*
13 *enactment of this Act, the Director, in consultation with*
14 *the Director of National Intelligence and, as appropriate,*
15 *other Federal agencies, shall develop a plan to—*

16 *(1) identify research areas supported by the*
17 *Foundation, including in the key technology focus*
18 *areas, that may involve access to controlled unclassi-*
19 *fied or classified information, including in the key*
20 *technology focus areas; and*

21 *(2) exercise due diligence in granting access, as*
22 *appropriate, to the CUI or classified information*
23 *identified under paragraph (1) to individuals work-*
24 *ing on such research who are employees of the Foun-*

1 *ation or covered individuals on research and devel-*
2 *opment awards funded by the Foundation.*

3 *(b) DEFINITIONS.—In this section:*

4 *(1) CLASSIFIED INFORMATION.—The term “clas-*
5 *sified information” means any information that has*
6 *been determined pursuant to Executive Order 13526,*
7 *any predecessor or successor order, or sections 1-274,*
8 *275-321, and 1001-3115 of the Atomic Energy Act of*
9 *1954 (42 U.S.C. 2011-2021, 2022-2286i, 2296a-*
10 *2297h-13) to require protection against unauthorized*
11 *disclosure and that is so designated.*

12 *(2) CONTROLLED UNCLASSIFIED INFORMATION.—*
13 *The term “controlled unclassified information” or*
14 *“CUI” means information described as “Controlled*
15 *Unclassified Information” under Executive Order*
16 *13556 or any successor order, to require protection*
17 *against unauthorized disclosure and that is so des-*
18 *ignated.*

19 **SEC. 10339A. FOUNDATION FUNDING TO INSTITUTIONS**
20 **HOSTING OR SUPPORTING CONFUCIUS INSTI-**
21 **TUTES.**

22 *(a) CONFUCIUS INSTITUTE DEFINED.—In this section*
23 *the term “Confucius Institute” means a cultural institute*
24 *established as a partnership between a United States insti-*
25 *tution of higher education and a Chinese institution of*

1 *higher education to promote and teach Chinese language*
2 *and culture that is funded, directly or indirectly, by the*
3 *Government of the People's Republic of China.*

4 **(b) RESTRICTIONS OF CONFUCIUS INSTITUTES.**—*Ex-*
5 *cept as provided in subsection (d), none of the funds made*
6 *available to the Foundation under this division or division*
7 *A, or an amendment made by this division or division A,*
8 *may be obligated or expended to an institution of higher*
9 *education that maintains a contract or agreement between*
10 *the institution and a Confucius Institute, unless the Direc-*
11 *tor, after consultation with the National Academies, deter-*
12 *mines such a waiver is appropriate in accordance with sub-*
13 *section (c).*

14 **(c) WAIVER.**—*The Director, after consultation with the*
15 *National Academies, may issue a waiver for an institution*
16 *of higher education that maintains a contract or agreement*
17 *between the institution and a Confucius Institute if such*
18 *contract or agreement includes clear provisions that—*

19 (1) *protect academic freedom at the institution;*

20 (2) *prohibit the application of any foreign law*
21 *on any campus of the institution;*

22 (3) *grant full managerial authority of the Confu-*
23 *cius Institute to the institution, including full control*
24 *over what is being taught, the activities carried out,*

1 *the research awards that are made, and who is em-*
2 *ployed at the Confucius Institute; and*

3 (4) *prohibit co-location with the institution's*
4 *Chinese language, history, and cultural programs and*
5 *require separate promotional materials.*

6 (d) *SPECIAL RULE.—*

7 (1) *IN GENERAL.—Notwithstanding any other*
8 *provision of this section, this section shall not apply*
9 *to an institution of higher education if that institu-*
10 *tion has fulfilled the requirements for a waiver from*
11 *the Department of Defense as described under section*
12 *1062 of the National Defense Authorization Act for*
13 *Fiscal Year 2021 (Public Law 116–283).*

14 (2) *EXCEPTION.—Notwithstanding any other*
15 *provision of this section, the prohibition under sub-*
16 *section (b) shall not apply to amounts provided to*
17 *students as educational assistance.*

18 (e) *EFFECTIVE DATE.—The limitation under sub-*
19 *section (b) shall apply with respect to the first fiscal year*
20 *that begins after the date that is two years after the date*
21 *of the enactment of this Act and to any subsequent fiscal*
22 *year subject to subsection (f).*

23 (f) *SUNSET.—This section shall cease to be effective on*
24 *the date that is five years after the date of the enactment*
25 *of this Act.*

1 **SEC. 10339B. FOREIGN FINANCIAL SUPPORT.**

2 (a) *IN GENERAL.*—*The Director shall request, on an*
3 *annual basis, from a recipient institution of higher edu-*
4 *cation a disclosure, in the form of a summary document,*
5 *from the institution, a foundation of the institution, and*
6 *related entities such as any educational, cultural, or lan-*
7 *guage entity, of the current financial support, the value of*
8 *which is \$50,000 or more, including gifts and contracts,*
9 *received directly or indirectly from a foreign source (as such*
10 *term is defined in section 117 of the Higher Education Act*
11 *of 1965 (20 U.S.C. 1011f(h)(2))) associated with a foreign*
12 *country of concern.*

13 (b) *RECORDS.*—*Each disclosure to the Director under*
14 *this section shall be made on the condition that the institu-*
15 *tion will maintain a true copy of the relevant records sub-*
16 *ject to the disclosure requirement until the latest of—*

17 (1) *the date that is four years after the date of*
18 *the agreement;*

19 (2) *the date on which the agreement terminates;*
20 *or*

21 (3) *the last day of any period that applicable*
22 *State public record law requires a true copy of such*
23 *agreement to be maintained.*

24 (c) *DOCUMENTATION.*—*Upon review of the disclosures*
25 *under this section, the Director may request that a recipient*
26 *institution provide true copies of any contracts, agreements,*

1 *or documentation of financial transactions associated with*
2 *disclosures made under this section.*

3 (d) *OFFICE OF THE INSPECTOR GENERAL.—The Di-*
4 *rector, acting through the Office of Research Security and*
5 *Policy in coordination with the Foundation’s Office of In-*
6 *spector General and in consultation with the recipient in-*
7 *stitution, may reduce the award funding amount or sus-*
8 *pend or terminate the award if the Director determines—*

9 (1) *such institution fails to comply with the*
10 *records retention requirement in subsection (b) or*
11 *fails to provide information requested under this sec-*
12 *tion; or*

13 (2) *the Chief of Research Security determines the*
14 *disclosures under this section indicate a threat to re-*
15 *search security.*

16 **SEC. 10339C. AUTHORIZATION OF APPROPRIATIONS.**

17 *From any amounts appropriated for the Foundation*
18 *for each of fiscal years 2023 through 2027, the Director shall*
19 *allocate \$6,000,000 to carry out the activities under this*
20 *subtitle.*

21 ***Subtitle E—Fundamental Research***

22 **SEC. 10341. BROADER IMPACTS.**

23 (a) *ASSESSMENT.—Not later than 120 days after the*
24 *date of enactment of this Act, the Director shall enter into*
25 *an agreement with a qualified independent organization to*

1 *assess how the Broader Impacts review criterion is applied*
2 *across the Foundation and make recommendations for im-*
3 *proving the effectiveness for meeting the goals established*
4 *in section 526 of the America Creating Opportunities to*
5 *Meaningfully Promote Excellence in Technology, Edu-*
6 *cation, and Science Reauthorization Act of 2010 (42 U.S.C.*
7 *1862p-14).*

8 (b) *ACTIVITIES.*—*The Director shall make awards on*
9 *a competitive basis, to institutions of higher education or*
10 *non-profit organizations (or consortia of such institutions*
11 *or organizations) to support activities to increase the effi-*
12 *ciency, effectiveness, and availability of resources for imple-*
13 *menting the Broader Impacts review criterion, including—*

14 (1) *training and workshops for program officers,*
15 *merit review panelists, award office administrators,*
16 *faculty, and students to improve understanding of the*
17 *goals and the full range of potential broader impacts*
18 *available to researchers to satisfy this criterion;*

19 (2) *repositories and clearinghouses for sharing*
20 *best practices and facilitating collaboration; and*

21 (3) *tools for evaluating and documenting societal*
22 *impacts of research.*

1 **SEC. 10342. SENSE OF CONGRESS.**

2 *It is the sense of Congress that the Director should con-*
3 *tinue to identify opportunities to reduce the administrative*
4 *burden on researchers.*

5 **SEC. 10343. RESEARCH ETHICS.**

6 (a) *SENSE OF CONGRESS.—It is the sense of Congress*
7 *that—*

8 (1) *a number of emerging areas of research have*
9 *potential ethical, social, safety, and security implica-*
10 *tions that might be apparent as early as the basic re-*
11 *search stage;*

12 (2) *the incorporation of ethical, social, safety,*
13 *and security considerations into the research design*
14 *and review process for Federal awards, may help*
15 *mitigate potential harms before they happen;*

16 (3) *the Foundation’s agreement with the Na-*
17 *tional Academies to conduct a study and make rec-*
18 *ommendations with respect to governance of research*
19 *in emerging technologies is a positive step toward ac-*
20 *complishing this goal; and*

21 (4) *the Foundation should continue to work with*
22 *stakeholders to promote best practices for governance*
23 *of research in emerging technologies at every stage of*
24 *research.*

25 (b) *INCORPORATION OF ETHICS CONSIDERATIONS.—*
26 *Drawing on stakeholder input, not later than 24 months*

1 *after the date of enactment of this Act, the Director shall*
2 *revise proposal instructions to require that ethical and soci-*
3 *etal considerations are to be included as part of a proposal*
4 *for funding prior to making the award, where such consid-*
5 *erations are applicable. Such considerations shall be evalu-*
6 *ated by the Director in the review of proposals, taking into*
7 *account any relevant input from the peer-reviewers for the*
8 *proposal, and shall factor into award decisions, as deemed*
9 *necessary by the Director. When incorporating such consid-*
10 *erations, proposers may include, as appropriate—*

11 (1)(A) *any readily foreseeable or quantifiable*
12 *risks to society, including how the research could en-*
13 *able products, technologies, or other outcomes that*
14 *could intentionally or unintentionally cause signifi-*
15 *cant societal harm; or*

16 (B) *an assertion that no readily foreseeable po-*
17 *tential ethical, social, safety, or security implications*
18 *are apparent;*

19 (2) *how technical or social solutions can mitigate*
20 *such risks and, as appropriate, a plan to implement*
21 *such mitigation measures; and*

22 (3) *how partnerships and collaborations in the*
23 *research can help mitigate potential harm and am-*
24 *plify potential societal benefits.*

1 (c) *GUIDANCE.*—*The Director shall solicit stakeholder*
2 *input to develop clear guidance on what constitutes a read-*
3 *ily foreseeable or quantifiable risk as described in subsection*
4 *(b)(1), and to the extent practicable harmonize this policy*
5 *with existing ethical policies or related requirements for*
6 *human subjects.*

7 (d) *RESEARCH.*—*The Director shall make awards, on*
8 *a competitive basis, to institutions of higher education or*
9 *non-profit organizations (or consortia of such institutions*
10 *or organizations) to support—*

11 (1) *research to assess the potential ethical and*
12 *societal implications of Foundation- supported re-*
13 *search and products or technologies enabled by such*
14 *research, including the benefits and risks identified*
15 *pursuant to subsection (b)(1); and*

16 (2) *the development and verification of ap-*
17 *proaches to proactively mitigate foreseeable risks to*
18 *society, including the technical and social solutions*
19 *identified pursuant to subsection (b)(1).*

20 (e) *ANNUAL REPORT.*—*The Director shall encourage*
21 *recipients to update their consideration of potential risks*
22 *and benefits as appropriate as part of the annual reports*
23 *required by all awardees under the award terms and condi-*
24 *tions.*

1 **SEC. 10344. RESEARCH REPRODUCIBILITY AND**
2 **REPLICABILITY.**

3 (a) *IN GENERAL.*—Consistent with existing Federal
4 law for privacy, intellectual property, and security, the Di-
5 rector shall facilitate public access to research products, in-
6 cluding data, software, and code, developed as part of Foun-
7 dation-supported projects.

8 (b) *DATA MANAGEMENT PLANS.*—

9 (1) *IN GENERAL.*—The Director shall require
10 that every proposal for funding for research include
11 a machine-readable data management plan that in-
12 cludes a description of how the awardee will archive
13 and preserve public access to data, software, and code
14 developed as part of the proposed project.

15 (2) *REQUIREMENTS.*—In carrying out the re-
16 quirement in paragraph (1), the Director shall—

17 (A) provide necessary resources, including
18 trainings and workshops, to educate researchers
19 and students on how to develop and review high
20 quality data management plans;

21 (B) ensure program officers and merit re-
22 view panels are equipped with the resources and
23 training necessary to review the quality of data
24 management plans; and

25 (C) ensure program officers and merit re-
26 view panels treat data management plans as es-

1 *essential elements of award proposals, where ap-*
2 *propriate.*

3 (c) *OPEN REPOSITORIES.*—*The Director shall—*

4 (1) *consult with the heads of other Federal re-*
5 *search agencies, as appropriate, and solicit input*
6 *from the scientific community, to develop and widely*
7 *disseminate a set of criteria for trusted open reposi-*
8 *tories to be used by Foundation-funded researchers,*
9 *accounting for discipline-specific needs and necessary*
10 *protections for sensitive information;*

11 (2) *work with stakeholders to identify significant*
12 *gaps in available repositories meeting the criteria de-*
13 *veloped under paragraph (1) and options for sup-*
14 *porting the development of additional or enhanced re-*
15 *positories;*

16 (3) *make awards on a competitive basis to insti-*
17 *tutions of higher education or non-profit organiza-*
18 *tions (or consortia of such institutions or organiza-*
19 *tions) for the development, upgrades, and mainte-*
20 *nance of open data repositories that meet the criteria*
21 *developed under paragraph (1);*

22 (4) *work with stakeholders and build on existing*
23 *models, where appropriate, to establish a single, pub-*
24 *lic, web-based point of access to help users locate re-*

1 *positories storing data, software, and code resulting*
2 *from or used in Foundation-supported projects;*

3 (5) *work with stakeholders to establish the nec-*
4 *essary policies and procedures and allocate the nec-*
5 *essary resources to ensure, as practicable, data under-*
6 *lying published findings resulting from Foundation-*
7 *supported projects are deposited in repositories meet-*
8 *ing the criteria developed under paragraph (1) at the*
9 *time of publication;*

10 (6) *incentivize the deposition of data, software,*
11 *and code into repositories that meet the criteria devel-*
12 *oped under paragraph (1); and*

13 (7) *coordinate with the scientific publishing com-*
14 *munity and the heads of other relevant Federal de-*
15 *partments and agencies to support the development of*
16 *voluntary consensus standards around data archiving*
17 *and sharing.*

18 (d) *RESEARCH, DEVELOPMENT, AND EDUCATION.—*
19 *The Director shall make awards, on a competitive basis to*
20 *institutions of higher education or non-profit organizations*
21 *(or consortia of such institutions or organizations) to—*

22 (1) *support research and development of open*
23 *source, sustainable, usable tools and infrastructure*
24 *that support reproducibility for a broad range of*
25 *studies across different disciplines;*

1 (2) *support research on computational reproduc-*
2 *ibility, including the limits of reproducibility and the*
3 *consistency of computational results in the develop-*
4 *ment of new computation hardware, tools, and meth-*
5 *ods; and*

6 (3) *support the education and training of stu-*
7 *dents, faculty, and researchers on computational*
8 *methods, tools, and techniques to improve the quality*
9 *and sharing of data, code, and supporting metadata*
10 *to produce reproducible research.*

11 **SEC. 10345. CLIMATE CHANGE RESEARCH.**

12 *The Director shall make awards, on a competitive*
13 *basis, to institutions of higher education or non-profit orga-*
14 *nizations (or consortia of such institutions or organiza-*
15 *tions) to support research to improve our understanding of*
16 *the climate system and related human and environmental*
17 *systems.*

18 **SEC. 10346. SOCIAL, BEHAVIORAL, AND ECONOMIC**
19 **SCIENCES.**

20 *The Director shall—*

21 (1) *actively communicate opportunities and so-*
22 *licit proposals for social, behavioral, and economic*
23 *science researchers to participate in cross-cutting and*
24 *interdisciplinary programs, including the Conver-*

1 *gence Accelerator and agency priority activities, and*
2 *the Mid-Scale Research Infrastructure program; and*
3 (2) *ensure social, behavioral, and economic*
4 *science researchers are represented on relevant merit*
5 *review panels for such activities.*

6 **SEC. 10347. MEASURING IMPACTS OF FEDERALLY FUNDED**
7 **RESEARCH AND DEVELOPMENT.**

8 *The Director shall make awards on a competitive,*
9 *merit-reviewed basis to institutions of higher education or*
10 *non-profit organizations (or consortia of such institutions*
11 *or organizations) to support research and development of*
12 *data, models, indicators, and associated analytical tools to*
13 *improve our understanding of the impacts of Federally*
14 *funded research on society, the economy, and the workforce,*
15 *including domestic job creation.*

16 **SEC. 10348. FOOD-ENERGY-WATER RESEARCH.**

17 *The Director shall make awards on a competitive basis*
18 *to institutions of higher education or non-profit organiza-*
19 *tions (or consortia of such institutions or organizations)*
20 *to—*

21 (1) *support research to significantly advance our*
22 *understanding of the food-energy-water system*
23 *through quantitative and computational modeling,*
24 *including support for relevant cyberinfrastructure;*

1 (2) *develop real-time, cyber-enabled interfaces*
2 *that improve understanding of the behavior of food-*
3 *energy-water systems and increase decision support*
4 *capability;*

5 (3) *support research that will lead to innovative*
6 *solutions to critical food-energy-water system prob-*
7 *lems; and*

8 (4) *grow the scientific workforce capable of*
9 *studying and managing the food-energy-water system,*
10 *through education and other professional development.*

11 **SEC. 10349. BIOLOGICAL FIELD STATIONS AND MARINE LAB-**
12 **ORATORIES.**

13 *The Director shall continue to support enhancing, re-*
14 *pairing and maintaining research instrumentation, labora-*
15 *tories, telecommunications and housing at biological field*
16 *stations and marine laboratories.*

17 **SEC. 10350. SUSTAINABLE CHEMISTRY RESEARCH AND EDU-**
18 **CATION.**

19 *In accordance with section 263 of the National Defense*
20 *Authorization Act for Fiscal Year 2021, the Director shall*
21 *carry out activities in support of sustainable chemistry, in-*
22 *cluding—*

23 (1) *establishing a program to make awards, on*
24 *a competitive basis, to institutions of higher edu-*

1 *cation or non-profit organizations (or consortia of*
2 *such institutions or organizations) to support—*

3 *(A) individual investigators and teams of*
4 *investigators, including to the extent practicable,*
5 *early career investigators for research and devel-*
6 *opment;*

7 *(B) collaborative research and development*
8 *partnerships among universities, industry, and*
9 *non-profit organizations;*

10 *(C) integrating sustainable chemistry prin-*
11 *ciples into elementary, secondary, under-*
12 *graduate, and graduate chemistry and chemical*
13 *engineering curriculum and research training,*
14 *as appropriate to that level of education and*
15 *training; and*

16 *(2) incorporating sustainable chemistry into ex-*
17 *isting Foundation research and development pro-*
18 *grams.*

19 **SEC. 10351. RISK AND RESILIENCE RESEARCH.**

20 *The Director shall make awards on a competitive basis*
21 *to institutions of higher education or non-profit organiza-*
22 *tions (or consortia of such institutions or organizations) to*
23 *advance knowledge of risk assessment and predictability*
24 *and to support the creation of tools and technologies, includ-*

1 *ing advancing data analytics and utilization of artificial*
2 *intelligence, for increased resilience through—*

3 *(1) improvements in our ability to understand,*
4 *model, and predict extreme events and natural haz-*
5 *ards;*

6 *(2) the creation of novel engineered systems solu-*
7 *tions for resilient complex infrastructures, particu-*
8 *larly those that address critical interdependence*
9 *among infrastructures and leverage the growing infu-*
10 *sion of cyber-physical-social components into the in-*
11 *frastructures;*

12 *(3) development of equipment and instrumenta-*
13 *tion for innovation in resilient engineered infrastruc-*
14 *tures;*

15 *(4) multidisciplinary research on the behaviors*
16 *individuals and communities engage in to detect, per-*
17 *ceive, understand, predict, assess, mitigate, and pre-*
18 *vent risks and to improve and increase resilience; and*

19 *(5) advancements in multidisciplinary wildfire*
20 *science, including those related to air quality impacts,*
21 *human behavior, and early detection and warning.*

22 **SEC. 10352. UNMANNED AIRCRAFT SYSTEMS TECH-**
23 **NOLOGIES.**

24 *In coordination with the Administrator of the Federal*
25 *Aviation Administration and the Administrator of the Na-*

1 *tional Aeronautics and Space Administration, the Director*
2 *shall carry out a program of research and related activities*
3 *related to unmanned aircraft system technologies, which*
4 *may include a prize competition pursuant to section 24 of*
5 *the Stevenson-Wydler Technology Innovation Act of 1980*
6 *(15 U.S.C. 3719) and support for undergraduate and grad-*
7 *uate curriculum development.*

8 **SEC. 10353. ACCELERATING UNMANNED MARITIME SYS-**
9 **TEMS TECHNOLOGIES.**

10 (a) *IN GENERAL.*—*In order to support advances in*
11 *marine science, maritime domain awareness, and national*
12 *security the Director, in consultation with the Under Sec-*
13 *retary of Commerce for Oceans and Atmosphere and the*
14 *Commandant of the Coast Guard, shall issue awards, on*
15 *a competitive basis, to institutions of higher education or*
16 *nonprofit organizations (or consortia of such institutions*
17 *or organizations) to support research that will accelerate*
18 *innovation to advance unmanned maritime systems for the*
19 *purpose of providing greater maritime domain awareness*
20 *to the Nation.*

21 (b) *COORDINATION.*—*In implementing this section, the*
22 *Director shall coordinate with the Coast Guard, the Depart-*
23 *ment of Defense, the National Oceanic and Atmospheric Ad-*
24 *ministration, and other Federal agencies, including those*

1 *established under the Commercial Engagement Through*
2 *Ocean Technology Act of 2018 (Public Law 115–394).*

3 **SEC. 10354. LEVERAGING INTERNATIONAL EXPERTISE IN**
4 **RESEARCH.**

5 *The Director shall explore and advance opportunities*
6 *for leveraging international capabilities and resources that*
7 *align with the Foundation and United States research com-*
8 *munity priorities and have the potential to benefit United*
9 *States prosperity, security, health, and well-being, includ-*
10 *ing through binational research and development organiza-*
11 *tions and foundations and by sending teams of Foundation*
12 *scientific staff for site visits of scientific facilities and agen-*
13 *cies in other countries. The Director shall establish and im-*
14 *plement policies, including through any research security*
15 *training requirements, to mitigate the potential risks of*
16 *such interactions, including risks to the protection of intel-*
17 *lectual property and the risk of undue foreign influence on*
18 *research.*

19 **SEC. 10355. BIOLOGICAL RESEARCH COLLECTIONS.**

20 *(a) IN GENERAL.—The Director shall continue to sup-*
21 *port databases, tools, methods, and other activities that se-*
22 *cure and improve existing physical and digital biological*
23 *research collections, improve the accessibility of collections*
24 *and collection-related data for research and educational*
25 *purposes, develop capacity for curation and collection man-*

1 agement, and to transfer ownership of collections that are
2 significant to the biological research community, including
3 to museums and universities.

4 (b) *SPECIMEN MANAGEMENT PLAN.*—In consultation
5 with other relevant Federal research agencies, and as the
6 Director determines is appropriate, the Director shall re-
7 quire that proposals submitted to the Foundation for fund-
8 ing for research that involves collecting or generating speci-
9 mens include, as part of the data management plan under
10 section 10344, a description of how the specimens and asso-
11 ciated data will be accessioned into and maintained in an
12 established biological collection.

13 (c) *ACTION CENTER FOR BIOLOGICAL COLLECTIONS.*—
14 In coordination with other relevant Federal research agen-
15 cies, as appropriate, the Director shall make awards on a
16 competitive basis to institutions of higher education or non-
17 profit organizations (or consortia of such institutions or or-
18 ganizations) to facilitate coordination and data sharing
19 among communities of practice for research, education,
20 workforce training, evaluation, and business model develop-
21 ment, including by establishing an Action Center for Bio-
22 logical Collections.

1 **SEC. 10356. CLEAN WATER RESEARCH AND TECHNOLOGY**
2 **ACCELERATION.**

3 *The Director shall make awards on a competitive,*
4 *merit-reviewed basis to institutions of higher education or*
5 *non-profit organizations (or consortia of such institutions*
6 *or organizations) to—*

7 *(1) support transdisciplinary research to signifi-*
8 *cantly advance our understanding of water avail-*
9 *ability, quality, and dynamics and the impact of*
10 *human activity and a changing climate on urban*
11 *and rural water and wastewater systems, including*
12 *in low-income, underserved, and disadvantaged com-*
13 *munities;*

14 *(2) develop, pilot, and deploy innovative tech-*
15 *nologies, systems, and other approaches to identifying*
16 *and addressing challenges that affect water avail-*
17 *ability, quality, and security, including through di-*
18 *rect engagement with affected communities and part-*
19 *nerships with the private sector, State, territorial,*
20 *Tribal, and local governments, non-profit organiza-*
21 *tions and water management professionals; and*

22 *(3) grow the scientific workforce capable of*
23 *studying and managing water and wastewater sys-*
24 *tems and of conducting wastewater surveillance,*
25 *through education, training, and other professional*
26 *development.*

1 **SEC. 10357. TECHNOLOGY AND BEHAVIORAL SCIENCE RE-**
2 **SEARCH.**

3 (a) *IN GENERAL.*—*The Director shall make awards on*
4 *a merit-reviewed, competitive basis for research and devel-*
5 *opment to—*

6 (1) *increase understanding of social media and*
7 *consumer technology access and use patterns and re-*
8 *lated mental health, behavioral, and substance use*
9 *disorder issues, particularly for children and adoles-*
10 *cents; and*

11 (2) *explore the role of social media and consumer*
12 *technology in rising rates of mental health and sub-*
13 *stance use disorder issues, including within commu-*
14 *nities experiencing long-term economic distress.*

15 (b) *COORDINATION TO AVOID DUPLICATION.*—*In mak-*
16 *ing awards under this subsection, the Director shall, for*
17 *purposes of avoiding duplication of activities and research,*
18 *consult, collaborate, and coordinate with the heads of other*
19 *relevant Federal departments and agencies, including the*
20 *Department of Health and Human Services.*

21 **SEC. 10358. MANUFACTURING RESEARCH AMENDMENT.**

22 *Section 506(a) of the America COMPETES Reauthor-*
23 *ization Act of 2010 (42 U.S.C. 1862p–1(a)) is amended—*

24 (1) *in paragraph (5), by striking “and” at the*
25 *end;*

26 (2) *in paragraph (6)—*

1 (A) by striking “and” before “virtual man-
2 ufacturing”; and

3 (B) by striking the period at the end and
4 inserting “; and artificial intelligence and ma-
5 chine learning; and”; and

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

7 “(7) additive manufacturing, including new ma-
8 terial designs, complex materials, rapid printing tech-
9 niques, and real-time process controls.”.

10 **SEC. 10359. CRITICAL MINERALS MINING RESEARCH AND**
11 **DEVELOPMENT.**

12 (a) *CRITICAL MINERALS MINING RESEARCH AND DE-*
13 *VELOPMENT AT THE FOUNDATION.—*

14 (1) *IN GENERAL.—In order to support supply*
15 *chain resiliency, the Director shall make awards, on*
16 *a competitive basis, to institutions of higher edu-*
17 *cation or nonprofit organizations (or consortia of*
18 *such institutions or organizations) to support basic*
19 *research that will accelerate innovation to advance*
20 *critical minerals mining strategies and technologies*
21 *for the purpose of making better use of domestic re-*
22 *sources and eliminating national reliance on min-*
23 *erals and mineral materials that are subject to supply*
24 *disruptions.*

1 (2) *USE OF FUNDS.*—Activities funded by an
2 award under this section may include—

3 (A) *advancing mining research and devel-*
4 *opment activities to develop new mapping and*
5 *mining technologies and techniques, including*
6 *advanced critical mineral extraction and pro-*
7 *duction, separation, alloying, or processing tech-*
8 *niques and technologies that can decrease energy*
9 *intensity to improve existing or to develop new*
10 *supply chains of critical minerals, and to yield*
11 *more efficient, economical, and environmentally*
12 *benign mining practices;*

13 (B) *advancing critical mineral processing*
14 *research activities to improve separation,*
15 *alloying, manufacturing, or recycling techniques*
16 *and technologies that can decrease the energy in-*
17 *tensity, waste, potential environmental impact,*
18 *and costs of those activities;*

19 (C) *conducting long-term earth observation*
20 *of reclaimed mine sites, including the study of*
21 *the evolution of microbial diversity at such sites;*

22 (D) *examining the application of artificial*
23 *intelligence for geological exploration of critical*
24 *minerals, including what size and diversity of*
25 *data sets would be required;*

1 (E) *examining the application of machine*
2 *learning for detection and sorting of critical*
3 *minerals, including what size and diversity of*
4 *data sets would be required;*

5 (F) *conducting detailed isotope studies of*
6 *critical minerals and the development of more*
7 *refined geologic models;*

8 (G) *improved understanding of the geologi-*
9 *cal and geochemical processes through which*
10 *critical minerals form and are concentrated into*
11 *economically viable deposits; or*

12 (H) *providing training and research oppor-*
13 *tunities to undergraduate and graduate students*
14 *to prepare the next generation of mining engi-*
15 *neers and researchers.*

16 (3) *EXISTING PROGRAMS.—The Director shall*
17 *ensure awards made under this subsection are com-*
18 *plementary and not duplicative of existing programs*
19 *across the Foundation and Federal Government.*

20 (b) *CRITICAL MATERIALS INTERAGENCY SUB-*
21 *COMMITTEE.—*

22 (1) *IN GENERAL.—The Critical Minerals Sub-*
23 *committee of the National Science and Technology*
24 *Council (referred to in this section as the “Sub-*
25 *committee”), shall coordinate Federal science and*

1 *technology efforts to ensure secure, reliable, and envi-*
2 *ronmentally sustainable supplies of critical materials*
3 *to the United States.*

4 (2) *PURPOSES.*—*The purposes of the Sub-*
5 *committee shall be—*

6 (A) *to advise and assist the National*
7 *Science and Technology Council, including the*
8 *Committee on Homeland and National Security,*
9 *on United States policies, procedures, and plans*
10 *as it relates to critical materials, including—*

11 (i) *Federal research, development, and*
12 *commercial application efforts to minimize*
13 *the environmental impacts of methods for*
14 *extractions, concentration, separation and*
15 *purification of conventional, secondary, and*
16 *unconventional sources of critical materials;*

17 (ii) *efficient use, substitution, and*
18 *reuse of critical materials;*

19 (iii) *the critical materials workforce of*
20 *the United States; and*

21 (iv) *United States private industry in-*
22 *vestments in innovation and technology*
23 *transfer from federally funded science and*
24 *technology;*

1 (B) to identify emerging opportunities,
2 stimulate international cooperation, and foster
3 the development of secure and reliable supply
4 chains of critical materials and establish sce-
5 nario modeling systems for supply problems of
6 critical materials and energy critical materials;

7 (C) to ensure the transparency of informa-
8 tion and data related to critical materials; and

9 (D) to provide recommendations on coordi-
10 nation and collaboration among the research, de-
11 velopment, and deployment programs and activi-
12 ties of Federal agencies to promote a secure and
13 reliable supply of critical materials necessary to
14 maintain national security, economic well-being,
15 public health, and industrial production.

16 (3) *RESPONSIBILITIES.*—In carrying out this
17 subsection, the Subcommittee may, taking into ac-
18 count the findings and recommendations of relevant
19 advisory committees—

20 (A) provide recommendations on how Fed-
21 eral agencies may improve the topographic, geo-
22 logic, and geophysical mapping of the United
23 States and improve the discoverability, accessi-
24 bility, and usability of the resulting and existing
25 data, to the extent permitted by law and subject

1 to appropriate limitation for purposes of privacy
2 and security;

3 (B) assess the progress towards developing
4 critical materials recycling and reprocessing
5 technologies, and technological alternatives to
6 critical materials;

7 (C) establish a mechanism for the coordina-
8 tion and evaluation of Federal programs with
9 critical material needs, including Federal pro-
10 grams involving research and development, in a
11 manner that complements related efforts carried
12 out by the private sector and other domestic and
13 international agencies and organizations;

14 (D) examine options for accessing and de-
15 veloping critical materials through investment
16 and trade with our allies and partners and pro-
17 vide recommendations;

18 (E) evaluate and provide recommendations
19 to incentivize the development and use of ad-
20 vances in science and technology in the private
21 industry;

22 (F) assess the need for and make rec-
23 ommendations to address the challenges the
24 United States critical materials supply chain
25 workforce faces, including aging and retiring

1 *personnel and faculty, and foreign competition*
2 *for United States talent;*

3 *(G) develop, and update as necessary, a*
4 *strategic plan to guide Federal programs and ac-*
5 *tivities to enhance scientific and technical capa-*
6 *bilities across critical material supply chains,*
7 *including a roadmap that identifies key research*
8 *and development needs and coordinates on-going*
9 *activities for source diversification, more efficient*
10 *use, recycling, and substitution for critical mate-*
11 *rials; as well as cross-cutting mining science,*
12 *data science techniques, materials science, manu-*
13 *facturing science and engineering, computational*
14 *modeling, and environmental health and safety*
15 *research and development;*

16 *(H) assess the need for, and make rec-*
17 *ommendations concerning, the availability and*
18 *adequacy of the supply of technically trained*
19 *personnel necessary for critical materials re-*
20 *search, development, extraction, and industrial*
21 *production, with a particular focus on the prob-*
22 *lem of attracting and maintaining high-quality*
23 *professionals for maintaining an adequate sup-*
24 *ply of energy critical materials; and*

1 (I) report to the appropriate Congressional
2 committees on activities and findings under this
3 section.

4 (c) *DEFINITIONS OF CRITICAL MINERAL AND CRITICAL*
5 *MINERAL OR METAL.*—*In this section, the terms “critical*
6 *mineral” and “critical mineral or metal” include any host*
7 *mineral of a critical mineral (within the meaning of those*
8 *terms in section 7002 of title VII of division Z of the Con-*
9 *solidated Appropriations Act, 2021 (Public Law 116–260)).*

10 **SEC. 10360. STUDY OF AI RESEARCH CAPACITY.**

11 (a) *IN GENERAL.*—*The Director shall conduct a study*
12 *or support the development of a study by a qualified inde-*
13 *pendent organization as determined by the Director, on ar-*
14 *tificial intelligence research capacity at United States insti-*
15 *tutions of higher education.*

16 (b) *STUDY CONTENTS.*—*The Director shall ensure that,*
17 *at a minimum, the study under subsection (a) addresses*
18 *the following topics:*

19 (1) *Which universities are putting out signifi-*
20 *cant peer-reviewed artificial intelligence research, in-*
21 *cluding based on quantity and number of citations.*

22 (2) *For each of the universities described in*
23 *paragraph (1), what specific factors enable their AI*
24 *research, including computing power, data set avail-*
25 *ability, specialized curriculum, faculty and graduate*

1 *students, sources of Federal and non-Federal research*
2 *funding, and industry and other partnerships.*

3 (3) *Promising practices at universities described*
4 *in paragraph (1) for advancing diversity, equity, and*
5 *inclusion in AI research programs.*

6 (4) *Geographic diversity across the country of*
7 *universities with the factors identified in paragraph*
8 (2).

9 (5) *How universities not included in paragraph*
10 *(1) could implement the factors in paragraph (2) to*
11 *produce AI research, as well as case studies that uni-*
12 *versities can look to as examples and potential pilot*
13 *programs that the Federal Government could develop*
14 *or support to help universities produce AI research.*

15 (c) *WORKSHOPS.*—*The Director may support work-*
16 *shops to help inform the study required under this sub-*
17 *section.*

18 (d) *PUBLICATION.*—*The Director shall ensure that the*
19 *study carried out under this subsection is made publicly*
20 *available not later than 12 months after the date of enact-*
21 *ment of this Act.*

22 (e) *AVOID DUPLICATION.*—*The Director shall ensure*
23 *that the activities carried out under this section are not*
24 *duplicative of activities supported by other parts of the*
25 *Foundation or other relevant Federal agencies, including*

1 *but not limited to the activities of the National AI Research*
2 *Resource Task Force.*

3 **SEC. 10361. ADVANCING IOT FOR PRECISION AGRICULTURE**
4 **CAPABILITIES ACT.**

5 (a) *SHORT TITLE.*—*This section may be cited as the*
6 *“Advancing IoT for Precision Agriculture Act of 2021”.*

7 (b) *PURPOSE.*—*It is the purpose of this section to pro-*
8 *mote scientific research and development opportunities for*
9 *connected technologies that advance precision agriculture*
10 *capabilities.*

11 (c) *FOUNDATION DIRECTIVE ON AGRICULTURAL SEN-*
12 *SOR RESEARCH.*—*In making awards under the sensor sys-*
13 *tems and networked systems programs of the Foundation,*
14 *the Director shall include in consideration of portfolio bal-*
15 *ance research and development on sensor connectivity in en-*
16 *vironments of intermittent connectivity and intermittent*
17 *computation—*

18 (1) *to improve the reliable use of advance sensing*
19 *systems in rural and agricultural areas; and*

20 (2) *that considers—*

21 (A) *direct gateway access for locally stored*
22 *data;*

23 (B) *attenuation of signal transmission;*

24 (C) *loss of signal transmission; and*

25 (D) *at-scale performance for wireless power.*

1 (d) *UPDATING CONSIDERATIONS FOR PRECISION AG-*
2 *RICULTURE TECHNOLOGY WITHIN THE NSF ADVANCED*
3 *TECHNICAL EDUCATION PROGRAM.*—Section 3 of the *Sci-*
4 *entific and Advanced-Technology Act of 1992 (42 U.S.C.*
5 *1862i)*, as amended by section 10312, is further amended—

6 (1) in subsection (d)(2), by adding at the end the
7 following:

8 “(G) applications that incorporate distance
9 learning tools and approaches.”; and

10 (2) in subsection (e)(3)—

11 (A) in subparagraph (C), by striking “and”
12 after the semicolon;

13 (B) in subparagraph (D), by striking the
14 period at the end and inserting “; and”; and

15 (C) by adding at the end the following:

16 “(E) applications that incorporate distance
17 learning tools and approaches.”.

18 (e) *GAO REVIEW.*—Not later than 18 months after the
19 date of enactment of this section, the Comptroller General
20 of the United States shall provide—

21 (1) a technology assessment of precision agri-
22 culture technologies, such as the existing use of—

23 (A) sensors, scanners, radio-frequency iden-
24 tification, and related technologies that can mon-

1 *itor soil properties, irrigation conditions, and*
2 *plant physiology;*

3 *(B) sensors, scanners, radio-frequency iden-*
4 *tification, and related technologies that can mon-*
5 *itor livestock activity and health;*

6 *(C) network connectivity and wireless com-*
7 *munications that can securely support digital*
8 *agriculture technologies in rural and remote*
9 *areas;*

10 *(D) aerial imagery generated by satellites*
11 *or unmanned aerial vehicles;*

12 *(E) ground-based robotics;*

13 *(F) control systems design and connectivity,*
14 *such as smart irrigation control systems;*

15 *(G) Global Positioning System-based appli-*
16 *cations; and*

17 *(H) data management software and ad-*
18 *vanced analytics that can assist decision making*
19 *and improve agricultural outcomes; and*

20 *(2) a review of Federal programs that provide*
21 *support for precision agriculture research, develop-*
22 *ment, adoption, education, or training, in existence*
23 *on the date of enactment of this section.*

1 **SEC. 10362. ASTRONOMY AND SATELLITE CONSTELLATIONS.**

2 *The Director shall support research into and the de-*
3 *sign, development, and testing of mitigation measures to*
4 *address the potential impact of satellite constellations on*
5 *Foundation scientific programs by—*

6 (1) *making awards on a competitive basis to*
7 *support study of the potential impacts of satellite con-*
8 *stellations on ground-based optical, infrared, and*
9 *radio astronomy, including through existing pro-*
10 *grams such Spectrum and Wireless Innovation en-*
11 *abled by Future Technologies (SWIFT) and the Spec-*
12 *trum Innovation Initiative;*

13 (2) *supporting research on potential satellite im-*
14 *pacts and benefits and mitigation strategies to be car-*
15 *ried out at one or more Foundation supported Feder-*
16 *ally Funded Research and Development Centers or*
17 *major multiuser research facilities as defined in sec-*
18 *tion 110(g) of the American Innovation and Competi-*
19 *tiveness Act (42 U.S.C. 1862s-2(g)), as appropriate;*
20 *and*

21 (3) *supporting workshops related to the potential*
22 *impact of satellite constellations on scientific research*
23 *and how those constellations could be used to improve*
24 *scientific research.*

1 **SEC. 10363. RESEARCH ON THE IMPACT OF INFLATION.**

2 (a) *IN GENERAL.*—*The Director may make awards, on*
3 *a competitive merit-reviewed basis, to institutions of higher*
4 *education or nonprofit organizations (or consortia of such*
5 *institutions or organizations) to support research to im-*
6 *prove our understanding of the impact of inflation.*

7 (b) *USE OF FUNDS.*—*Activities funded by an award*
8 *under this section may include—*

9 (1) *measuring the economic impact of inflation*
10 *on the American people, including an analysis of*
11 *cost-of-living and wage impacts;*

12 (2) *considering the impact of inflation on Amer-*
13 *ican international competitiveness;*

14 (3) *evaluating the impact of inflation on rural*
15 *and underserved communities throughout the country;*

16 (4) *assessing the ways inflation could impact fu-*
17 *ture American generations; and*

18 (5) *evaluating the impact of policymaking on in-*
19 *flation, including the impact of further Government*
20 *spending.*

21 (c) *COORDINATION TO AVOID DUPLICATION.*—*In mak-*
22 *ing awards under this section, the Director shall, for pur-*
23 *poses of avoiding duplication of activities and research,*
24 *consult, collaborate, and coordinate with the programs and*
25 *policies of other relevant Federal agencies.*

1 **SEC. 10364. MICROGRAVITY UTILIZATION POLICY.**

2 (a) *SENSE OF CONGRESS.*—*It is the sense of Congress*
3 *that space technology and the utilization of the micro-*
4 *gravity environment for science, engineering, and tech-*
5 *nology development is critical to long-term competitiveness*
6 *with near-peer competitors, including China.*

7 (b) *POLICY.*—*To the extent appropriate during an*
8 *award period, the Foundation shall facilitate access by re-*
9 *cipients of Foundation awards to the microgravity environ-*
10 *ment, including in private sector platforms, for the develop-*
11 *ment of science, engineering, and technology relevant to the*
12 *award.*

13 (c) *REPORT.*—*Not later than 180 days after the date*
14 *of enactment of this Act, the Director shall provide to the*
15 *appropriate committees of Congress a report on the Foun-*
16 *dation's plan for facilitating awardee access to the micro-*
17 *gravity environment.*

18 **SEC. 10365. RECOGNITION OF THE ARECIBO OBSERVATORY.**

19 (a) *FINDINGS.*—*Congress finds the following:*

20 (1) *The Department of Defense began developing*
21 *the Arecibo Observatory located in Barrio Esperanza,*
22 *Arecibo, Puerto Rico, during the 1950s, and its char-*
23 *acteristic instrument, a large radio telescope of 305*
24 *meters in diameter was completed in 1963.*

25 (2) *The facility was later owned by the National*
26 *Science Foundation, and supported by the National*

1 *Aeronautics and Space Administration and various*
2 *university partners.*

3 (3) *The Arecibo Observatory’s 305-meter fixed*
4 *spherical radio telescope, was the world’s largest sin-*
5 *gle-dish radio telescope until the Five-Hundred-Meter*
6 *Aperture Spherical Radio Telescope located in*
7 *Gizhou, China, began observing in 2016.*

8 (4) *The 305-meter radio telescope made unparal-*
9 *leled contributions to the fields of radio astronomy,*
10 *planetary, and atmospheric sciences, and played a*
11 *role in inspiring thousands of students in Puerto*
12 *Rico, the Nation, and the world to pursue careers in*
13 *STEM fields through the Arecibo Observatory Edu-*
14 *cation and Public Outreach Programs.*

15 (5) *The radio telescope significantly advanced*
16 *the field of radio astronomy, including the first indi-*
17 *rect detection of gravitational waves, the first detec-*
18 *tion of extrasolar planets, innumerable contributions*
19 *to the field of time domain astronomy and the study*
20 *of the interstellar medium, and played a key role in*
21 *the search for extraterrestrial intelligence.*

22 (6) *The Arecibo Observatory had the best plan-*
23 *etary radar system in the world, used by the National*
24 *Aeronautics and Space Administration for near-*

1 *Earth object detection and was an essential part of*
2 *the agency's planetary defense program.*

3 *(7) The planetary radar at the Arecibo Observ-*
4 *atory has contributed fundamentally and signifi-*
5 *cantly to the knowledge of the solar system.*

6 *(8) The Arecibo Observatory's Incoherent Scatter*
7 *Radar and supporting facilities have provided funda-*
8 *mental understanding of the ionosphere and upper at-*
9 *mosphere, and the interface between the atmosphere*
10 *and space that protects the planet from solar wind,*
11 *meteors, and other potential threats.*

12 *(9) December 1, 2021, marks the 1-year anniver-*
13 *sary of the uncontrolled collapse sustained by the*
14 *radio telescope after a series of cable failures in tower*
15 *4.*

16 *(b) SENSE OF CONGRESS.—It is the sense of Congress*
17 *that the Congress—*

18 *(1) acknowledges the loss of the Arecibo Observ-*
19 *atory's radio telescope due to its collapse and its im-*
20 *plications for the loss of a unique world-class multi-*
21 *disciplinary science facility which conducted research*
22 *in the areas of space and atmospheric sciences, radar*
23 *astronomy and planetary sciences, astronomy, and*
24 *astrophysics;*

1 (2) *acknowledges that the uncontrolled collapse of*
2 *the 305-meter radio telescope represents a loss of as-*
3 *tronomical observation capabilities, scientific research*
4 *and development, planetary defense capabilities, and*
5 *applied science capabilities for the United States;*

6 (3) *recognizes the rich scientific, educational,*
7 *and economic benefits that the Arecibo Telescope has*
8 *made to the people of Puerto Rico, the Nation, and*
9 *the world;*

10 (4) *recognizes the work and contributions made*
11 *by the thousands of dedicated staff who have sup-*
12 *ported the Arecibo Observatory for close to 6 decades;*

13 (5) *commends the National Science Foundation*
14 *for convening a virtual workshop in June 2021, to ex-*
15 *plore ideas for future scientific and educational ac-*
16 *tivities at the Arecibo Observatory; and*

17 (6) *encourages the National Science Foundation,*
18 *in consultation with other Federal agencies, to explore*
19 *opportunities for strengthening and expanding the*
20 *role of the Arecibo Observatory in Puerto Rico*
21 *through education, outreach, and diversity programs,*
22 *and future research capabilities and technology at the*
23 *site.*

1 ***Subtitle F—Research Infrastructure***

2 ***SEC. 10371. FACILITY OPERATION AND MAINTENANCE.***

3 (a) *IN GENERAL.*—*The Director shall continue the Fa-*
4 *ility Operation Transition pilot program for a total of 5*
5 *years.*

6 (b) *COST SHARING.*—*The Facility Operation Transi-*
7 *tion program shall provide funding for 10 to 50 percent*
8 *of the operations and maintenance costs for major research*
9 *facilities that are within the first five years of operation,*
10 *where the share is determined based on—*

11 (1) *the operations and maintenance costs of the*
12 *major research facility; and*

13 (2) *the capacity of the managing directorate or*
14 *division to absorb such costs.*

15 (c) *REPORT.*—*After the fifth year of the pilot program,*
16 *the Director shall transmit a report to Congress that in-*
17 *cludes—*

18 (1) *an assessment, that includes feedback from*
19 *the research community, of the effectiveness of the*
20 *pilot program for—*

21 (A) *supporting research directorates and di-*
22 *visions in balancing investments in research*
23 *grants and funding for the initial operation and*
24 *maintenance of major facilities;*

1 (B) incentivizing the development of new
2 world-class facilities;

3 (C) facilitating interagency and inter-
4 national partnerships;

5 (D) funding core elements of multi-discipli-
6 nary facilities; and

7 (E) supporting facility divestment costs;
8 and

9 (2) if deemed effective, a plan for permanent im-
10 plementation of the pilot program.

11 **SEC. 10372. REVIEWS.**

12 *The Director shall periodically carry out reviews with-*
13 *in each of the directorates and divisions to assess the cost*
14 *and benefits of extending the operations of research facilities*
15 *that have exceeded their planned operational lifespan.*

16 **SEC. 10373. HELIUM CONSERVATION.**

17 (a) *MAJOR RESEARCH INSTRUMENTATION SUP-*
18 *PORT.—*

19 (1) *IN GENERAL.—The Director shall support,*
20 *through the Major Research Instrumentation pro-*
21 *gram, proposal requests that include the purchase, in-*
22 *stallation, operation, and maintenance of equipment*
23 *and instrumentation to reduce consumption of he-*
24 *lium.*

1 (2) *COST SHARING.*—*The Director may waive*
2 *the cost-sharing requirement for helium conservation*
3 *measures for non-Ph.D.-granting institutions of high-*
4 *er education and Ph.D.-granting institutions of high-*
5 *er education that are not ranked among the top 100*
6 *institutions receiving Federal research and develop-*
7 *ment funding, as documented by the National Center*
8 *for Science and Engineering Statistics.*

9 (b) *ANNUAL REPORT.*—*No later than 1 year after the*
10 *date of enactment of this Act and annually for the subse-*
11 *quent two years, the Director shall submit an annual report*
12 *to Congress on the use of funding awarded by the Founda-*
13 *tion for the purchase and conservation of helium. The report*
14 *should include—*

- 15 (1) *the volume and price of helium purchased;*
16 (2) *changes in pricing and availability of he-*
17 *lium; and*
18 (3) *any supply disruptions impacting a substan-*
19 *tial number of institutions.*

20 **SEC. 10374. ADVANCED COMPUTING.**

21 (a) *COMPUTING NEEDS.*—*To gather information about*
22 *the computational needs of Foundation-funded projects, the*
23 *Director shall require award proposals submitted to the*
24 *Foundation, as appropriate, to include estimates of com-*
25 *putational resource needs for projects that require use of*

1 *advanced computing. The Director shall encourage and pro-*
2 *vide access to tools that facilitate the inclusion of these*
3 *measures, including those identified in the 2016 National*
4 *Academies report entitled “Future Directions for NSF Ad-*
5 *vanced Computing Infrastructure to Support U.S. Science*
6 *and Engineering in 2017–2020”.*

7 **(b) REPORTS.**—*The Director shall document and pub-*
8 *lish every two years a summary of the amount and types*
9 *of advanced computing capabilities that are needed to fully*
10 *meet the Foundation’s project needs as identified under sub-*
11 *section (a).*

12 **(c) ROADMAP.**—*To set priorities and guide strategic*
13 *decisions regarding investments in advanced computing ca-*
14 *pabilities, the Director shall develop, publish, and regularly*
15 *update a 5-year advanced computing roadmap that—*

16 **(1)** *describes the advanced computing resources*
17 *and capabilities that would fully meet anticipated*
18 *project needs, including through investments in the*
19 *Mid-Scale Research Infrastructure program and the*
20 *Major Research Equipment and Facilities Construc-*
21 *tion account;*

22 **(2)** *draws on community input, information*
23 *contained in research proposals, allocation requests,*
24 *insights from Foundation-funded cyber-infrastructure*

1 operators, and Foundation-wide information gath-
2 ering regarding community needs;

3 (3) considers computational needs of planned
4 major facilities;

5 (4) reflects anticipated technology trends;

6 (5) informs users and potential partners about
7 future facilities and services;

8 (6) addresses the needs of groups historically
9 underrepresented in STEM and geographic regions
10 with low availability and high demand for advanced
11 computing resources;

12 (7) considers how Foundation-supported ad-
13 vanced computing capabilities can be leveraged for
14 activities through the Directorate for Technology, In-
15 novation, and Partnerships; and

16 (8) provides an update to Congress about the
17 level of funding necessary to fully meet computational
18 resource needs for the research community.

19 (d) SECURING AMERICAN RESEARCH FROM CYBER
20 THEFT.—

21 (1) NETWORKING AND INFORMATION TECH-
22 NOLOGY RESEARCH AND DEVELOPMENT UPDATE.—
23 Section 101(a)(1) of the High-Performance Com-
24 puting Act of 1991 (15 U.S.C. 5511) is amended—

1 (A) by moving the margins of subparagraph
2 (D) and each of subparagraphs (J) through (O)
3 two ems to the left;

4 (B) by redesignating subparagraphs (J)
5 through (O) as subparagraphs (K) through (P),
6 respectively; and

7 (C) by inserting after subparagraph (I) the
8 following:

9 “(J) provide for improving the security, re-
10 liability, and resiliency of computing and net-
11 working systems used by institutions of higher
12 education and other nonprofit research institu-
13 tions for the processing, storage and trans-
14 mission of sensitive federally funded research
15 and associated data;”.

16 (2) COMPUTING ENCLAVE PILOT PROGRAM.—

17 (A) IN GENERAL.—The Director, in con-
18 sultation with the Director of the National Insti-
19 tute of Standards and Technology and the Sec-
20 retary of Energy, and the heads of other relevant
21 Federal departments and agencies, shall establish
22 a pilot program to make awards to ensure the se-
23 curity of federally supported research data and
24 to assist regional institutions of higher education
25 and their researchers in compliance with regula-

1 *tions regarding the safeguarding of sensitive in-*
2 *formation and other relevant regulations and*
3 *Federal guidelines.*

4 *(B) STRUCTURE.—In carrying out the pilot*
5 *program established pursuant to subparagraph*
6 *(A), the Director shall select, for the development,*
7 *installation, maintenance, or sustainment of se-*
8 *ecure computing enclaves, three institutions of*
9 *higher education that have an established grad-*
10 *uate student program and a demonstrated his-*
11 *tory of working with secure information, con-*
12 *sistent with appropriate security protocols.*

13 *(C) REGIONALIZATION.—*

14 *(i) IN GENERAL.—In selecting univer-*
15 *sities pursuant to subparagraph (B), the*
16 *Director shall give preference to institutions*
17 *of higher education with the capability of*
18 *servicing other regional universities.*

19 *(ii) GEOGRAPHIC DISPERSAL.—The en-*
20 *claves should be geographically dispersed to*
21 *better meet the needs of regional interests.*

22 *(D) PROGRAM ELEMENTS.—The Director*
23 *shall work with institutions of higher education*
24 *selected pursuant to subparagraph (B) to—*

1 (i) develop an approved design blue-
2 print for compliance with Federal data pro-
3 tection protocols;

4 (ii) develop a comprehensive and con-
5 fidential list, or a bill of materials, of each
6 binary component of the software, firmware,
7 or product that is required to deploy addi-
8 tional secure computing enclaves;

9 (iii) develop templates for all policies
10 and procedures required to operate the se-
11 cure computing enclave in a research set-
12 ting;

13 (iv) develop a system security plan
14 template; and

15 (v) develop a process for managing a
16 plan of action and milestones for the secure
17 computing enclave.

18 (E) *SUSTAINABILITY*.—In reviewing appli-
19 cations for awards, the Director shall review and
20 consider plans and prospects of the applicant in-
21 stitution of higher education to ensure long-term
22 sustainability of the computing enclave, beyond
23 the availability of Federal funds.

24 (F) *DURATION*.—Subject to other avail-
25 ability of appropriations, the pilot program es-

1 *established pursuant to subparagraph (A) shall op-*
2 *erate for not less than 3 years.*

3 (G) *REPORT.*—

4 (i) *IN GENERAL.*—*The Director shall*
5 *report to Congress not later than 6 months*
6 *after the completion of the pilot program*
7 *under subparagraph (A).*

8 (ii) *CONTENTS.*—*The report required*
9 *under clause (i) shall include—*

10 (I) *an assessment of the pilot pro-*
11 *gram under subparagraph (A), includ-*
12 *ing an assessment of the security bene-*
13 *fits provided by such secure computing*
14 *enclaves;*

15 (II) *recommendations related to*
16 *the value of expanding the network of*
17 *secure computing enclaves; and*

18 (III) *recommendations on the effi-*
19 *cacy of the use of secure computing en-*
20 *claves by other Federal agencies in a*
21 *broader effort to expand security of*
22 *Federal research.*

23 (H) *AUTHORIZATION OF APPROPRIA-*
24 *TIONS.*—*There is authorized to be appropriated*
25 *to the Director, \$38,000,000 for fiscal years 2023*

1 *through 2025, to carry out the activities outlined*
2 *in this paragraph.*

3 **SEC. 10375. NATIONAL SECURE DATA SERVICE.**

4 *(a) IN GENERAL.—The Director, in consultation with*
5 *the Director of the Office of Management and Budget and*
6 *the interagency committee established under section 5103*
7 *of the National Artificial Intelligence Initiative Act of 2020*
8 *(15 U.S.C. 9415), shall establish a demonstration project*
9 *to develop, refine, and test models to inform the full imple-*
10 *mentation of the Commission on Evidence-Based Policy-*
11 *making recommendation for a governmentwide data linkage*
12 *and access infrastructure for statistical activities conducted*
13 *for statistical purposes, as defined in chapter 35 of title 44,*
14 *United States Code.*

15 *(b) ESTABLISHMENT.—Not later than one year after*
16 *the date of enactment of this Act, the Director shall establish*
17 *a National Secure Data Service demonstration project. The*
18 *National Secure Data Service demonstration project shall*
19 *be—*

20 *(1) aligned with the principles, best practices,*
21 *and priority actions recommended by the Advisory*
22 *Committee on Data for Evidence Building, to the ex-*
23 *tent feasible; and*

1 (2) *operated directly by or via a contract that is*
2 *managed by the National Center for Science and En-*
3 *gineering Statistics.*

4 (c) *DATA.—In carrying out this section, the Director*
5 *shall engage with Federal and State agencies to collect, ac-*
6 *quire, analyze, report, and disseminate statistical data in*
7 *the United States and other nations to support government-*
8 *wide evidence-building activities consistent with the Foun-*
9 *dations for Evidence-Based Policymaking Act of 2018.*

10 (d) *VOLUNTARY PARTICIPATION.—Participation in the*
11 *National Secure Data Service demonstration project by*
12 *Federal and State agencies shall be voluntary.*

13 (e) *PRIVACY AND CONFIDENTIALITY PROTECTIONS.—*
14 *If the Director issues a management contract under sub-*
15 *section (b), the recipient shall be designated as an “agent”*
16 *under subchapter III of chapter 35 of title 44, United States*
17 *Code, with all requirements and obligations for protecting*
18 *confidential information delineated in the Confidential In-*
19 *formation Protection and Statistical Efficiency Act of 2018*
20 *and the Privacy Act of 1974.*

21 (f) *TECHNOLOGY AND PRIVACY STANDARDS.—In car-*
22 *rying out this subsection, the Director shall—*

23 (1) *consider application and use only of systems*
24 *and technologies that incorporate protection measures*
25 *to reasonably ensure confidential data and statistical*

1 *products are protected in accordance with obligations*
2 *under subchapter III of chapter 35 of title 44, United*
3 *States Code, including systems and technologies that*
4 *ensure—*

5 *(A) raw data and other sensitive inputs are*
6 *not accessible to recipients of statistical outputs*
7 *from the National Secure Data Service dem-*
8 *onstration project;*

9 *(B) no individual entity's data or informa-*
10 *tion is revealed by the National Secure Data*
11 *Service demonstration project platform to any*
12 *other party in an identifiable form;*

13 *(C) no information about the data assets*
14 *used in the National Secure Data Service dem-*
15 *onstration project is revealed to any other party,*
16 *except as incorporated into the final statistical*
17 *output;*

18 *(D) the National Secure Data Service dem-*
19 *onstration project permits only authorized ana-*
20 *lysts to perform statistical queries necessary to*
21 *answer approved project questions, and prohibits*
22 *any other queries; and*

23 *(E) the National Secure Data Service dem-*
24 *onstration project conducts privacy risk assess-*
25 *ments to minimize the privacy risks to indi-*

1 *vidual entities whose data has been made avail-*
2 *able by a reporting entity, including those pri-*
3 *vacuity risks that could result from data breaches*
4 *of any system operated by the reporting entity,*
5 *as well as for determining approved project ques-*
6 *tions under subparagraph (D) to minimize the*
7 *privacy risks to individuals affected by uses of*
8 *the statistical output; and*

9 *(2) the National Secure Data Service demonstra-*
10 *tion project shall implement reasonable measures*
11 *commensurate with the risks to individuals' privacy*
12 *to achieve the outcomes under subparagraphs (A)*
13 *through (E) of paragraph (1), which may include the*
14 *appropriate application of privacy-enhancing tech-*
15 *nologies and appropriate measures to minimize or*
16 *prevent reidentification risks consistent with any ap-*
17 *plicable guidance or regulations issued under sub-*
18 *chapter III of chapter 35 of title 44, United States*
19 *Code.*

20 *(g) TRANSPARENCY.—The National Secure Data Serv-*
21 *ice established under subsection (b) shall maintain a public*
22 *website with up-to-date information on supported projects.*

23 *(h) REPORT.—Not later than 2 years after the date*
24 *of enactment of this Act, the National Secure Data Service*

1 *demonstration project established under subsection (b) shall*
2 *submit a report to Congress that includes—*

3 *(1) a description of policies for protecting data,*
4 *consistent with applicable Federal law;*

5 *(2) a comprehensive description of all completed*
6 *or active data linkage activities and projects;*

7 *(3) an assessment of the effectiveness of the dem-*
8 *onstration project for mitigating risks and removing*
9 *barriers to a sustained implementation of the Na-*
10 *tional Secure Data Service as recommended by the*
11 *Commission on Evidence-Based Policymaking; and*

12 *(4) if deemed effective by the Director, a plan for*
13 *scaling up the demonstration project to facilitate data*
14 *access for evidence building while ensuring trans-*
15 *parency and privacy.*

16 *(i) AUTHORIZATION OF APPROPRIATIONS.—There are*
17 *authorized to be appropriated to the Director to carry out*
18 *this subsection \$9,000,000 for each of fiscal years 2023*
19 *through 2027.*

20 ***Subtitle G—Directorate for Tech-***
21 ***nology, Innovation, and Partner-***
22 ***ships***

23 ***SEC. 10381. ESTABLISHMENT.***

24 *There is established within the Foundation the Direc-*
25 *torate for Technology, Innovation, and Partnerships to ad-*

1 *vance research and development, technology development,*
2 *and related solutions to address United States societal, na-*
3 *tional, and geostrategic challenges, for the benefit of all*
4 *Americans.*

5 **SEC. 10382. PURPOSES.**

6 *The purposes of the Directorate established under sec-*
7 *tion 10381 are to—*

8 *(1) support use-inspired and translational re-*
9 *search and accelerate the development and use of fed-*
10 *erally funded research;*

11 *(2) strengthen United States competitiveness by*
12 *accelerating the development of key technologies; and*

13 *(3) grow the domestic workforce in key tech-*
14 *nology focus areas, and expand the participation of*
15 *United States students and researchers in areas of so-*
16 *cietal, national, and geostrategic importance, at all*
17 *levels of education.*

18 **SEC. 10383. ACTIVITIES.**

19 *Subject to the availability of appropriated funds, the*
20 *Director shall achieve the purposes described in section*
21 *10382 by making awards through the Directorate that—*

22 *(1) support transformational advances in use-in-*
23 *spired and translational research and technology de-*
24 *velopment, including through diverse funding mecha-*
25 *nisms and models at different scales, to include con-*

1 *vergence accelerators and projects designed to achieve*
2 *specific technology metrics or objectives;*

3 (2) *encourage the translation of research into in-*
4 *novations, processes, and products, including by—*

5 (A) *engaging researchers on topics relevant*
6 *to United States societal, national, and*
7 *geostrategic challenges, including by educating*
8 *researchers on engaging with end users and the*
9 *public;*

10 (B) *advancing novel approaches and reduc-*
11 *ing barriers to technology transfer, including*
12 *through intellectual property frameworks between*
13 *academia and industry, nonprofit entities, ven-*
14 *ture capital communities, and approaches to*
15 *technology transfer for applications with public*
16 *benefit that may not rely on traditional commer-*
17 *cialization tools; and*

18 (C) *establishing partnerships that connect*
19 *researchers and research products to businesses,*
20 *accelerators, and incubators that enable research*
21 *uptake, prototype development and scaling, en-*
22 *trepreneurial education, and the formation and*
23 *growth of new companies;*

24 (3) *develop mutually-beneficial research and*
25 *technology development partnerships and collabora-*

1 *tions among institutions of higher education, includ-*
2 *ing historically Black colleges and universities, Tribal*
3 *Colleges or Universities, minority-serving institutions,*
4 *emerging research institutions, EPSCoR institutions,*
5 *and nonprofit organizations, labor organizations,*
6 *businesses and other for-profit entities, Federal or*
7 *State agencies, local or Tribal governments, civil soci-*
8 *ety organizations, other Foundation directorates, na-*
9 *tional labs, field stations and marine laboratories,*
10 *and, as appropriate, international entities and bina-*
11 *tional research and development foundations and*
12 *funds, excluding foreign entities of concern;*

13 *(4) partner with other directorates and offices of*
14 *the Foundation for specific projects or research areas*
15 *including—*

16 *(A) to pursue basic questions about natural,*
17 *human, and physical phenomena that could en-*
18 *able advances in the challenges and key tech-*
19 *nology focus areas under section 10387;*

20 *(B) to study questions that could affect the*
21 *design (including human interfaces), safety, se-*
22 *curity, operation, deployment, or the social and*
23 *ethical consequences of technologies and innova-*
24 *tions in the challenges and key technology focus*
25 *areas under section 10387, including the develop-*

1 *ment of technologies and innovations that com-*
2 *plement or enhance the abilities of workers and*
3 *impact of specific innovations on domestic jobs*
4 *and equitable opportunity; and*

5 (C) *to further the creation of a domestic*
6 *workforce capable of advancing, using, and*
7 *adapting to the key technology focus areas;*

8 (5) *build capacity and infrastructure for use-in-*
9 *spired and translational research at institutions of*
10 *higher education across the United States, including*
11 *by making awards to support administrative activi-*
12 *ties that advance development, operation, integration,*
13 *deployment, and sharing of innovation;*

14 (6) *support the education, mentoring, and train-*
15 *ing of undergraduate students, graduate students, and*
16 *postdoctoral researchers, to both advance use-inspired*
17 *and translational research and to address workforce*
18 *challenges, through scholarships, fellowships, and*
19 *traineeships; and*

20 (7) *identify social, behavioral, and economic*
21 *drivers and consequences of technological innovations*
22 *that could enable advances in the challenges and key*
23 *technology focus areas under section 10387.*

1 **SEC. 10384. REQUIREMENTS.**

2 *In carrying out the activities under the Directorate,*
3 *the Director shall ensure the programmatic work of the Di-*
4 *rectorate and Foundation—*

5 *(1) utilizes the full potential of the United States*
6 *workforce by avoiding undue geographic concentra-*
7 *tion of research and development and education fund-*
8 *ing across the United States, and encourages broader*
9 *participation in the key technology focus area work-*
10 *force by populations historically underrepresented in*
11 *STEM; and*

12 *(2) incorporates a worker perspective through*
13 *participation by labor organizations and workforce*
14 *training organizations.*

15 **SEC. 10385. ASSISTANT DIRECTOR.**

16 *(a) IN GENERAL.—The Director shall appoint an As-*
17 *stant Director responsible for the management of the Di-*
18 *rectorate established under this subtitle, in the same manner*
19 *as other Assistant Directors of the Foundation are ap-*
20 *pointed.*

21 *(b) QUALIFICATIONS.—The Assistant Director shall be*
22 *an individual, who by reason of professional background*
23 *and experience, is specially qualified to—*

24 *(1) advise the Director on all matters pertaining*
25 *to use-inspired and translational research, develop-*
26 *ment, and commercialization at the Foundation, in-*

1 *cluding partnership with the private sector and other*
2 *users of Foundation funded research; and*

3 *(2) develop and implement the necessary policies*
4 *and procedures to promote a culture of use-inspired*
5 *and translational research within the Directorate and*
6 *across the Foundation and carry out the responsibil-*
7 *ities under subsection (c).*

8 *(c) RESPONSIBILITIES.—The responsibilities of the As-*
9 *sistant Director shall include—*

10 *(1) advising the Director on all matters per-*
11 *taining to use-inspired and translational research*
12 *and development activities at the Foundation, includ-*
13 *ing effective practices for convergence research, and*
14 *the potential impact of Foundation research on*
15 *United States societal, national and geostrategic chal-*
16 *lenges;*

17 *(2) identifying opportunities for and facilitating*
18 *coordination and collaboration, where appropriate, on*
19 *use-inspired and translational research, development,*
20 *adoption, and commercialization—*

21 *(A) among the offices, directorates, and di-*
22 *visions within the Foundation; and*

23 *(B) between the Foundation and stake-*
24 *holders in academia, the private sector, includ-*
25 *ing non-profit entities, labor organizations, Fed-*

1 *eral or State agencies, and international entities,*
2 *as appropriate;*

3 *(3) ensuring that the activities carried out under*
4 *this subtitle do not substantially and unnecessarily*
5 *duplicate activities supported by other parts of the*
6 *Foundation or other relevant Federal agencies;*

7 *(4) approving all new programs within the Di-*
8 *rectorate;*

9 *(5) developing and testing diverse merit-review*
10 *models and mechanisms for selecting and providing*
11 *awards for use-inspired and translational research*
12 *and development at different scales, from individual*
13 *investigator awards to large multi-institution collabo-*
14 *rations;*

15 *(6) assessing the success of programs;*

16 *(7) administering awards to achieve the purposes*
17 *described in section 10382; and*

18 *(8) performing other such duties pertaining to*
19 *the purposes in section 10382 as are required by the*
20 *Director.*

21 *(d) RELATIONSHIP TO THE DIRECTOR.—The Assistant*
22 *Director shall report to the Director.*

23 *(e) RELATIONSHIP TO OTHER PROGRAMS.—No other*
24 *directorates within the Foundation shall report to the Assist-*
25 *ant Director.*

1 **SEC. 10386. ADVISORY COMMITTEE.**

2 (a) *IN GENERAL.*—*In accordance with the Federal Ad-*
3 *visory Committee Act (5 U.S.C. App.) the Director shall*
4 *establish an advisory committee to assess, and make rec-*
5 *ommendations regarding, the activities carried out under*
6 *this subtitle.*

7 (b) *MEMBERSHIP.*—*The advisory committee members*
8 *shall—*

9 (1) *be individuals with relevant experience or ex-*
10 *pertise, including individuals from industry and na-*
11 *tional labs, educators, academic subject matter ex-*
12 *perts, including individuals with knowledge of key*
13 *technology focus areas and their impact on United*
14 *States national security and geostrategic leadership,*
15 *the technical and social dimensions of science and*
16 *technology, technology transfer experts, labor organi-*
17 *zations, representatives of civil society, and other non-*
18 *governmental organizations; and*

19 (2) *consist of at least 10 members broadly rep-*
20 *resentative of stakeholders, including no less than 3*
21 *members from the private sector, none of whom shall*
22 *be an employee of the Federal Government, and no*
23 *less than 1 member with significant expertise in*
24 *United States national security and economic com-*
25 *petitiveness.*

1 (c) *RESPONSIBILITIES.*—*The Committee’s responsibilities shall include—*

3 (1) *reviewing and advising on activities carried*
4 *out under this subtitle;*

5 (2) *proposing strategies for fulfilling the purposes in section 10382;*

7 (3) *proposing potential areas of research, particularly as relevant to United States societal, national, and geostrategic challenges; and*

10 (4) *other relevant issues as determined by the*
11 *Director.*

12 **SEC. 10387. CHALLENGES AND FOCUS AREAS.**

13 (a) *IN GENERAL.*—*In consultation with the Assistant*
14 *Director, the Board, and the interagency working group established under subtitle F of title VI, the Director shall*
15 *identify, and annually review and update as appropriate,*
16 *identify, and annually review and update as appropriate,*
17 *a list of—*

18 (1) *not more than 5 United States societal, national, and geostrategic challenges that may be addressed by technology to guide activities under this subtitle; and*

22 (2) *not more than 10 key technology focus areas*
23 *to guide activities under this subtitle.*

1 (b) *INITIAL LIST OF SOCIETAL, NATIONAL, AND*
2 *GEOSTRATEGIC CHALLENGES.*—*The initial list of societal,*
3 *national, and geostrategic challenges are the following:*

4 (1) *United States national security.*

5 (2) *United States manufacturing and industrial*
6 *productivity.*

7 (3) *United States workforce development and*
8 *skills gaps.*

9 (4) *Climate change and environmental sustain-*
10 *ability.*

11 (5) *Inequitable access to education, opportunity,*
12 *or other services.*

13 (c) *INITIAL LIST OF KEY TECHNOLOGY FOCUS*
14 *AREAS.*—*The initial list of key technology focus areas are*
15 *the following:*

16 (1) *Artificial intelligence, machine learning, au-*
17 *tonomy, and related advances.*

18 (2) *High performance computing, semiconduc-*
19 *tors, and advanced computer hardware and software.*

20 (3) *Quantum information science and tech-*
21 *nology.*

22 (4) *Robotics, automation, and advanced manu-*
23 *facturing.*

24 (5) *Natural and anthropogenic disaster preven-*
25 *tion or mitigation.*

1 (6) *Advanced communications technology and*
2 *immersive technology.*

3 (7) *Biotechnology, medical technology, genomics,*
4 *and synthetic biology.*

5 (8) *Data storage, data management, distributed*
6 *ledger technologies, and cybersecurity, including bio-*
7 *metrics.*

8 (9) *Advanced energy and industrial efficiency*
9 *technologies, such as batteries and advanced nuclear*
10 *technologies, including but not limited to for the pur-*
11 *poses of electric generation (consistent with section 15*
12 *of the National Science Foundation Act of 1950 (42*
13 *U.S.C. 1874).*

14 (10) *Advanced materials science, including com-*
15 *posites 2D materials, other next-generation materials,*
16 *and related manufacturing technologies.*

17 (d) *RELATIONSHIP BETWEEN UNITED STATES SOCI-*
18 *ETAL, NATIONAL, AND GEOSTRATEGIC CHALLENGES AND*
19 *KEY TECHNOLOGY FOCUS AREAS.—*

20 (1) *In updating the list under subsection (a)(1),*
21 *the Director shall evaluate national and global tech-*
22 *nology trends.*

23 (2) *In updating the list under subsection (a)(2),*
24 *the Director shall consider the impact of the selected*

1 *technologies on United States societal, national, and*
2 *geostrategic challenges.*

3 (3) *The list under subsection (a)(2) may, but is*
4 *not required to, align directly with the list under sub-*
5 *section (a)(1).*

6 (4) *Nothing under this section shall prevent the*
7 *Director from making limited investments in tech-*
8 *nologies or areas not identified in subsection (a)(1) or*
9 *subsection (a)(2).*

10 (e) *REVIEW AND UPDATES.—The Director, in coordi-*
11 *nation with the interagency working group established*
12 *under subtitle F of title VI and in consultation with the*
13 *Director of National Intelligence and the Director of the*
14 *Federal Bureau of Investigation, shall annually review and*
15 *update as appropriate, the list of key technology focus areas*
16 *for purposes of this division. As part of the annual review,*
17 *the Director—*

18 (1) *shall consider input from relevant industries*
19 *and stakeholders;*

20 (2) *may consider the challenges and rec-*
21 *ommendations identified in the reports required by*
22 *sections 206 and 206B of the National Science and*
23 *Technology Policy, Organization, and Priorities Act*
24 *of 1976, as added by section 10611 and 10613 of this*
25 *division and in other relevant reports, such as tech-*

1 *nology and global trend reports from the defense and*
2 *intelligence communities;*

3 *(3) shall consider the potential impact of the key*
4 *technology focus areas on addressing societal, na-*
5 *tional, and geostrategic challenges; and*

6 *(4) subject to the limitation under subsection (a),*
7 *may add or delete key technology focus areas in light*
8 *of shifting national needs or competitive threats to the*
9 *United States (including for reasons of the United*
10 *States or other countries having advanced or fallen*
11 *behind in a technological area).*

12 *(f) REPORTING.—At the conclusion of the annual re-*
13 *view and update process required by subsection (e), the Di-*
14 *rector, in consultation with other Federal research agencies,*
15 *as appropriate, shall deliver a report to Congress detail-*
16 *ing—*

17 *(1) the key technology focus areas and rationale*
18 *for their selection;*

19 *(2) the societal, national, and geostrategic chal-*
20 *lenges and rationale for their selection;*

21 *(3) the role of the Foundation in advancing the*
22 *key technology focus areas;*

23 *(4) the impact, including to the academic re-*
24 *search community, of any changes to the key tech-*
25 *nology focus areas; and*

1 (5) *the activities and partnerships between the*
2 *Directorate and the private sector.*

3 (g) *DETAILED DESCRIPTION.—The National Science*
4 *Foundation shall, in coordination with the Office of Man-*
5 *agement and Budget, submit as part of their annual budget*
6 *requests to Congress, a detailed description of the activities*
7 *to be funded under this subtitle, including an explanation*
8 *of how the requested funding is complementary and not re-*
9 *dundant of programs, efforts, and infrastructure under-*
10 *taken or supported by other relevant Federal agencies.*

11 (h) *NATIONAL ACADEMIES.—Not later than 5 years*
12 *after the date of enactment of this Act, the Director shall*
13 *contract with the National Academies to conduct a review*
14 *of the key technology focus areas and the societal, national,*
15 *and geostrategic challenges, including—*

16 (1) *an assessment of their selection process;*

17 (2) *an assessment of their relevance to the pur-*
18 *poses of the Directorate, including to solving chal-*
19 *lenges with social, economic, health, scientific, and*
20 *national security implications;*

21 (3) *a review of whether Federal investment in*
22 *the key technology focus areas have resulted in new*
23 *domestic manufacturing capacity and job creation;*

24 (4) *an assessment of any critical, new emerging*
25 *areas;*

1 (5) *an assessment of Federal investments in edu-*
2 *cation and workforce development to support the key*
3 *technology focus areas; and*

4 (6) *an assessment of relative balance in leader-*
5 *ship in addressing the key technology focus areas be-*
6 *tween the United States, allied and partner countries,*
7 *and the People’s Republic of China.*

8 **SEC. 10388. REGIONAL INNOVATION ENGINES.**

9 (a) *IN GENERAL.*—*From amounts made available to*
10 *the Directorate, the Director shall make awards to eligible*
11 *entities for the planning, establishment, and support of Re-*
12 *gional Innovation Engines.*

13 (b) *PURPOSE.*—*The purpose of the Regional Innova-*
14 *tion Engines shall be to—*

15 (1) *advance multidisciplinary, collaborative, use-*
16 *inspired and translational research, technology devel-*
17 *opment, in key technology focus areas;*

18 (2) *address regional, national, societal, or*
19 *geostrategic challenges;*

20 (3) *leverage the expertise of multi-disciplinary*
21 *and multi- sector partners, including partners from*
22 *private industry, nonprofit organizations, and civil*
23 *society organizations; and*

24 (4) *support the development of scientific, innova-*
25 *tion, entrepreneurial, and STEM educational capac-*

1 *ity within the region of the Regional Innovation En-*
2 *gine to grow and sustain regional innovation.*

3 *(c) USES OF FUNDS.—Funds awarded under this sec-*
4 *tion may be used by a Regional Innovation Engine to—*

5 *(1) conduct use-inspired and translational re-*
6 *search and technology development to advance inno-*
7 *vation in at least one of the key technology focus*
8 *areas and to help solve a compelling regional, na-*
9 *tional, societal, or geostrategic challenge;*

10 *(2) further the development, adoption, and com-*
11 *mercialization of innovations in key technology focus*
12 *areas, including through support for proof-of-concept*
13 *development, and through partnership with other Fed-*
14 *eral agencies and Federal laboratories, industry, in-*
15 *cluding startup companies, labor organizations, civil*
16 *society organizations, and State, territorial, local,*
17 *and Tribal governments;*

18 *(3) develop and manage, or facilitate access to,*
19 *test beds and instrumentation, which may include*
20 *fabrication facilities and cyberinfrastructure, to ad-*
21 *vance the development, integration, and demonstra-*
22 *tion of new, innovative technologies, including hard-*
23 *ware or software;*

24 *(4) establish traineeship programs for graduate*
25 *students who pursue degrees and research related to*

1 *the key technology focus areas leading to a masters or*
2 *doctorate degree by providing funding and other as-*
3 *sistance, and opportunities for research experiences in*
4 *government or industry related to the students' stud-*
5 *ies;*

6 (5) *engage in outreach and engagement in the re-*
7 *gion to broaden participation in the activities of the*
8 *Regional Innovation Engine; and*

9 (6) *reimburse, in part or in whole, the cost of in-*
10 *strumentation, technology transfer, and commer-*
11 *cialization activities, including patenting and licens-*
12 *ing, and for operations and staff, as the Director de-*
13 *termines appropriate.*

14 (d) *SELECTION PROCESS.—In making awards under*
15 *this subtitle, the Director shall consider, in addition to the*
16 *scientific and technical merit of the proposal, the extent to*
17 *which the activities and locations proposed—*

18 (1) *have the potential to create an innovation*
19 *ecosystem, or enhance existing ecosystems and con-*
20 *tribute to job creation in a region;*

21 (2) *demonstrate a capacity to engage and part-*
22 *ner with multiple types of institutions of higher edu-*
23 *cation, industry, labor, nonprofit organizations, civil*
24 *society organizations, other Federal agencies, Federal*
25 *laboratories, State, local, and Tribal governments,*

1 *and other appropriate organizations, including to in-*
2 *form research directions and account for ethical, soci-*
3 *etal, safety, and security implications relevant to the*
4 *potential applications of the research;*

5 (3) *demonstrate a capacity to broaden participa-*
6 *tion of populations historically underrepresented in*
7 *STEM in the activities of the Regional Innovation*
8 *Engine; and*

9 (4) *demonstrate a plan and capability to prevent*
10 *the inappropriate use or dissemination of the research*
11 *and technology, including research results, data, and*
12 *intellectual property, as appropriate and consistent*
13 *with the requirements of the relevant award.*

14 (e) *REQUIREMENTS.—*

15 (1) *ELIGIBILITY.—For the purposes of this sec-*
16 *tion, an “eligible entity” means an institution of*
17 *higher education, a nonprofit organization, a private*
18 *sector entity, or a consortium thereof.*

19 (2) *PARTNERSHIPS.—To be eligible for an award*
20 *under this section an eligible entity—*

21 (A) *shall include in its proposal partner-*
22 *ship with 1 or more institution that is—*

23 (i) *a historically Black college or uni-*
24 *versity;*

25 (ii) *a Tribal College or University;*

1 (iii) a minority-serving institution;

2 (iv) an EPSCoR institution;

3 (v) an emerging research institution;

4 or

5 (vi) a community college;

6 (B) may include partnership with 1 or

7 more—

8 (i) additional entities described in
9 paragraph (2)(A);

10 (ii) industry entities, including
11 startups, small businesses, and public-pri-
12 vate partnerships;

13 (iii) economic development organiza-
14 tions or venture development organizations,
15 as such terms are defined in section 28(a)
16 of the Stevenson-Wydler Technology Innova-
17 tion Act of 1980 (15 U.S.C. 13701 et seq.),
18 as added by section 10621 of this division;

19 (iv) National Laboratories;

20 (v) Federal laboratories, as defined in
21 section 4 of the Stevenson-Wydler Tech-
22 nology Innovation Act of 1980 (15 U.S.C.
23 3703);

24 (vi) Federal research facilities;

25 (vii) labor organizations;

1 (viii) entities described in paragraph
2 (1) or (2) from allied or partner countries;

3 (ix) other entities to be vital to the suc-
4 cess of the program, as determined by the
5 Director;

6 (x) binational research and develop-
7 ment foundations and funds, excluding
8 those affiliated with foreign entities of con-
9 cern, as defined in section 10612; and

10 (xi) Engineer Research and Develop-
11 ment Center laboratories of the Army Corps
12 of Engineers; and

13 (C) shall include as part of its proposal a
14 plan for—

15 (i) establishing a sustained partner-
16 ship that is jointly developed and managed,
17 draws from the capacities of each institu-
18 tion, and is mutually beneficial; and

19 (ii) documents governance and man-
20 agement plans, financial contributions from
21 non-Federal sources, and plans for owner-
22 ship and use of any intellectual property.

23 (3) *PROMOTING PARTNERSHIPS.*—In making
24 awards under this section, the Director shall encour-
25 age applicants for a Regional Innovation Engine that

1 *include multiple regional partners as described in*
2 *subsection (e)(2).*

3 (4) *GEOGRAPHIC DISTRIBUTION.*—*In making*
4 *awards under this section, the Director shall take into*
5 *consideration the extent to which the proposals ex-*
6 *pend the geographic distribution of the Regional In-*
7 *novation Engines, including by giving special consid-*
8 *eration to rural-serving institutions of higher edu-*
9 *cation.*

10 (5) *RESOURCE AVAILABILITY.*—*The Director*
11 *shall ensure that any eligible entity receiving an*
12 *award under this section shall—*

13 (A) *provide information on relevant cur-*
14 *rently existing resources available to the pro-*
15 *posing team from all internal and external*
16 *sources, including all partner organizations; and*

17 (B) *include letters of collaboration from*
18 *partner organizations that include information*
19 *on resource contributions committed by such*
20 *partners.*

21 (f) *COLLABORATION WITH REGIONAL TECHNOLOGY*
22 *HUBS.*—*Each Regional Innovation Engine established*
23 *under this section may collaborate and participate in, as*
24 *appropriate, the activities of any regional technology hub*
25 *designated under section 28 of the Stevenson-Wydler Tech-*

1 *nology Innovation Act of 1980 (15 U.S.C. 3701 et seq.), as*
2 *added by section 10621.*

3 (g) *DURATION.—*

4 (1) *INITIAL PERIOD.—An award under this sec-*
5 *tion shall be for an initial period of 5 years.*

6 (2) *RENEWAL.—An established Regional Innova-*
7 *tion Engine may apply for, and the Director may*
8 *award, extended funding for periods of 5 years on a*
9 *merit-reviewed basis.*

10 (h) *COMPETITIVE, MERIT-REVIEW.—In making*
11 *awards under this section, the Director shall—*

12 (1) *use a competitive, merit review process that*
13 *includes peer review by a diverse group of individuals*
14 *with relevant expertise from both the private and pub-*
15 *lic sectors; and*

16 (2) *ensure the focus areas of the Regional Inno-*
17 *vation Engines do not substantially and unneces-*
18 *sarily duplicate the efforts of any other Regional In-*
19 *novation Engine or any other similar effort at an-*
20 *other Federal agency.*

21 (i) *COLLABORATION.—In making awards under this*
22 *section, the Director may collaborate with Federal depart-*
23 *ments and agencies whose missions contribute to or are af-*
24 *ected by the technology focus area of the institute.*

1 **SEC. 10389. TRANSLATION ACCELERATOR.**

2 (a) *IN GENERAL.*—*The Director shall establish Trans-*
3 *lation Accelerators to further the research, development, and*
4 *commercialization of innovation in the key technology focus*
5 *areas.*

6 (b) *PARTNERSHIPS.*—

7 (1) *IN GENERAL.*—*Each Translation Accelerator*
8 *shall be comprised of a partnership including 2 or*
9 *more of the following entities:*

10 (A) *An institution of higher education.*

11 (B) *A for-profit company.*

12 (C) *A nonprofit organization.*

13 (D) *A Federal agency.*

14 (E) *Another entity, if that entity is deter-*
15 *mined by the Director to be vital to the success*
16 *of the program.*

17 (2) *INSTITUTIONAL OR ORGANIZATIONAL*
18 *LEVEL.*—*The Director shall work to ensure that such*
19 *partnerships exist at the institutional or organization*
20 *level, rather than solely at the principal investigator*
21 *level.*

22 (3) *COST SHARE.*—*Not less than 25 percent of*
23 *the funding for an institute shall be provided by non-*
24 *Federal entities.*

25 (4) *NUMBER OF CENTERS AND INSTITUTES ES-*
26 *TABLISHED.*—*The Director shall endeavor to establish*

1 *a balance in the number of Regional Innovation En-*
2 *gines and Translation Accelerators.*

3 (c) *AUTHORIZATION OF APPROPRIATIONS.—From*
4 *within funds authorized for the Directorate for Technology,*
5 *Innovation, and Partnerships, there are authorized to carry*
6 *out the activities under this section and section 10388*
7 *\$6,500,000,000 for fiscal years 2023 through 2027.*

8 **SEC. 10390. TEST BEDS.**

9 (a) *PROGRAM AUTHORIZED.—*

10 (1) *IN GENERAL.—From amounts made avail-*
11 *able for the Directorate, the Director, in coordination*
12 *with the Director of the National Institute of Stand-*
13 *ards and Technology, the Secretary of Energy, and*
14 *other Federal agencies, as determined appropriate by*
15 *the Director, shall establish a program in the Direc-*
16 *torate to make awards, on a competitive basis, to in-*
17 *stitutions of higher education, nonprofit organiza-*
18 *tions, or consortia thereof to establish and operate test*
19 *beds, which may include fabrication facilities and*
20 *cyberinfrastructure, to advance the development, oper-*
21 *ation, integration, deployment, and, as appropriate,*
22 *demonstration of new, innovative critical technologies,*
23 *which may include hardware or software.*

24 (2) *COORDINATION.—In establishing new test*
25 *beds under this section, the Director shall ensure co-*

1 *ordination with other test beds supported by the*
2 *Foundation or other Federal agencies to avoid dupli-*
3 *cation and maximize the use of Federal resources.*

4 *(b) PROPOSALS.—An applicant for an award under*
5 *this section shall submit a proposal to the Director, at such*
6 *time, in such manner, and containing such information as*
7 *the Director may reasonably require. The proposal shall,*
8 *at a minimum, describe—*

9 *(1) the technology or technologies that will be the*
10 *focus of the test bed;*

11 *(2) the goals of the work to be done at the test*
12 *bed;*

13 *(3) how the applicant will assemble a workforce*
14 *with the skills needed to operate the test bed;*

15 *(4) how the applicant will ensure broad access to*
16 *the test bed;*

17 *(5) how the applicant will collaborate with firms*
18 *in critical technologies, including through coordinated*
19 *research and development and funding, to ensure that*
20 *work in the test bed will contribute to the commercial*
21 *viability of any technologies and will include collabo-*
22 *ration from industry and labor organizations;*

23 *(6) how the applicant will encourage the partici-*
24 *pation of inventors and entrepreneurs and the devel-*
25 *opment of new businesses;*

1 (7) *how the applicant will increase participation*
2 *by populations that are underrepresented in STEM;*

3 (8) *how the applicant will demonstrate that the*
4 *commercial viability of any new technologies will*
5 *support the creation of high-quality domestic jobs;*

6 (9) *how the test bed will operate after Federal*
7 *funding has ended;*

8 (10) *how the test bed will disseminate lessons*
9 *and other technical information to United States en-*
10 *tities or allied or partner country entities in the*
11 *United States; and*

12 (11) *how the applicant plans to take measures to*
13 *prevent the inappropriate use of research results,*
14 *data, and intellectual property, as applicable and*
15 *consistent with the requirements of the award.*

16 (c) *AUTHORIZED USE OF FUNDS.*—*A recipient of an*
17 *award under this section may, consistent with the purposes*
18 *of this section, use the award for the purchase of equipment*
19 *and for the support of students, faculty and staff, and*
20 *postdoctoral researchers.*

21 (d) *GEOGRAPHIC DIVERSITY.*—*In selecting award re-*
22 *cipients under this section, the Director shall consider the*
23 *extent to which proposals would expand the geographic di-*
24 *versity of test beds.*

1 **SEC. 10391. PLANNING AND CAPACITY BUILDING AWARDS.**

2 (a) *IN GENERAL.*—Under the program established in
3 section 508 of the America *COMPETES* Reauthorization
4 Act of 2010 (42 U.S.C. 1862p–2) and the activities author-
5 ized under this section, from amounts made available to
6 the Directorate, the Director, in coordination with other
7 Federal agencies as determined appropriate by the Director,
8 shall make awards, on a competitive basis, to eligible enti-
9 ties to advance the development, adoption, and commer-
10 cialization of technologies, consistent with the purposes of
11 the Directorate under section 10382.

12 (b) *ELIGIBLE ENTITY.*—To be eligible to receive an
13 award under this section, an entity shall be—

14 (1) an institution of higher education, which
15 may be a community college (or a consortium of such
16 institutions);

17 (2) a nonprofit organization that is either affili-
18 ated with an institution of higher education or de-
19 signed to support technology development or entrepre-
20 neurship; or

21 (3) a consortium that includes—

22 (A) an entity described in paragraph (1) or
23 (2) as the lead award recipient; and

24 (B) one or more additional individuals or
25 entities, which shall be—

1 (i) *an economic development organiza-*
2 *tion or similar entity that is focused pri-*
3 *marily on improving science, technology,*
4 *innovation, or entrepreneurship;*

5 (ii) *an industry organization or firm*
6 *in a relevant technology or innovation sec-*
7 *tor;*

8 (iii) *an industry-experienced executive*
9 *with entrepreneurship experience that is fo-*
10 *cused primarily on de-risking technologies*
11 *from both a scientific and a business per-*
12 *spective; or*

13 (iv) *an individual or entity with in-*
14 *dustry and startup expertise, including a*
15 *mentor network, across relevant technology*
16 *or innovation sectors.*

17 (c) *USE OF FUNDS.—In addition to activities listed*
18 *under section 10383, an eligible entity receiving an award*
19 *under this section may use funds to—*

20 (1) *identify academic research with the potential*
21 *for technology transfer and commercialization, par-*
22 *ticularly as relevant to the purposes of the Directorate*
23 *under section 10382;*

24 (2) *ensure the availability of staff, including*
25 *technology transfer professionals, entrepreneurs in*

1 *residence, and other mentors as required to accom-*
2 *plish the purpose of this section;*

3 *(3) help offset the costs of patenting and licens-*
4 *ing research products, both domestically and inter-*
5 *nationally;*

6 *(4) revise institution policies, including policies*
7 *related to intellectual property and faculty entrepre-*
8 *neurship, and taking other necessary steps to imple-*
9 *ment relevant best practices for academic technology*
10 *transfer;*

11 *(5) develop local, regional, and national partner-*
12 *ships among institutions of higher education and be-*
13 *tween institutions of higher education and private*
14 *sector entities and other relevant organizations, in-*
15 *cluding investors, with the purpose of building net-*
16 *works, expertise, and other capacity to identify prom-*
17 *ising research that may have potential market value*
18 *and enable researchers to pursue further development*
19 *and transfer of their ideas into possible commercial or*
20 *other use;*

21 *(6) develop seminars, courses, and other edu-*
22 *cational opportunities for students, post-doctoral re-*
23 *searchers, faculty, and other relevant staff at institu-*
24 *tions of higher education to increase awareness and*
25 *understanding of entrepreneurship, patenting, busi-*

1 *ness planning, research security, and other areas rel-*
2 *evant to technology transfer, and connect students*
3 *and researchers to relevant resources, including men-*
4 *tors in the private sector; and*

5 *(7) create, support, or fund entities or competi-*
6 *tions to allow entrepreneurial students and faculty to*
7 *illustrate the commercialization potential of their*
8 *ideas, including through venture funds of institution*
9 *of higher education.*

10 *(d) LIMITATIONS ON FUNDING.—*

11 *(1) Awards made under this section shall be at*
12 *least 3 years in duration and shall not exceed*
13 *\$1,000,000 per fiscal year.*

14 *(2) Awards made under this section shall not*
15 *support the development or operation of capital in-*
16 *vestment funds.*

17 *(e) APPLICATION.—An eligible entity seeking funding*
18 *under this section shall submit an application to the Direc-*
19 *tor at such time, in such manner, and containing such in-*
20 *formation and assurances as such Director may require.*

21 *The application shall include, at a minimum, a description*
22 *of—*

23 *(1) how the eligible entity submitting an appli-*
24 *cation plans to sustain the proposed activities beyond*
25 *the duration of the award;*

1 (2) *the steps the applicant will take to enable*
2 *technology transfer and adoption and why such steps*
3 *are likely to be effective;*

4 (3) *how the applicant will encourage the train-*
5 *ing and participation of students and potential entre-*
6 *preneurs and the transition of research results to*
7 *practice, including the development of new businesses;*

8 (4) *as relevant, potential steps to drive economic*
9 *growth in a particular region, by collaborating with*
10 *industry, venture capital entities, non-profit organi-*
11 *zations, and State and local governments within that*
12 *region; and*

13 (5) *background information that the Director de-*
14 *termines is relevant to demonstrate the success of the*
15 *innovation and entrepreneurship support models pro-*
16 *posed by the applicant to commercialize technologies.*

17 (f) *COLLABORATIVE INNOVATION RESOURCE CENTER*

18 *PROGRAM.—*

19 (1) *IN GENERAL.—The Director shall make*
20 *awards under this section to eligible entities to estab-*
21 *lish collaborative innovation resource centers that*
22 *promote regional technology transfer and technology*
23 *development activities available to more than one in-*
24 *stitution of higher education and to other entities in*
25 *a region.*

1 (2) *USE OF FUNDS.*—*An eligible entity that re-*
2 *ceives an award under this subsection shall use award*
3 *funds to carry out one or more of the following activi-*
4 *ties, to the benefit of the region in which the center*
5 *is located:*

6 (A) *Providing start-ups and small business*
7 *concerns (as defined in section 3 of the Small*
8 *Business Act (15 U.S.C. 632)) within the region*
9 *with access to facilities, scientific infrastructure,*
10 *personnel, and other assets as required for tech-*
11 *nology maturation.*

12 (B) *Supporting entrepreneurial training for*
13 *start-up and small business personnel.*

14 (3) *Providing engineering and entrepreneurial*
15 *experiences and hands-on training for students en-*
16 *rolled in participating institutions of higher edu-*
17 *cation.*

18 (g) *REPORTING ON COMMERCIALIZATION METRICS.*—

19 *The Director shall establish—*

20 (1) *metrics related to commercialization for an*
21 *award under this section; and*

22 (2) *a reporting schedule for recipients of such*
23 *awards that takes into account both short- and long-*
24 *term goals of the programs under this section.*

1 (h) *GEOGRAPHIC DIVERSITY.*—*The Director shall en-*
2 *sure regional and geographic diversity in issuing awards*
3 *under this section.*

4 (i) *AUTHORIZATION OF APPROPRIATIONS.*—*From*
5 *within funds authorized for the Directorate for Technology,*
6 *Innovation, and Partnerships, there are authorized to carry*
7 *out the activities under this section \$3,100,000,000 for fiscal*
8 *years 2023 through 2027.*

9 **SEC. 10392. ENTREPRENEURIAL FELLOWSHIPS.**

10 (a) *IN GENERAL.*—*The Director, acting through the*
11 *Directorate for Technology, Innovation, and Partnerships,*
12 *shall award fellowships to scientists and engineers to help*
13 *develop leaders capable of maturing promising ideas and*
14 *technologies from lab to market or other use and forge con-*
15 *nections between academic research and the government, in-*
16 *dustry, financial sectors, and other end users.*

17 (b) *APPLICATION.*—*An applicant for a fellowship*
18 *under this section shall submit to the Director an applica-*
19 *tion at such time, in such manner, and containing such*
20 *information as the Director may require. At a minimum,*
21 *the Director shall require that applicants—*

22 (1) *have completed a doctoral degree in a STEM*
23 *field no more than 5 years prior to the date of the*
24 *application, or have otherwise demonstrated signifi-*
25 *cant postbaccalaureate scientific research experience*

1 and are considered early career, according to require-
2 ments established by the Director; and

3 (2) have included in the application a proposal
4 for how the fellow will be embedded in a host institu-
5 tion's research environment.

6 (c) *OUTREACH.*—The Director shall conduct program
7 outreach to recruit fellowship applicants—

8 (1) from diverse research institutions;

9 (2) from all regions of the country; and

10 (3) from groups historically underrepresented in
11 STEM fields.

12 (d) *ADMINISTRATION AGREEMENTS.*—The Director
13 may enter into an agreement with a qualified third-party
14 entity to administer the fellowships, subject to the provi-
15 sions of this section.

16 (e) *AUTHORIZATION OF APPROPRIATIONS.*—There are
17 authorized to be appropriated to the Director a total of
18 \$125,000,000 for fiscal years 2023 through 2027, to carry
19 out the activities outlined in this section.

20 **SEC. 10393. SCHOLARSHIPS AND FELLOWSHIPS.**

21 (a) *IN GENERAL.*—The Director, acting through the
22 Directorate, shall fund undergraduate scholarships (includ-
23 ing at community colleges), graduate fellowships and
24 traineeships, and postdoctoral awards in the key technology
25 focus areas.

1 (b) *IMPLEMENTATION.*—*The Director may carry out*
2 *subsection (a) by making awards—*

3 (1) *directly to students; and*

4 (2) *to institutions of higher education or con-*
5 *sortia of institutions of higher education, including*
6 *those institutions or consortia involved in operating*
7 *Regional Innovation Engines established under sec-*
8 *tion 10388.*

9 (c) *BROADENING PARTICIPATION.*—*In carrying out*
10 *this section, the Director shall take steps to increase the par-*
11 *ticipation of populations that are underrepresented in*
12 *STEM, which may include—*

13 (1) *establishing or augmenting programs tar-*
14 *geted at populations that are underrepresented in*
15 *STEM;*

16 (2) *supporting traineeships or other relevant*
17 *programs at historically Black colleges and univer-*
18 *sities, Tribal Colleges or Universities, and minority-*
19 *serving institutions;*

20 (3) *enabling low-income populations to pursue*
21 *associate, undergraduate, or graduate level degrees in*
22 *STEM;*

23 (4) *addressing current and expected gaps in the*
24 *availability or skills of the STEM workforce, or ad-*
25 *ressing needs of the STEM workforce, including by*

1 *increasing educational capacity at institutions and*
2 *by prioritizing awards to United States citizens, per-*
3 *manent residents, and individuals that will grow the*
4 *domestic workforce; and*

5 *(5) addressing geographic diversity in the STEM*
6 *workforce.*

7 *(d) ENCOURAGING INNOVATION.—In carrying out this*
8 *section, the Director shall encourage innovation in graduate*
9 *education, including through encouraging institutions of*
10 *higher education to offer graduate students opportunities to*
11 *gain experience in industry or Government as part of their*
12 *graduate training, and through support for students in pro-*
13 *fessional master’s programs related to the key technology*
14 *focus areas or to the societal, national, and geostrategic*
15 *challenges.*

16 *(e) AREAS OF FUNDING SUPPORT.—Subject to the*
17 *availability of funds to carry out this section, the Director*
18 *shall—*

19 *(1) issue—*

20 *(A) postdoctoral awards,*

21 *(B) graduate fellowships and traineeships,*
22 *inclusive of the NSF Research Traineeships and*
23 *fellowships awarded under the Graduate Re-*
24 *search Fellowship Program; and*

1 (C) *scholarships, including undergraduate*
2 *scholarships, research experiences, and intern-*
3 *ships, including—*

4 (i) *scholarships to attend community*
5 *colleges; and*

6 (ii) *research experiences and intern-*
7 *ships under sections 513, 514, and 515 of*
8 *the America COMPETES Reauthorization*
9 *Act of 2010 (42 U.S.C. 1862p–5; 1862p–6;*
10 *1862p–7);*

11 (2) *ensure that not less than 10 percent of the*
12 *funds made available to carry out this section are*
13 *used to support additional awards that focus on com-*
14 *munity college training, education, and teaching pro-*
15 *grams that increase the participation of populations*
16 *that are historically underrepresented in STEM, in-*
17 *cluding technical programs through programs such as*
18 *the Advanced Technological Education program; and*

19 (3) *if funds remain after carrying out para-*
20 *graphs (1) and (2) make awards to institutions of*
21 *higher education to enable the institutions to fund the*
22 *development and establishment of new or specialized*
23 *programs of study for graduate, undergraduate, or*
24 *technical college students and the evaluation of the ef-*
25 *fectiveness of those programs of study.*

1 (f) *LOW-INCOME SCHOLARSHIP PROGRAM.*—

2 (1) *IN GENERAL.*—*The Director shall award*
3 *scholarships to low-income individuals to enable such*
4 *individuals to pursue associate, undergraduate, or*
5 *graduate level degrees in STEM fields.*

6 (2) *ELIGIBILITY.*—

7 (A) *IN GENERAL.*—*To be eligible to receive*
8 *a scholarship under this subsection, an indi-*
9 *vidual—*

10 (i) *must be a citizen of the United*
11 *States, a national of the United States (as*
12 *defined in section 1101(a) of title 8), an*
13 *alien admitted as a refugee under section*
14 *1157 of title 8, or an alien lawfully admit-*
15 *ted to the United States for permanent resi-*
16 *dence;*

17 (ii) *shall prepare and submit to the*
18 *Director an application at such time, in*
19 *such manner, and containing such informa-*
20 *tion as the Director may require; and*

21 (iii) *shall certify to the Director that*
22 *the individual intends to use amounts re-*
23 *ceived under the scholarship to enroll or*
24 *continue enrollment at an institution of*
25 *higher education (as defined in section*

1 1001(a) of title 20) in order to pursue an
2 associate, undergraduate, or graduate level
3 degree in STEM fields designated by the
4 Director.

5 (B) ABILITY.—Awards of scholarships
6 under this subsection shall be made by the Direc-
7 tor solely on the basis of the ability of the appli-
8 cant, except that in any case in which 2 or more
9 applicants for scholarships are deemed by the
10 Director to be possessed of substantially equal
11 ability, and there are not sufficient scholarships
12 available to award one to each of such appli-
13 cants, the available scholarship or scholarships
14 shall be awarded to the applicants in a manner
15 that will tend to result in a geographically wide
16 distribution throughout the United States recipi-
17 ents' places of permanent residence.

18 (3) SCHOLARSHIP AMOUNT AND RENEWAL.—Sec-
19 tion 414(d) of the American Competitiveness and
20 Workforce Improvement Act of 1998 (42 U.S.C.
21 1869c) is amended in paragraph (3) by—

22 (A) striking “, except that the Director shall
23 not award a scholarship in an amount exceeding
24 \$10,000 per year”; and

1 (B) striking “4 years” and inserting “5
2 years”.

3 (4) *AUTHORIZATION.*—Of amounts authorized
4 for the Directorate for Technology, Innovation, and
5 Partnerships, \$100,000,000 shall be authorized to
6 carry out this subsection.

7 (g) *EXISTING PROGRAMS.*—The Director may use or
8 augment existing STEM education programs of the Foun-
9 dation and leverage education or entrepreneurial partners
10 to carry out this section.

11 **SEC. 10394. RESEARCH AND DEVELOPMENT AWARDS.**

12 (a) *IN GENERAL.*—From amounts made available for
13 the Directorate, the Director shall make awards, on a com-
14 petitive basis, for research and technology development
15 within the key technology focus areas, including invest-
16 ments that advance solutions to the challenges under section
17 10387.

18 (b) *PURPOSE.*—The purpose of the awards under this
19 section shall be to accelerate technological advances and
20 technology adoption in the key technology focus areas.

21 (c) *RECIPIENTS.*—Recipients of funds under this sec-
22 tion may include institutions of higher education, research
23 institutions, non-profit organizations, private sector enti-
24 ties, consortia, or other entities as defined by the Director.

1 (d) *METRICS.*—*The Director may set metrics, includ-*
2 *ing goals and deadlines, for the development and dem-*
3 *onstration of technology as determined in the terms of the*
4 *award, and may use such metrics to determine whether an*
5 *award recipient shall be eligible for continued or follow-on*
6 *funding.*

7 (e) *SHORT TERM TECHNOLOGY DEPLOYMENT.*—*The*
8 *Director shall also make awards, including through the*
9 *SBIR and STTR programs (as defined in section 9(e) of*
10 *the Small Business Act (15 U.S.C. 638(e)), to expedite*
11 *short-term technology deployment within a period of no*
12 *longer than 24 months.*

13 (f) *SELECTION CRITERIA.*—*In selecting recipients for*
14 *an award under this section, the Director shall consider,*
15 *at a minimum—*

16 (1) *the relevance of the project to the challenges*
17 *and the key technology focus areas under section*
18 *10387, and the potential of the project to result in*
19 *transformational advances for such challenges and the*
20 *key technology focus areas;*

21 (2) *the current status of similar technology, the*
22 *limits of current practice, and the novelty and risks*
23 *of the proposed project;*

1 (b) *ELIGIBILITY.*—*The entity seeking an award for a*
2 *Center under this section must be an institution of higher*
3 *education, a nonprofit organization, or a consortium of*
4 *such institutions or organizations, which may include a*
5 *STEM ecosystem .*

6 (c) *APPLICATION.*—*An eligible entity under subsection*
7 *(b) seeking an award under this section shall submit an*
8 *application to the Director at such time, in such manner,*
9 *and containing such information as the Director may re-*
10 *quire. The application shall include, at a minimum, a de-*
11 *scription of how the proposed Center will be used to—*

12 (1) *establish partnerships among academic insti-*
13 *tutions, local or State educational agencies, and other*
14 *relevant stakeholders in supporting programs and ac-*
15 *tivities to facilitate the widespread and sustained im-*
16 *plementation of promising, evidence-based STEM*
17 *education practices, models, programs, curriculum,*
18 *and technologies;*

19 (2) *support enhanced STEM education infra-*
20 *structure, including cyberlearning technologies, to fa-*
21 *cilitate the widespread adoption of promising, evi-*
22 *dence-based practices;*

23 (3) *support research and development on scaling*
24 *practices, partnerships, and alternative models to cur-*
25 *rent approaches, including approaches sensitive to the*

1 *unique combinations of capabilities, resources, and*
2 *needs of varying localities, educators, and learners;*

3 (4) *include a focus on the learning needs of*
4 *under-resourced schools and learners in low-resource*
5 *or underachieving local educational agencies in urban*
6 *and rural communities and the development of high-*
7 *quality curriculum that engages these learners in the*
8 *knowledge and practices of STEM fields;*

9 (5) *include a focus on the learning needs and*
10 *unique challenges facing students with disabilities;*

11 (6) *support research, development, or education*
12 *on one or more of the key technology focus areas;*

13 (7) *support research and development on scaling*
14 *practices and models to support and sustain highly-*
15 *qualified STEM educators in urban and rural com-*
16 *munities; and*

17 (8) *at the discretion of the Director, any other*
18 *requirements recommended in the study commissioned*
19 *under section 10311(a) of subtitle B.*

20 (d) *ADDITIONAL CONSIDERATIONS.—In making an*
21 *award under this section, the Director may also consider*
22 *the extent to which the proposed Center will—*

23 (1) *leverage existing collaborations, tools, and*
24 *strategies supported by the Foundation, including*
25 *NSF INCLUDES and the Convergence Accelerators;*

1 (2) *support research on and the development and*
2 *scaling of innovative approaches to distance learning*
3 *and education for various student populations;*

4 (3) *support education innovations that leverage*
5 *new technologies or deepen understanding of the im-*
6 *act of technology on educational systems; and*

7 (4) *include a commitment from local or State*
8 *education administrators to making the proposed re-*
9 *forms and activities a priority.*

10 (e) *PARTNERSHIP.*—*In carrying out the program*
11 *under this section, the Director shall explore opportunities*
12 *to partner with the Department of Education, including*
13 *through jointly funding activities under this section.*

14 (f) *DURATION.*—*Each award made under this section*
15 *shall be for a duration of no more than 5 years.*

16 (g) *ANNUAL MEETING.*—*The Director shall encourage*
17 *and facilitate an annual meeting of the Centers, as appro-*
18 *priate, to foster collaboration among the Centers and to fur-*
19 *ther disseminate the results of the Centers' supported activi-*
20 *ties.*

21 (h) *EXISTING PROGRAMS.*—*The Director may use ex-*
22 *isting NSF programs to establish and execute this section.*

23 (i) *REPORT.*—*Not later than 5 years after the date of*
24 *enactment of this Act, the Director shall submit to Congress*

1 *and make widely available to the public a report that in-*
2 *cludes—*

3 (1) *a description of the focus and proposed goals*
4 *of each Center;*

5 (2) *an assessment, based on a common set of*
6 *benchmarks and tools, of the Centers' success in help-*
7 *ing to promote scalable solutions in PreK–12 STEM*
8 *education; and*

9 (3) *any recommendations for administrative and*
10 *legislative action that could optimize the effectiveness*
11 *of the Centers established under this section.*

12 **SEC. 10396. AUTHORITIES.**

13 *In addition to existing authorities available to the*
14 *Foundation, the Director may exercise the following au-*
15 *thorities in carrying out the activities under this subtitle:*

16 (1) *AWARDS.—In carrying out this subtitle, the*
17 *Director may provide awards in the form of grants,*
18 *contracts, cooperative agreements, cash prizes, and*
19 *other transactions.*

20 (2) *PROGRAM DIRECTORS.—*

21 (A) *DESIGNATION.—The Director may des-*
22 *ignate individuals to serve as program directors*
23 *for the programs established within the Direc-*
24 *torate pursuant to the responsibilities established*

1 under subparagraph (B). The Director shall en-
2 sure that program directors—

3 (i) have expertise in one or more of the
4 challenges and key technology focus areas
5 under section 10387; and

6 (ii) come from a variety of back-
7 grounds, including industry, and from a
8 variety of institutions of higher education.

9 (B) *RESPONSIBILITIES.*—A program direc-
10 tor of a program of the Directorate, in consulta-
11 tion with the Assistant Director, shall be respon-
12 sible for—

13 (i) establishing research and develop-
14 ment goals for the program, including
15 through the convening of workshops, confer-
16 ring with a broad range of stakeholders and
17 outside experts, taking into account relevant
18 expert reports, and publicizing the goals of
19 the program to the public and private sec-
20 tors;

21 (ii) surveying a wide range of institu-
22 tions of higher education, nonprofit organi-
23 zations, and private entities to identify
24 emerging trends in the challenges and key
25 technology focus areas under section 10387,

1 *and, as appropriate, soliciting proposals*
2 *from such entities to conduct research in*
3 *areas of particular promise that the private*
4 *sector is the not likely to undertake inde-*
5 *pendently.*

6 *(iii) facilitating research collaborations*
7 *in the challenges and key technology focus*
8 *areas under section 10387, including con-*
9 *necting academic researchers with potential*
10 *end-users of technology, including industry,*
11 *labor organizations, nonprofit organiza-*
12 *tions, civil society organizations, and other*
13 *relevant organizations;*

14 *(iv) reviewing applications for projects*
15 *submitted under section 10394 according to*
16 *the Merit Review Criteria established by the*
17 *Director for such projects and described in*
18 *the Foundation's Proposal and Award Poli-*
19 *cies and Procedures Guide, and any such*
20 *additional criteria as determined by the Di-*
21 *rector; and*

22 *(v) monitoring the progress of projects*
23 *supported under the program and taking*
24 *into account input from relevant experts*

1 *and stakeholders, recommending program*
2 *updates as needed.*

3 (C) *SELECTION CRITERIA.*—*Program direc-*
4 *tors may use diverse merit review models for se-*
5 *lection of award recipients under section 10394,*
6 *including internal review and different models*
7 *that use peer review.*

8 (D) *TERMS.*—*Program directors of the Di-*
9 *rectorate may be appointed by the Director for*
10 *a limited term, renewable at the discretion of the*
11 *Director.*

12 (3) *EXPERTS IN SCIENCE AND ENGINEERING.*—

13 (A) *PROGRAM AUTHORIZED.*—*The Founda-*
14 *tion may carry out a program of personnel man-*
15 *agement authority provided under subparagraph*
16 *(B) in order to facilitate recruitment of eminent*
17 *experts in science or engineering for research and*
18 *development projects and to enhance the admin-*
19 *istration and management of the Foundation.*

20 (B) *PERSONNEL MANAGEMENT AUTHOR-*
21 *ITY.*—*Under the program under subparagraph*
22 *(A), the Foundation may—*

23 (i) *without regard to any provision of*
24 *title 5, United States Code, governing the*
25 *appointment of employees in the competi-*

1 *tive service, appoint individuals to a total*
2 *of not more than 70 positions in the Foun-*
3 *ation, of which not more than 5 such posi-*
4 *tions may be positions of administration or*
5 *management of the Foundation;*

6 *(ii) prescribe the rates of basic pay for*
7 *positions to which employees are appointed*
8 *under clause (i)—*

9 *(I) in the case of employees ap-*
10 *pointed pursuant to clause (i) to any*
11 *of 5 positions designated by the Foun-*
12 *ation for purposes of this clause, at*
13 *rates not in excess of a rate equal to*
14 *150 percent of the maximum rate of*
15 *basic pay authorized for positions at*
16 *level I of the Executive Schedule under*
17 *section 5312 of title 5, United States*
18 *Code; and*

19 *(II) in the case of any other em-*
20 *ployee appointed pursuant to clause*
21 *(i), at rates not in excess of the max-*
22 *imum rate of basic pay authorized for*
23 *senior-level positions under section*
24 *5376 of title 5, United States Code;*
25 *and*

1 (iii) *pay any employee appointed*
2 *under subparagraph (A), other than an em-*
3 *ployee appointed to a position designated as*
4 *described in clause (ii)(I), payments in ad-*
5 *dition to basic pay within the limit appli-*
6 *cable to the employee under subparagraph*
7 *(D).*

8 (C) *LIMITATION ON TERM OF APPOINT-*
9 *MENT.—*

10 (i) *IN GENERAL.—Except as provided*
11 *in clause (ii), the service of an employee*
12 *under an appointment under subparagraph*
13 *(B)(i) may not exceed 4 years.*

14 (ii) *EXTENSION.—The Director may,*
15 *in the case of a particular employee under*
16 *the program under subparagraph (A), ex-*
17 *tend the period to which service is limited*
18 *under clause (i) by up to 2 years if the Di-*
19 *rector determines that such action is nec-*
20 *essary to promote the efficiency of the Foun-*
21 *dation.*

22 (D) *MAXIMUM AMOUNT OF ADDITIONAL PAY-*
23 *MENTS PAYABLE.—Notwithstanding any other*
24 *provision of this subsection or section 5307 of*
25 *title 5, United States Code, no additional pay-*

1 ments may be paid to an employee under sub-
2 paragraph (B)(iii) in any calendar year if, or to
3 the extent that, the employee's total annual com-
4 pensation in such calendar year will exceed the
5 maximum amount of total annual compensation
6 payable at the salary set in accordance with sec-
7 tion 104 of title 3, United States Code.

8 (4) *HIGHLY QUALIFIED EXPERTS IN NEEDED OC-*
9 *CUPATIONS.—*

10 (A) *IN GENERAL.—*The Foundation may
11 carry out a program using the authority pro-
12 vided in subparagraph (B) in order to attract
13 highly qualified experts in needed occupations,
14 as determined by the Foundation. Individuals
15 hired by the Director through such authority
16 may include individuals with expertise in busi-
17 ness creativity, innovation management, design
18 thinking, entrepreneurship, venture capital, and
19 related fields.

20 (B) *AUTHORITY.—*Under the program, the
21 Foundation may—

22 (i) appoint personnel from outside the
23 civil service and uniformed services (as such
24 terms are defined in section 2101 of title 5,
25 United States Code) to positions in the

1 *Foundation without regard to any provi-*
2 *sion of title 5, United States Code, gov-*
3 *erning the appointment of employees in the*
4 *competitive service;*

5 *(ii) prescribe the rates of basic pay for*
6 *positions to which employees are appointed*
7 *under clause (i) at rates not in excess of the*
8 *maximum rate of basic pay authorized for*
9 *senior-level positions under section 5376 of*
10 *title 5, United States Code; and*

11 *(iii) pay any employee appointed*
12 *under clause (i) payments in addition to*
13 *basic pay within the limits applicable to the*
14 *employee under subparagraph (D).*

15 (C) *LIMITATION ON TERM OF APPOINT-*
16 *MENT.—*

17 (i) *IN GENERAL.—Except as provided*
18 *in clause (ii), the service of an employee*
19 *under an appointment made pursuant to*
20 *this subsection may not exceed 5 years.*

21 (ii) *EXTENSION.—The Foundation*
22 *may, in the case of a particular employee,*
23 *extend the period to which service is limited*
24 *under clause (i) by up to 1 additional year*
25 *if the Foundation determines that such ac-*

1 *tion is necessary to promote the Founda-*
2 *tion's national security missions.*

3 *(D) LIMITATIONS ON ADDITIONAL PAY-*
4 *MENTS.—*

5 *(i) TOTAL AMOUNT.—The total amount*
6 *of the additional payments paid to an em-*
7 *ployee under this subsection for any 12-*
8 *month period may not exceed the maximum*
9 *amount of total compensation payable at*
10 *the salary set in accordance with section*
11 *104 of title, United States Code.*

12 *(ii) ELIGIBILITY FOR PAYMENTS.—An*
13 *employee appointed under this subsection is*
14 *not eligible for any bonus, monetary award,*
15 *or other monetary incentive for service, ex-*
16 *cept for payments authorized under this*
17 *subsection.*

18 *(E) LIMITATION ON NUMBER OF HIGHLY*
19 *QUALIFIED EXPERTS.—The number of highly*
20 *qualified experts appointed and retained by the*
21 *Foundation under sub (B)(i) shall not exceed 70*
22 *at any time.*

23 *(F) SAVINGS PROVISIONS.—In the event*
24 *that the Foundation terminates the program*
25 *under this paragraph, in the case of an employee*

1 *who, on the day before the termination of the*
2 *program, is serving in a position pursuant to an*
3 *appointment under this paragraph—*

4 *(i) the termination of the program does*
5 *not terminate the employee's employment in*
6 *that position before the expiration of the*
7 *lesser of—*

8 *(I) the period for which the em-*
9 *ployee was appointed; or*

10 *(II) the period to which the em-*
11 *ployee's service is limited under sub-*
12 *paragraph (C), including any exten-*
13 *sion made under this paragraph before*
14 *the termination of the program; and*

15 *(ii) the rate of basic pay prescribed for*
16 *the position under this paragraph may not*
17 *be reduced as long as the employee con-*
18 *tinues to serve at an acceptable level of per-*
19 *formance in the position without a break in*
20 *service.*

21 (5) *ADDITIONAL HIRING AUTHORITY.—To the ex-*
22 *tent needed to carry out the duties under paragraph*
23 *(1)(A), the Director is authorized to utilize hiring au-*
24 *thorities under section 3372 of title 5, United States*
25 *Code, to staff the Foundation with employees from*

1 *other Federal agencies, State and local governments,*
2 *Indian Tribes and Tribal organizations, institutions*
3 *of higher education, and other organizations, as de-*
4 *scribed in that section, in the same manner and sub-*
5 *ject to the same conditions, that apply to such indi-*
6 *viduals utilized to accomplish other missions of the*
7 *Foundation.*

8 (6) *NATIONAL ACADEMY OF PUBLIC ADMINISTRA-*
9 *TION.—*

10 (A) *STUDY.—Not later than 30 days after*
11 *the date of enactment of this Act, the Director*
12 *shall contract with the National Academy of*
13 *Public Administration to conduct a study on the*
14 *organizational and management structure of the*
15 *Foundation, to—*

16 (i) *evaluate and make recommenda-*
17 *tions to efficiently and effectively implement*
18 *the Directorate for Technology, Innovation,*
19 *and Partnerships; and*

20 (ii) *evaluate and make recommenda-*
21 *tions to ensure coordination of the Direc-*
22 *torate for Technology, Innovation, and*
23 *Partnerships with other directorates and of-*
24 *fices of the Foundation and other Federal*
25 *agencies.*

1 (B) *REVIEW.*—Upon completion of the
 2 study under subparagraph (A), the Foundation
 3 shall review the recommendations from the Na-
 4 tional Academy of Public Administration and
 5 provide a briefing to Congress on the plans of the
 6 Foundation to implement any such recommenda-
 7 tions.

8 (7) *PROVIDING AUTHORITY TO DISSEMINATE IN-*
 9 *FORMATION.*—Section 11 of the National Science
 10 Foundation Act of 1950 (42 U.S.C. 1870) is amend-
 11 ed—

12 (A) in subsection (j), by striking “and”
 13 after the semicolon;

14 (B) in subsection (k), by striking the period
 15 at the end and inserting “; and”; and

16 (C) by adding at the end the following:

17 “(l) to provide for the widest practicable and appro-
 18 priate dissemination of information within the United
 19 States concerning the Foundation’s activities and the re-
 20 sults of those activities.”.

21 **SEC. 10397. COORDINATION OF ACTIVITIES.**

22 (a) *IN GENERAL.*—In carrying out the activities of the
 23 Directorate, the Director shall coordinate and collaborate
 24 as appropriate with the Secretary of Energy, the Director
 25 of the National Institute of Standards and Technology, and

1 *the heads of other Federal research agencies, as appropriate,*
2 *to further the goals of this subtitle.*

3 (b) *AVOID DUPLICATION.*—*The Director shall ensure,*
4 *to the greatest extent practicable, that activities carried out*
5 *by the Directorate are not duplicative of activities sup-*
6 *ported by other parts of the Foundation or other relevant*
7 *Federal agencies. In carrying out the activities prescribed*
8 *by this division, the Director shall coordinate with the*
9 *interagency working group established under subtitle F of*
10 *title VI and heads of other Federal research agencies to en-*
11 *sure these activities enhance and complement, but do not*
12 *constitute unnecessary duplication of effort and to ensure*
13 *the responsible stewardship of funds.*

14 (c) *EMERGING TECHNOLOGIES.*—*After completion of*
15 *the studies regarding emerging technologies conducted by*
16 *the Secretary of Commerce under title XV of division FF*
17 *of the Consolidated Appropriations Act, 2021 (Public Law*
18 *116–260), the Director shall consider the results of such*
19 *studies in carrying out the activities of the Directorate.*

20 **SEC. 10398. ETHICAL, LEGAL, AND SOCIETAL CONSIDER-**
21 **ATIONS.**

22 *The Director shall engage, as appropriate, experts in*
23 *the social dimensions of science and technology and set up*
24 *formal avenues for public input, as appropriate, to ensure*
25 *that ethical, legal, and societal considerations are taken into*

1 *account in the priorities and activities of the Directorate,*
2 *including in the selection of the challenges and key tech-*
3 *nology focus areas under section 10387 and the award-mak-*
4 *ing process, and throughout all stages of supported projects.*

5 **SEC. 10399. REPORTS AND ROADMAPS.**

6 (a) *ANNUAL REPORT.*—*The Director shall provide to*
7 *the relevant authorizing and appropriations committees of*
8 *Congress an annual report describing projects supported by*
9 *the Directorate during the previous year.*

10 (b) *ROADMAP.*—*Not later than 1 year after the date*
11 *of enactment of this Act, the Director shall provide to the*
12 *relevant authorizing and appropriations committees of*
13 *Congress a roadmap describing the strategic vision that the*
14 *Directorate will use to guide investment decisions over the*
15 *following 3 years.*

16 (c) *REPORTS.*—*Not later than 1 year after the date*
17 *of enactment of this Act and every 3 years thereafter, the*
18 *Director, in consultation with the heads of relevant Federal*
19 *agencies, shall prepare and submit to Congress—*

20 (1) *a strategic vision for the next 5 years for the*
21 *Directorate, including a description of how the Foun-*
22 *ation will increase funding for research and edu-*
23 *cation for populations underrepresented in STEM*
24 *and geographic areas; and*

1 (2) *a description of the planned activities of the*
2 *Directorate to secure federally funded science and*
3 *technology pursuant to section 1746 of the National*
4 *Defense Authorization Act for Fiscal Year 2020 (Pub-*
5 *lic Law 116–92; 42 U.S.C. 6601 note) and section*
6 *223 of William M. (Mac) Thornberry National De-*
7 *fense Authorization Act for Fiscal Year 2021 (Public*
8 *Law 116–283) and the requirements under subtitle D*
9 *of this title and subtitle E of title VI .*

10 (d) *SELECTION CRITERIA REPORT.—Not later than 24*
11 *months after the establishment of the Directorate, the Direc-*
12 *tor shall prepare and submit a report to Congress regarding*
13 *the use of alternative methods for the selection of award re-*
14 *cipients and the distribution of funding to recipients, as*
15 *compared to the traditional peer review process.*

16 **SEC. 10399A. EVALUATION.**

17 (a) *IN GENERAL.—After the Directorate has been in*
18 *operation for 6 years, the Director shall enter into an agree-*
19 *ment with the National Academies to provide an evaluation*
20 *of how well the Directorate is achieving the purposes identi-*
21 *fied in section 10382.*

22 (b) *INCLUSIONS.—The evaluation shall include—*

23 (1) *an assessment of the impact of Directorate*
24 *activities on the Foundation’s primary science mis-*
25 *sion;*

1 (2) *an assessment of the Directorate’s impact on*
2 *the challenges and key technology focus areas under*
3 *section 10387;*

4 (3) *an assessment of efforts to ensure coordina-*
5 *tion between the Directorate and other Federal agen-*
6 *cies, and with external entities;*

7 (4) *a description of lessons learned from oper-*
8 *ation of the Directorate; and*

9 (5) *recommended funding levels for the Direc-*
10 *torate;*

11 (c) *AVAILABILITY.—On completion of the evaluation,*
12 *the evaluation shall be made available to Congress and the*
13 *public.*

14 ***Subtitle H—Administrative*** 15 ***Amendments***

16 ***SEC. 10399D. SUPPORTING VETERANS IN STEM CAREERS.***

17 *Section 3(c) of the Supporting Veterans in STEM Ca-*
18 *reers Act (42 U.S.C. 1862t) is amended by striking “an-*
19 *nual” and inserting “biennial”.*

20 ***SEC. 10399E. SUNSHINE ACT COMPLIANCE.***

21 *Section 15(a) of the National Science Foundation Au-*
22 *thorization Act of 2002 (42 U.S.C. 1862n–5(a)) is amend-*
23 *ed—*

24 (1) *so that paragraph (3) reads as follows:*

1 “(3) *COMPLIANCE REVIEW.*—*The Inspector Gen-*
2 *eral of the Foundation shall conduct a review of the*
3 *compliance by the Board with the requirements de-*
4 *scribed in paragraph (2) as necessary based on a tri-*
5 *ennial risk assessment. Any review deemed necessary*
6 *shall examine the proposed and actual content of*
7 *closed meetings and determine whether the closure of*
8 *the meetings was consistent with section 552b of title*
9 *5, United States Code.”; and*

10 (2) *by striking paragraphs (4) and (5) and in-*
11 *serting the following:*

12 “(4) *MATERIALS RELATING TO CLOSED POR-*
13 *TIONS OF MEETING.*—*To facilitate the risk assessment*
14 *required under paragraph (3) of this subsection, and*
15 *any subsequent review conducted by the Inspector*
16 *General, the Office of the National Science Board*
17 *shall maintain the General Counsel’s certificate, the*
18 *presiding officer’s statement, and a transcript or re-*
19 *coding of any closed meeting, for at least 3 years*
20 *after such meeting.”.*

21 **SEC. 10399F. SCIENCE AND ENGINEERING INDICATORS RE-**
22 **PORT SUBMISSION.**

23 *Section 4(j)(1) of the National Science Foundation Act*
24 *of 1950 (42 U.S.C. 1863(j)(1)) is amended by striking*
25 *“January 15” and inserting “March 15”.*

1 **TITLE IV—BIOECONOMY**
2 **RESEARCH AND DEVELOPMENT**

3 **SEC. 10401. DEFINITIONS.**

4 *In this title:*

5 (1) *INITIATIVE.*—*The term “Initiative” means*
6 *the National Engineering Biology Research and De-*
7 *velopment Initiative established under section 10402.*

8 (2) *OMICS.*—*The term “omics” refers to the col-*
9 *lective technologies used to explore the roles, relation-*
10 *ships, and actions of the various types of molecules*
11 *that make up the cells and systems of an organism*
12 *and the systems level analysis of their functions.*

13 **SEC. 10402. NATIONAL ENGINEERING BIOLOGY RESEARCH**
14 **AND DEVELOPMENT INITIATIVE.**

15 (a) *IN GENERAL.*—*The President, acting through the*
16 *Office of Science and Technology Policy, shall implement*
17 *a National Engineering Biology Research and Development*
18 *Initiative to advance societal well-being, national security,*
19 *sustainability, and economic productivity and competitive-*
20 *ness through the following:*

21 (1) *Advancing areas of research at the intersec-*
22 *tion of the biological, physical, chemical, data, and*
23 *computational and information sciences and engi-*
24 *neering to accelerate scientific understanding and*
25 *technological innovation in engineering biology.*

1 (2) *Advancing areas of biomanufacturing re-*
2 *search to optimize, standardize, scale, and deliver new*
3 *products and solutions.*

4 (3) *Supporting social and behavioral sciences*
5 *and economics research that advances the field of en-*
6 *gineering biology and contributes to the development*
7 *and public understanding of new products, processes,*
8 *and technologies.*

9 (4) *Improving the understanding of engineering*
10 *biology of the scientific and lay public and sup-*
11 *porting greater evidence-based public discourse about*
12 *its benefits and risks.*

13 (5) *Supporting research relating to the risks and*
14 *benefits of engineering biology, including under sub-*
15 *section (d).*

16 (6) *Supporting the development of novel tools*
17 *and technologies to accelerate scientific understanding*
18 *and technological innovation in engineering biology.*

19 (7) *Expanding the number of researchers, edu-*
20 *cators, and students and a retooled workforce with en-*
21 *gineering biology training, including from tradition-*
22 *ally underrepresented and underserved populations.*

23 (8) *Accelerating the translation and commer-*
24 *cialization of engineering biology and biomanufac-*
25 *turing research and development by the private sector.*

1 (9) *Improving the interagency planning and co-*
2 *ordination of Federal Government activities related to*
3 *engineering biology.*

4 (b) *INITIATIVE ACTIVITIES.*—*The activities of the Ini-*
5 *tiative shall include the following:*

6 (1) *Sustained support for engineering biology re-*
7 *search and development through the following:*

8 (A) *Grants to fund the work of individual*
9 *investigators and teams of investigators, includ-*
10 *ing interdisciplinary teams.*

11 (B) *Projects funded under joint solicitations*
12 *by a collaboration of not fewer than two agencies*
13 *participating in the Initiative.*

14 (C) *Interdisciplinary research centers that*
15 *are organized to investigate basic research ques-*
16 *tions, carry out technology development and*
17 *demonstration activities, and increase under-*
18 *standing of how to scale up engineering biology*
19 *processes, including biomanufacturing.*

20 (2) *Sustained support for databases and related*
21 *tools, including the following:*

22 (A) *Support for the establishment, curation,*
23 *and maintenance of curated genomics,*
24 *epigenomics, and other relevant omics databases,*
25 *including plant, animal, and microbial data-*

1 *bases, that are available to researchers to carry*
2 *out engineering biology research in a manner*
3 *that does not compromise national security or*
4 *the privacy or security of information within*
5 *such databases.*

6 *(B) Development of standards for such*
7 *databases, including for curation, interoper-*
8 *ability, and protection of privacy and security.*

9 *(C) Support for the development of com-*
10 *putational tools, including artificial intelligence*
11 *tools, that can accelerate research and innova-*
12 *tion using such databases.*

13 *(D) An inventory and assessment of all*
14 *Federal government omics databases to identify*
15 *opportunities to improve the utility of such data-*
16 *bases, as appropriate and in a manner that does*
17 *not compromise national security or the privacy*
18 *and security of information within such data-*
19 *bases, and inform investment in such databases*
20 *as critical infrastructure for the engineering biol-*
21 *ogy research enterprise.*

22 *(3) Sustained support for the development, opti-*
23 *mization, and validation of novel tools and tech-*
24 *nologies to enable the dynamic study of molecular*
25 *processes in situ, including through the following:*

1 (A) *Research conducted at Federal labora-*
2 *tories.*

3 (B) *Grants to fund the work of investigators*
4 *at institutions of higher education and other*
5 *nonprofit research institutions.*

6 (C) *Incentivized development of retooled in-*
7 *dustrial sites across the country that foster a*
8 *pivot to modernized engineering biology initia-*
9 *tives.*

10 (D) *Awards under the Small Business Inno-*
11 *vation Research Program and the Small Busi-*
12 *ness Technology Transfer Program (as described*
13 *in section 9 of the Small Business Act (15*
14 *U.S.C. 638)).*

15 (4) *Support for education and training of under-*
16 *graduate and graduate students in engineering biol-*
17 *ogy, biomanufacturing, bioprocess engineering, and*
18 *computational science applied to engineering biology*
19 *and in the related ethical, legal, environmental, safe-*
20 *ty, security, and other societal domains.*

21 (5) *Support for a national network of testbeds*
22 *based on open standards, interfaces, and processes, in-*
23 *cluding by repurposing existing facilities such as*
24 *those specified in paragraph (3)(C), that would enable*
25 *scale up of laboratory engineering biology research.*

1 (6) *Activities to develop robust mechanisms for*
2 *documenting and quantifying the outputs and eco-*
3 *nommic benefits of engineering biology.*

4 (7) *Activities to accelerate the translation and*
5 *commercialization of new products, processes, and*
6 *technologies by carrying out the following:*

7 (A) *Identifying precompetitive research op-*
8 *portunities.*

9 (B) *Facilitating public-private partnerships*
10 *in engineering biology research and development,*
11 *including to address barriers to scaling up inno-*
12 *vations in engineering biology.*

13 (C) *Connecting researchers, graduate stu-*
14 *dents, and postdoctoral fellows with entrepre-*
15 *neurship education and training opportunities.*

16 (D) *Supporting proof of concept activities*
17 *and the formation of startup companies includ-*
18 *ing through programs such as the Small Busi-*
19 *ness Innovation Research Program and the*
20 *Small Business Technology Transfer Program.*

21 (c) *EXPANDING PARTICIPATION.—The Initiative shall*
22 *include, to the maximum extent practicable, outreach to*
23 *primarily undergraduate and historically Black colleges*
24 *and universities, Tribal Colleges or Universities, and mi-*
25 *nority-serving institutions about Initiative opportunities,*

1 *and shall encourage the development of research collabora-*
2 *tions between research-intensive universities and primarily*
3 *undergraduate and historically Black colleges and univer-*
4 *sities, Tribal Colleges or Universities, and minority-serving*
5 *institutions.*

6 (d) *ETHICAL, LEGAL, ENVIRONMENTAL, SAFETY, SE-*
7 *CURITY, AND SOCIETAL ISSUES.—Initiative activities shall*
8 *take into account ethical, legal, environmental, safety, secu-*
9 *rity, and other appropriate societal issues by carrying out*
10 *the following:*

11 (1) *Supporting research, including in the social*
12 *sciences, and other activities addressing ethical, legal,*
13 *environmental, and other appropriate societal issues*
14 *related to engineering biology, including integrating*
15 *research on such topics with the research and develop-*
16 *ment in engineering biology, and encouraging the dis-*
17 *semination of the results of such research, including*
18 *through interdisciplinary engineering biology research*
19 *centers described in subsection (b)(1)(C).*

20 (2) *Supporting research and other activities re-*
21 *lated to the safety and security implications of engi-*
22 *neering biology, including outreach to increase aware-*
23 *ness among Federal researchers and federally-funded*
24 *researchers at institutions of higher education about*

1 *potential safety and security implications of engineer-*
2 *ing biology research, as appropriate.*

3 (3) *Ensuring that input from Federal and non-*
4 *Federal experts on the ethical, legal, environmental,*
5 *safety, security, and other appropriate societal issues*
6 *related to engineering biology is integrated into the*
7 *Initiative.*

8 (4) *Ensuring, through the agencies and depart-*
9 *ments that participate in the Initiative, that public*
10 *input and outreach are integrated into the Initiative*
11 *by the convening of regular and ongoing public dis-*
12 *cussions through mechanisms such as workshops, con-*
13 *sensus conferences, and educational events, as appro-*
14 *priate.*

15 (5) *Complying with all applicable provisions of*
16 *Federal law.*

17 **SEC. 10403. INITIATIVE COORDINATION.**

18 (a) *INTERAGENCY COMMITTEE.*—*The President, acting*
19 *through the Office of Science and Technology Policy, shall*
20 *designate an interagency committee to coordinate activities*
21 *of the Initiative as appropriate, which shall be co-chaired*
22 *by the Office of Science and Technology Policy. The Direc-*
23 *tor of the Office of Science and Technology Policy shall se-*
24 *lect an additional co-chairperson from among the members*
25 *of the interagency committee. The interagency committee*

1 *shall oversee the planning, management, and coordination*
2 *of the Initiative. The interagency committee shall carry out*
3 *the following:*

4 (1) *Provide for interagency coordination of Fed-*
5 *eral engineering biology research, development, and*
6 *other activities undertaken pursuant to the Initiative.*

7 (2) *Establish and periodically update goals and*
8 *priorities for the Initiative.*

9 (3) *Develop, not later than 12 months after the*
10 *date of the enactment of this Act, and update every*
11 *five years thereafter, a strategic plan submitted to the*
12 *Committee on Science, Space, and Technology, the*
13 *Committee on Agriculture, and the Committee on En-*
14 *ergy and Commerce of the House of Representatives*
15 *and the Committee on Commerce, Science, and Trans-*
16 *portation, the Committee on Agriculture, Nutrition,*
17 *and Forestry, the Committee on Small Business and*
18 *Entrepreneurship, and the Committee on Health,*
19 *Education, Labor, and Pensions of the Senate that—*

20 (A) *guides the activities of the Initiative for*
21 *purposes of meeting the goals and priorities es-*
22 *tablished under (and updated pursuant to) para-*
23 *graph (2); and*

24 (B) *describes—*

1 (i) the Initiative’s support for long-
2 term funding for interdisciplinary engineer-
3 ing biology research and development;

4 (ii) the Initiative’s support for edu-
5 cation and public outreach activities;

6 (iii) the Initiative’s support for re-
7 search and other activities on ethical, legal,
8 environmental, safety, security, and other
9 appropriate societal issues related to engi-
10 neering biology, including—

11 (I) an applied biorisk manage-
12 ment research plan;

13 (II) recommendations for inte-
14 grating security into biological data
15 access and international reciprocity
16 agreements;

17 (III) recommendations for manu-
18 facturing restructuring to support en-
19 gineering biology research, develop-
20 ment, and scaling-up initiatives; and

21 (IV) an evaluation of existing bio-
22 security governance policies, guidance,
23 and directives for the purposes of cre-
24 ating an adaptable, evidence-based
25 framework to respond to emerging bio-

1 *security challenges created by advances*
2 *in engineering biology;*

3 *(iv) how the Initiative will contribute*
4 *to moving results out of the laboratory and*
5 *into application for the benefit of society*
6 *and United States competitiveness; and*

7 *(v) how the Initiative will measure*
8 *and track the contributions of engineering*
9 *biology to United States economic growth*
10 *and other societal indicators.*

11 *(4) Develop a national genomic sequencing strat-*
12 *egy to ensure engineering biology research fully*
13 *leverages plant, animal, and microbe biodiversity, as*
14 *appropriate and in a manner that does not com-*
15 *promise economic competitiveness, national security,*
16 *or the privacy or security of human genetic informa-*
17 *tion, to enhance long-term innovation and competi-*
18 *tiveness in engineering biology in the United States.*

19 *(5) Develop a plan to utilize Federal programs,*
20 *such as the Small Business Innovation Research Pro-*
21 *gram and the Small Business Technology Transfer*
22 *Program (as described in section 9 of the Small Busi-*
23 *ness Act (15 U.S.C. 638)), in support of the activities*
24 *described in section 10402(b)(3).*

1 (6) *In carrying out this section, take into consid-*
2 *eration the recommendations of the advisory com-*
3 *mittee established under section 10404, the results of*
4 *the workshop convened under section 10402, existing*
5 *reports on related topics, and the views of academic,*
6 *State, industry, and other appropriate groups.*

7 (b) *QUINQUENNIAL REPORT.—Beginning with fiscal*
8 *year 2023 and every five years thereafter for ten years, the*
9 *interagency committee shall prepare and submit to the*
10 *Committee on Science, Space, and Technology, the Com-*
11 *mittee on Energy and Commerce, and the Committee on*
12 *Agriculture of the House of Representatives and the Com-*
13 *mittee on Commerce, Science, and Transportation, the*
14 *Committee on Health, Education, Labor, and Pensions, the*
15 *Committee on Small Business and Entrepreneurship, and*
16 *the Committee on Agriculture, Nutrition, and Forestry of*
17 *the Senate a report that includes the following:*

18 (1) *A summarized agency budget in support of*
19 *the Initiative for the current fiscal year, including a*
20 *breakout of spending for each agency participating in*
21 *the Program, and for the development and acquisition*
22 *of any research facilities and instrumentation.*

23 (2) *An assessment of how Federal agencies are*
24 *implementing the plan described in subsection (a)(3),*
25 *including the following:*

1 (A) *A description of the amount and num-*
2 *ber of awards made under the Small Business*
3 *Innovation Research Program and the Small*
4 *Business Technology Transfer Program (as de-*
5 *scribed in section 9 of the Small Business Act*
6 *(15 U.S.C. 638)) in support of the Initiative.*

7 (B) *A description of the amount and num-*
8 *ber of projects funded under joint solicitations by*
9 *a collaboration of not fewer than two agencies*
10 *participating in the Initiative.*

11 (C) *A description of effects of newly-funded*
12 *projects by the Initiative.*

13 (c) *INITIATIVE COORDINATION OFFICE.—*

14 (1) *IN GENERAL.—The President shall establish*
15 *an Initiative Coordination Office, with a Director*
16 *and full-time staff, which shall—*

17 (A) *provide technical and administrative*
18 *support to the interagency committee and the ad-*
19 *visory committee established under subsection (a)*
20 *and section 10404;*

21 (B) *serve as the point of contact on Federal*
22 *engineering biology activities for government or-*
23 *ganizations, academia, industry, professional so-*
24 *cieties, State governments, interested citizen*

1 groups, and others to exchange technical and
2 programmatic information;

3 (C) oversee interagency coordination of the
4 Initiative, including by encouraging and sup-
5 porting joint agency solicitation and selection of
6 applications for funding of activities under the
7 Initiative, as appropriate;

8 (D) conduct public outreach, including dis-
9 semination of findings and recommendations of
10 the advisory committee, as appropriate;

11 (E) serve as the coordinator of ethical, legal,
12 environmental, safety, security, and other appro-
13 priate societal input; and

14 (F) promote access to, and early applica-
15 tion of, the technologies, innovations, and exper-
16 tise derived from Initiative activities to agency
17 missions and systems across the Federal Govern-
18 ment, and to United States industry, including
19 startup companies.

20 (2) FUNDING.—The Director of the Office of
21 Science and Technology Policy, in coordination with
22 each participating Federal department and agency,
23 as appropriate, shall develop and annually update an
24 estimate of the funds necessary to carry out the ac-
25 tivities of the Initiative Coordination Office and sub-

1 *mental entities, who are qualified to provide advice on the*
2 *Initiative.*

3 (b) *ASSESSMENT.—The advisory committee shall as-*
4 *sess the following:*

5 (1) *The current state of United States competi-*
6 *tiveness in engineering biology, including the scope*
7 *and scale of United States investments in engineering*
8 *biology research and development in the international*
9 *context.*

10 (2) *Current market barriers to commercializa-*
11 *tion of engineering biology products, processes, and*
12 *tools in the United States.*

13 (3) *Progress made in implementing the Initia-*
14 *tive.*

15 (4) *The need to revise the Initiative.*

16 (5) *The balance of activities and funding across*
17 *the Initiative.*

18 (6) *Whether the strategic plan developed or up-*
19 *dated by the interagency committee established under*
20 *section 10403 is helping to maintain United States*
21 *leadership in engineering biology.*

22 (7) *Whether ethical, legal, environmental, safety,*
23 *security, and other appropriate societal issues are*
24 *adequately addressed by the Initiative.*

1 (c) *REPORTS.*—Beginning not later than two years
2 after the date of the enactment of this Act and not less fre-
3 quently than once every five years thereafter, the advisory
4 committee shall submit to the President, the Committee on
5 Science, Space, and Technology, the Committee on Energy
6 and Commerce, and the Committee on Agriculture of the
7 House of Representatives, and the Committee on Commerce,
8 Science, and Transportation, the Committee on Health,
9 Education, Labor, and Pensions, and the Committee on Ag-
10 riculture, Nutrition, and Forestry of the Senate, a report
11 on the following:

12 (1) *The findings of the advisory committee's as-*
13 *essment under subsection (b).*

14 (2) *The advisory committee's recommendations*
15 *for ways to improve the Initiative.*

16 (d) *APPLICATION OF FEDERAL ADVISORY COMMITTEE*
17 *ACT.*—Section 14 of the Federal Advisory Committee Act
18 (5 U.S.C. App.) shall not apply to the advisory committee.

19 (e) *TERMINATION.*—The advisory committee estab-
20 lished under subsection (a) shall terminate on the date that
21 is 10 years after the date of the enactment of this Act.

1 **SEC. 10405. EXTERNAL REVIEW OF ETHICAL, LEGAL, ENVI-**
2 **RONMENTAL, SAFETY, SECURITY, AND SOCI-**
3 **ETAL ISSUES.**

4 (a) *IN GENERAL.*—Not later than six months after the
5 date of enactment of this Act, the Director of the National
6 Science Foundation shall seek to enter into an agreement
7 with the National Academies of Sciences, Engineering, and
8 Medicine to conduct a review, and make recommendations
9 with respect to, the ethical, legal, environmental, safety, se-
10 curity, and other appropriate societal issues related to engi-
11 neering biology research and development. The review shall
12 include the following:

13 (1) *An assessment of the current research on such*
14 *issues.*

15 (2) *A description of the research needs relating*
16 *to such issues.*

17 (3) *Recommendations on how the Initiative can*
18 *address the research needs identified pursuant to*
19 *paragraph (2).*

20 (4) *Recommendations on how researchers en-*
21 *gaged in engineering biology can best incorporate*
22 *considerations of such issues into the development of*
23 *research proposals and the conduct of research.*

24 (b) *REPORT TO CONGRESS.*—The agreement entered
25 into under subsection (a) shall require the National Acad-

1 *emies of Sciences, Engineering, and Medicine to, not later*
2 *than two years after the date of the enactment of this Act—*

3 (1) *submit to the Committee on Science, Space,*
4 *and Technology and the Committee on Agriculture of*
5 *the House of Representatives and the Committee on*
6 *Commerce, Science, and Transportation and the Com-*
7 *mittee on Agriculture, Nutrition, and Forestry of the*
8 *Senate a report containing the findings and rec-*
9 *ommendations of the review conducted under sub-*
10 *section (a); and*

11 (2) *make a copy of such report available on a*
12 *publicly accessible website.*

13 **SEC. 10406. AGENCY ACTIVITIES.**

14 (a) *NATIONAL SCIENCE FOUNDATION.—As part of the*
15 *Initiative, the National Science Foundation shall carry out*
16 *the following:*

17 (1) *Support research in engineering biology and*
18 *biomanufacturing through individual grants, collabo-*
19 *rative grants, and through interdisciplinary research*
20 *centers.*

21 (2) *Support research on the environmental, legal,*
22 *ethical, and social implications of engineering biol-*
23 *ogy.*

24 (3) *Provide support for research instrumenta-*
25 *tion, equipment, and cyberinfrastructure for engineer-*

1 *ing biology disciplines, including support for re-*
2 *search, development, optimization, and validation of*
3 *novel technologies to enable the dynamic study of mo-*
4 *lecular processes in situ.*

5 (4) *Support curriculum development and re-*
6 *search experiences for secondary, undergraduate, and*
7 *graduate students in engineering biology and bio-*
8 *manufacturing, including through support for grad-*
9 *uate fellowships and traineeships in engineering biol-*
10 *ogy.*

11 (5) *Award grants, on a competitive basis, to en-*
12 *able institutions to support graduate students and*
13 *postdoctoral fellows who perform some of their engi-*
14 *neering biology research in an industry setting.*

15 (b) *DEPARTMENT OF COMMERCE.—*

16 (1) *NATIONAL INSTITUTE OF STANDARDS AND*
17 *TECHNOLOGY.—As part of the Initiative, the Director*
18 *of the National Institute of Standards and Technology*
19 *shall carry out the following:*

20 (A) *Advance the development of standard*
21 *reference materials and measurements, including*
22 *to promote interoperability between new compo-*
23 *nent technologies and processes for engineering*
24 *biology and biomanufacturing discovery, innova-*
25 *tion, and production processes.*

1 (B) *Establish new data tools, techniques,*
2 *and processes necessary to advance engineering*
3 *biology and biomanufacturing.*

4 (C) *Provide access to user facilities with ad-*
5 *vanced or unique equipment, services, materials,*
6 *and other resources to industry, institutions of*
7 *higher education, nonprofit organizations, and*
8 *government agencies to perform research and*
9 *testing.*

10 (D) *Provide technical expertise to inform*
11 *the potential development of guidelines or safe-*
12 *guards for new products, processes, and systems*
13 *of engineering biology.*

14 (2) *NATIONAL OCEANIC AND ATMOSPHERIC AD-*
15 *MINISTRATION.—As part of the initiative, the Admin-*
16 *istrator of the National Oceanic and Atmospheric Ad-*
17 *ministration shall carry out the following:*

18 (A) *Conduct and support research in omics*
19 *and associated bioinformatic sciences and de-*
20 *velop tools and products to improve ecosystem*
21 *stewardship, monitoring, management, assess-*
22 *ments, and forecasts, consistent with the mission*
23 *of the agency.*

1 (B) Collaborate with other agencies to un-
2 derstand potential environmental threats and
3 safeguards related to engineering biology.

4 (c) DEPARTMENT OF ENERGY.—As part of the Initia-
5 tive, the Secretary of Energy shall carry out the following:

6 (1) Conduct and support research, development,
7 demonstration, and commercial application activities
8 in engineering biology, including in the areas of syn-
9 thetic biology, advanced biofuel and bioproduct devel-
10 opment, biobased materials, and environmental reme-
11 diation.

12 (2) Support the development, optimization and
13 validation of novel, scalable tools and technologies to
14 enable the dynamic study of molecular processes in
15 situ.

16 (3) Provide access to user facilities with ad-
17 vanced or unique equipment, services, materials, and
18 other resources, including secure access to high-per-
19 formance computing, as appropriate, to industry, in-
20 stitutions of higher education, nonprofit organiza-
21 tions, and government agencies to perform research
22 and testing;

23 (4) Strengthen collaboration between the Office of
24 Science and the Energy Efficiency and Renewable
25 Energy Office to help transfer fundamental research

1 *results to industry and accelerate commercial appli-*
2 *cations.*

3 *(d) DEPARTMENT OF DEFENSE.—As part of the Ini-*
4 *tiative, the Secretary of Defense shall carry out the fol-*
5 *lowing:*

6 *(1) Conduct and support research and develop-*
7 *ment in engineering biology and associated data and*
8 *information sciences.*

9 *(2) Support curriculum development and re-*
10 *search experiences in engineering biology and associ-*
11 *ated data and information sciences across the mili-*
12 *tary education system, including the service acad-*
13 *emies, professional military education, and military*
14 *graduate education.*

15 *(3) Assess risks of potential national security*
16 *and economic security threats relating to engineering*
17 *biology.*

18 *(e) NATIONAL AERONAUTICS AND SPACE ADMINISTRA-*
19 *TION.—As part of the Initiative, the National Aeronautics*
20 *and Space Administration shall carry out the following:*

21 *(1) Conduct and support research in engineering*
22 *biology, including in synthetic biology, and related to*
23 *Earth and space sciences, aeronautics, space tech-*
24 *nology, and space exploration and experimentation,*

1 *consistent with the priorities established in the Na-*
2 *tional Academies' decadal surveys.*

3 (2) *Award grants, on a competitive basis, that*
4 *enable institutions to support graduate students and*
5 *postdoctoral fellows who perform some of their engi-*
6 *neering biology research in an industry setting.*

7 (f) *DEPARTMENT OF AGRICULTURE.—As part of the*
8 *Initiative, the Secretary of Agriculture shall support re-*
9 *search and development in engineering biology through the*
10 *Agricultural Research Service, the National Institute of*
11 *Food and Agriculture programs and grants, and the Office*
12 *of the Chief Scientist.*

13 (g) *ENVIRONMENTAL PROTECTION AGENCY.—As part*
14 *of the Initiative, the Environmental Protection Agency shall*
15 *support research on how products, processes, and systems*
16 *of engineering biology will affect or can protect the environ-*
17 *ment.*

18 (h) *DEPARTMENT OF HEALTH AND HUMAN SERV-*
19 *ICES.—As part of the Initiative, the Secretary of Health*
20 *and Human Services, as appropriate and consistent with*
21 *activities of the Department of Health and Human Services*
22 *in effect on the day before the date of the enactment of this*
23 *Act, shall carry out the following:*

1 (1) *Support research and development to ad-*
2 *vance the understanding and application of engineer-*
3 *ing biology for human health.*

4 (2) *Support relevant interdisciplinary research*
5 *and coordination.*

6 (3) *Support activities necessary to facilitate*
7 *oversight of relevant emerging biotechnologies.*

8 **SEC. 10407. RULE OF CONSTRUCTION.**

9 *Nothing in this title may be construed to require public*
10 *disclosure of information that is exempt from mandatory*
11 *disclosure under section 552 of title 5, United States Code.*

12 **TITLE V—BROADENING**
13 **PARTICIPATION IN SCIENCE**
14 **Subtitle A—STEM Opportunities**

15 **SEC. 10501. FEDERAL RESEARCH AGENCY POLICIES FOR**
16 **CAREGIVERS.**

17 (a) *OSTP GUIDANCE.*—*Not later than 12 months after*
18 *the date of the enactment of this Act, the Director, in con-*
19 *sultation with the heads of relevant agencies, shall provide*
20 *guidance to each Federal research agency to establish poli-*
21 *cies that—*

22 (1) *apply to all—*

23 (A) *research awards granted by such agen-*
24 *cy; and*

1 (B) principal investigators of such research
2 and their trainees, including postdoctoral re-
3 searchers and graduate students, who have
4 caregiving responsibilities, including care for a
5 newborn or newly adopted child and care for an
6 immediate family member who has a disability
7 or a serious health condition; and

8 (2) provide, to the extent feasible—

9 (A) flexibility in timing for the initiation of
10 approved research awards granted by such agen-
11 cy;

12 (B) no-cost extensions of such research
13 awards;

14 (C) award supplements, as appropriate, to
15 research awards to sustain research activities
16 conducted under such awards; and

17 (D) any other appropriate accommodations
18 at the discretion of the director of each such
19 agency.

20 (b) *UNIFORMITY OF GUIDANCE.*—In providing guid-
21 ance under subsection (a), the Director shall encourage uni-
22 formity, to the extent practicable, and consistency in the
23 policies established pursuant to such guidance across all
24 Federal research agencies.

1 (c) *ESTABLISHMENT OF POLICIES.*—Consistent, to the
2 extent practicable, with the guidance under subsection (a),
3 Federal research agencies shall—

4 (1) maintain or develop and implement policies
5 for individuals described in paragraph (1)(B) of such
6 subsection; and

7 (2) broadly disseminate in easily accessible for-
8 mats such policies to current and potential award re-
9 cipients.

10 (d) *DATA ON USAGE.*—Federal research agencies shall
11 consider—

12 (1) collecting data, including demographic data
13 that can be disaggregated by sex, geographic location,
14 and socioeconomic indicators, which may include em-
15 ployment status, occupation, educational attainment,
16 parental education, and income, on the usage of the
17 policies under subsection (c), at both institutions of
18 higher education and Federal laboratories; and

19 (2) reporting such data on an annual basis to
20 the Director in such form as required by the Director.

21 **SEC. 10502. COLLECTION AND REPORTING OF DATA ON**
22 **FEDERAL RESEARCH AWARDS.**

23 (a) *COLLECTION OF DATA.*—

24 (1) *IN GENERAL.*—Each Federal research agency
25 shall collect, as practicable, with respect to all appli-

1 *cations for merit-reviewed research and development*
2 *awards made by such agency, standardized record-*
3 *level annual information on demographics, primary*
4 *field, award type, institution type, review rating,*
5 *budget request, funding outcome, and awarded budget.*

6 (2) *UNIFORMITY AND STANDARDIZATION.—The*
7 *Director, in consultation with the heads of each Fed-*
8 *eral research agency, shall establish, and update as*
9 *necessary, a policy to ensure uniformity and stand-*
10 *ardization of the data collection required under para-*
11 *graph (1).*

12 (3) *RECORD-LEVEL DATA.—*

13 (A) *REQUIREMENT.—Beginning not later*
14 *than two years after the issuance of the policy*
15 *under paragraph (2) to Federal research agen-*
16 *cies, and on an annual basis thereafter, each*
17 *Federal research agency shall submit to the Na-*
18 *tional Center for Science and Engineering Sta-*
19 *tistics record-level data collected under para-*
20 *graph (1) in the form required by the Director*
21 *of the National Science Foundation.*

22 (B) *PREVIOUS DATA.—As part of the first*
23 *submission under subparagraph (A), each Fed-*
24 *eral research agency, to the extent practicable,*
25 *shall also submit comparable record-level data, if*

1 *it is available to the agency, for the five years*
2 *preceding the date of such submission, or an*
3 *analysis for why such data cannot be provided.*

4 *(b) REPORTING OF DATA.—The Director of the Na-*
5 *tional Science Foundation shall publish statistical sum-*
6 *mary data, as practicable, collected under this section,*
7 *disaggregated and cross-tabulated by race, ethnicity, sex, so-*
8 *cioeconomic indicators, which may include employment sta-*
9 *tus, occupation, educational attainment, parental edu-*
10 *cation, and income, geographic location, and years since*
11 *completion of doctoral degree, including in conjunction with*
12 *the National Science Foundation’s report required by sec-*
13 *tion 37 of the Science and Engineering Equal Opportuni-*
14 *ties Act (42 U.S.C. 1885d; Public Law 96–516).*

15 **SEC. 10503. POLICIES FOR REVIEW OF FEDERAL RESEARCH**
16 **AWARDS.**

17 *(a) ASSESSMENT OF POLICIES.—Federal research*
18 *agencies shall regularly assess, and update as necessary,*
19 *policies, and practices to remove or reduce cultural and in-*
20 *stitutional barriers limiting the recruitment, retention, and*
21 *success of groups historically underrepresented in STEM re-*
22 *search careers, including policies and practices relevant to*
23 *the unbiased review of Federal research applications.*

1 (b) *CONSIDERATIONS AND ACTIVITIES.*—*In carrying*
2 *out the requirements under subsection (a), Federal research*
3 *agencies shall—*

4 (1) *review current levels of participation of*
5 *groups historically underrepresented in STEM in*
6 *peer-review panels and consider approaches for ex-*
7 *panding their participation;*

8 (2) *analyze the data collected under section*
9 *10502, including funding rates of proposals from all*
10 *groups, including those historically underrepresented*
11 *in STEM;*

12 (3) *collect and disseminate best practices to re-*
13 *move or reduce cultural and institutional barriers*
14 *limiting the recruitment, retention, and success of*
15 *groups historically underrepresented in STEM re-*
16 *search careers; and*

17 (4) *implement evidence-based policies and prac-*
18 *tices to achieve the goals of this section.*

19 **SEC. 10504. COLLECTION OF DATA ON DEMOGRAPHICS OF**
20 **FACULTY.**

21 (a) *COLLECTION OF DATA.*—

22 (1) *IN GENERAL.*—*Not later than 5 years after*
23 *the date of the enactment of this Act and at least*
24 *every five years thereafter, the Director of the Na-*
25 *tional Science Foundation shall carry out a survey to*

1 collect data from award recipients on the demo-
2 graphics of STEM faculty, by broad fields of STEM,
3 at different types of institutions of higher education
4 that receive Federal research funding.

5 (2) SURVEY CONSIDERATIONS.—To the extent
6 practicable, the Director of the National Science
7 Foundation shall survey, by sex, race, socioeconomic
8 indicators, which may include employment status, oc-
9 cupation, educational attainment, parental education,
10 and income, geographic location, ethnicity, citizen-
11 ship status, and years since completion of doctoral de-
12 gree—

13 (A) the number and percentage of faculty;

14 (B) the number and percentage of faculty at
15 each rank;

16 (C) the number and percentage of faculty
17 who are in nontenure-track positions, including
18 teaching and research;

19 (D) the number and percentage of faculty
20 who are reviewed for promotion, including ten-
21 ure, and the percentage of that number who are
22 promoted, including being awarded tenure;

23 (E) faculty years in rank;

24 (F) the number and percentage of faculty to
25 leave tenure-track positions;

1 (G) the number and percentage of faculty
2 hired, by rank; and

3 (H) the number and percentage of faculty
4 in leadership positions.

5 (b) *EXISTING SURVEYS.*—The Director of the National
6 Science Foundation, may, in modifying or expanding exist-
7 ing Federal surveys of higher education (as necessary)—

8 (1) take into account the considerations under
9 subsection (a)(2) by collaborating with statistical cen-
10 ters at other Federal agencies; or

11 (2) make an award to an institution of higher
12 education or nonprofit organization (or consortia
13 thereof) to take such considerations into account.

14 (c) *REPORTING DATA.*—The Director of the National
15 Science Foundation shall publish statistical summary data
16 collected under this section, including as part of the Na-
17 tional Science Foundation’s report required by section 37
18 of the Science and Engineering Equal Opportunities Act
19 (42 U.S.C. 1885d; Public Law 96–516).

20 (d) *AUTHORIZATION OF APPROPRIATIONS.*—There are
21 authorized to be appropriated to the Director of the Na-
22 tional Science Foundation \$4,000,000 in each of fiscal
23 years 2023 through 2025 to develop and carry out the ini-
24 tial survey required under subsection (a).

1 **SEC. 10505. CULTURAL AND INSTITUTIONAL BARRIERS TO**
2 **EXPANDING THE ACADEMIC AND FEDERAL**
3 **STEM WORKFORCE.**

4 (a) *BEST PRACTICES.*—

5 (1) *DEVELOPMENT OF GUIDANCE.*—Not later
6 than 12 months after the date of enactment of this
7 Act, the Director, in consultation with the interagency
8 working group on inclusion in STEM and utilizing
9 existing guidance already developed by Federal re-
10 search agencies where applicable, shall broadly dis-
11 seminate to entities that receive Federal research
12 funding best practices for—

13 (A) *conducting periodic climate surveys of*
14 *STEM departments and divisions, with a par-*
15 *ticular focus on identifying and addressing any*
16 *cultural or institutional barriers to the recruit-*
17 *ment, retention, or advancement of groups his-*
18 *torically underrepresented in STEM studies and*
19 *careers; and*

20 (B) *providing educational opportunities, in-*
21 *cluding workshops, for STEM professionals to*
22 *learn about current research on effective prac-*
23 *tices for unbiased recruitment, evaluation, and*
24 *promotion of undergraduate and graduate stu-*
25 *dents and research personnel.*

1 (2) *ESTABLISHMENT OF POLICIES.*—*Consistent*
2 *with the guidance developed under paragraph (1)—*

3 (A) *The Director of the National Science*
4 *Foundation, in consultation with the heads of*
5 *Federal research agencies, shall develop a policy*
6 *that—*

7 (i) *applies to, at a minimum, doctoral*
8 *degree granting institutions that receive*
9 *Federal research funding; and*

10 (ii) *requires each such institution, not*
11 *later than 3 years after the date of enact-*
12 *ment of this Act, and to the extent prac-*
13 *ticable, to report to the Director of the Na-*
14 *tional Science Foundation on activities and*
15 *policies developed and implemented based*
16 *on the guidance disseminated under para-*
17 *graph (1); and*

18 (B) *each Federal research agency with a*
19 *Federal laboratory shall maintain or develop*
20 *and implement practices and policies for the*
21 *purposes described in paragraph (1) for such*
22 *laboratory and, not later than three years after*
23 *the date of the enactment of this Act, each Fed-*
24 *eral laboratory shall report to the head of such*
25 *agency on such practices and policies.*

1 **(b) REPORT TO CONGRESS.**—Not later than four years
2 after the date of the enactment of this Act, the Director of
3 the National Science Foundation shall submit a report to
4 Congress that includes a summary and analysis of the types
5 and frequency of activities and policies developed and car-
6 ried out under subsection (a) based on the reports submitted
7 under paragraph (2) of such subsection.

8 **SEC. 10506. EXISTING ACTIVITIES.**

9 A Federal research agency may satisfy requirements
10 under this subtitle through activities and programs in exist-
11 ence as of the date of the enactment of this Act.

12 **SEC. 10507. REPORT TO CONGRESS.**

13 Not later than four years after the date of the enact-
14 ment of this Act, the Director shall submit to Congress a
15 report that includes the following:

16 (1) A description and evaluation of the status
17 and usage of policies implemented pursuant to section
18 10505 at all Federal research agencies, including any
19 recommendations for revising or expanding such poli-
20 cies.

21 (2) With respect to efforts to remove or reduce
22 cultural and institutional barriers limiting the re-
23 cruitment, retention, and success of groups histori-
24 cally underrepresented in academic and government
25 STEM research careers under section 10505—

1 (A) *what steps all Federal research agencies*
2 *have taken to implement policies and practices*
3 *to further such efforts;*

4 (B) *a description of any significant updates*
5 *to the policies for review of Federal research*
6 *awards required under such section; and*

7 (C) *any evidence of the impact of such poli-*
8 *cies on the review or awarding of Federal re-*
9 *search awards; and*

10 (3) *A description and evaluation of the status of*
11 *institution of higher education and Federal labora-*
12 *tory policies and practices required under section*
13 *10505, including any recommendations for revising*
14 *or expanding such policies.*

15 **SEC. 10508. MERIT REVIEW.**

16 *Nothing in this subtitle may be construed as altering*
17 *any intellectual or broader impacts criteria at Federal re-*
18 *search agencies for evaluating award applications.*

19 **SEC. 10509. DETERMINATION OF BUDGETARY EFFECTS.**

20 *The budgetary effects of this subtitle, for the purpose*
21 *of complying with the Statutory Pay-As-You-Go Act of*
22 *2010, shall be determined by reference to the latest state-*
23 *ment titled “Budgetary Effects of PAYGO Legislation” for*
24 *this subtitle, submitted for printing in the Congressional*
25 *Record by the Chairman of the House Budget Committee,*

1 *provided that such statement has been submitted prior to*
 2 *the vote on passage.*

3 **SEC. 10510. DEFINITION.**

4 *In this subtitle, the term “Director” means the Direc-*
 5 *tor of the Office of Science and Technology Policy.*

6 ***Subtitle B—Rural STEM Education***
 7 ***Research***

8 **SEC. 10511. DEFINITION.**

9 *In this subtitle, the term “Director” means the Direc-*
 10 *tor of the National Science Foundation.*

11 **SEC. 10512. NATIONAL SCIENCE FOUNDATION RURAL STEM**
 12 **ACTIVITIES.**

13 *(a) PREPARING RURAL STEM EDUCATORS.—*

14 *(1) IN GENERAL.—The Director shall make*
 15 *awards on a merit- reviewed, competitive basis to in-*
 16 *stitutions of higher education or nonprofit organiza-*
 17 *tions (or a consortium thereof) for research and devel-*
 18 *opment activities to advance innovative approaches to*
 19 *support and sustain high-quality STEM teaching in*
 20 *rural schools.*

21 *(2) USE OF FUNDS.—*

22 *(A) IN GENERAL.—Awards made under this*
 23 *subsection shall be used for the research and de-*
 24 *velopment activities referred to in paragraph (1),*
 25 *which may include—*

1 (i) *engaging rural educators, prin-*
2 *cipals, or other school leaders of students in*
3 *prekindergarten through grade 12 in profes-*
4 *sional learning opportunities to enhance*
5 *STEM knowledge, including computer*
6 *science, and develop best practices;*

7 (ii) *supporting research on effective*
8 *STEM teaching and school leadership prac-*
9 *tices in rural settings, including the use of*
10 *rubrics and mastery- based grading prac-*
11 *tices to assess student performance when*
12 *employing the transdisciplinary teaching*
13 *approach for STEM disciplines;*

14 (iii) *designing and developing pre-serv-*
15 *ice and in-service training resources to as-*
16 *sist such rural educators, principals, and*
17 *other school leaders in adopting*
18 *transdisciplinary teaching practices across*
19 *STEM courses;*

20 (iv) *coordinating with local partners to*
21 *adapt STEM teaching practices to leverage*
22 *local, natural, and community assets in*
23 *order to support in-place learning in rural*
24 *areas;*

1 (v) providing hands-on training and
2 research opportunities for rural educators
3 described in clause (i) at Federal labora-
4 tories or institutions of higher education, or
5 in industry;

6 (vi) developing training and best prac-
7 tices for educators who teach multiple grade
8 levels within a STEM discipline;

9 (vii) designing and implementing pro-
10 fessional development courses and experi-
11 ences, including mentoring, for rural edu-
12 cators, principals, and other school leaders
13 described in clause (i) that combine face-to-
14 face and online experiences; and

15 (viii) any other activity the Director
16 determines will accomplish the goals of this
17 paragraph.

18 (B) *RURAL STEM COLLABORATIVE*.—The
19 Director shall establish a pilot program of re-
20 gional cohorts in rural areas that will provide
21 peer support, mentoring, and hands-on research
22 experiences for rural STEM educators, prin-
23 cipals, and other school leaders of students in
24 prekindergarten through grade 12, in order to
25 build an ecosystem of cooperation among edu-

1 *cators, principals, other school leaders, research-*
2 *ers, academia, and local industry.*

3 **(b) BROADENING PARTICIPATION OF RURAL STU-**
4 **DENTS IN STEM.—**

5 **(1) IN GENERAL.—***The Director shall make*
6 *awards on a merit- reviewed, competitive basis to in-*
7 *stitutions of higher education or nonprofit organiza-*
8 *tions (or a consortium thereof) for—*

9 **(A)** *research and development of program-*
10 *ming to identify the barriers rural students face*
11 *in accessing high-quality STEM education; and*

12 **(B)** *development of innovative solutions to*
13 *improve the participation and advancement of*
14 *rural students in prekindergarten through grade*
15 *12 in STEM studies.*

16 **(2) USE OF FUNDS.—**

17 **(A) IN GENERAL.—***Awards made under this*
18 *subsection shall be used for the research and de-*
19 *velopment activities referred to in paragraph (1),*
20 *which may include—*

21 **(i)** *developing partnerships with com-*
22 *munity colleges to offer advanced STEM*
23 *course work, including computer science, to*
24 *rural high school students;*

1 (ii) supporting research on effective
2 STEM practices in rural settings;

3 (iii) implementing a school-wide
4 STEM approach, including preparation
5 and support for principals and other school
6 leaders;

7 (iv) improving the Foundation's Ad-
8 vanced Technology Education program's co-
9 ordination and engagement with rural com-
10 munities;

11 (v) collaborating with existing commu-
12 nity partners and networks, such as the Co-
13 operative Extension System services and ex-
14 tramural research programs of the Depart-
15 ment of Agriculture and youth serving orga-
16 nizations like 4-H, after school STEM pro-
17 grams, and summer STEM programs, to le-
18 verage community resources and develop
19 place-based programming;

20 (vi) connecting rural school districts
21 and institutions of higher education, to im-
22 prove precollegiate STEM education and
23 engagement;

24 (vii) supporting partnerships that offer
25 hands- on inquiry-based science activities,

1 including coding, and access to lab re-
2 sources for students studying STEM in pre-
3 kindergarten through grade 12 in a rural
4 area;

5 (viii) evaluating the role of broadband
6 connectivity and its associated impact on
7 the STEM and technology literacy of rural
8 students;

9 (ix) building capacity to support ex-
10 tracurricular STEM programs in rural
11 schools, including mentor-led engagement
12 programs, STEM programs held during
13 non-school hours, STEM networks,
14 makerspaces, coding activities, and competi-
15 tions;

16 (x) creating partnerships with local in-
17 dustries and local educational agencies to
18 tailor STEM curricula and educational ex-
19 periences to the needs of a particular local
20 or regional economy; and

21 (xi) any other activity the Director de-
22 termines will accomplish the goals of this
23 paragraph.

24 (c) *APPLICATION.*—An applicant seeking an award
25 under subsection (a) or (b) shall submit an application at

1 *such time, in such manner, and containing such informa-*
2 *tion as the Director may require. The application may in-*
3 *clude the following:*

4 (1) *A description of the target population to be*
5 *served by the research activity or activities for which*
6 *such award is sought.*

7 (2) *A description of the process for recruitment*
8 *and selection of students, educators, principals, and*
9 *other school leaders, or schools from rural areas to*
10 *participate in such activity or activities.*

11 (3) *A description of how such activity or activi-*
12 *ties may inform efforts to promote the engagement*
13 *and achievement of rural students in prekindergarten*
14 *through grade 12 in STEM studies.*

15 (4) *In the case of a proposal consisting of a part-*
16 *nership or partnerships with one or more rural*
17 *schools and one or more researchers, a plan for estab-*
18 *lishing a sustained partnership that is jointly devel-*
19 *oped and managed, draws from the capacities of each*
20 *partner, and is mutually beneficial.*

21 (d) *PARTNERSHIPS.*—*In making awards under sub-*
22 *section (a) or (b), the Director shall—*

23 (1) *encourage applicants which, for the purpose*
24 *of the activity or activities funded through the award,*
25 *include or partner with a nonprofit organization or*

1 *an institution of higher education (or a consortium*
2 *thereof) that has extensive experience and expertise in*
3 *increasing the participation of rural students in pre-*
4 *kindergarten through grade 12 in STEM;*

5 *(2) encourage applicants which, for the purpose*
6 *of the activity or activities funded through the award,*
7 *include or partner with a consortium of rural schools*
8 *or rural school districts; and*

9 *(3) encourage applications which, for the pur-*
10 *pose of the activity or activities funded through the*
11 *award, include commitments from school principals,*
12 *other school leaders, and administrators to making re-*
13 *forms and activities proposed by the applicant a pri-*
14 *ority.*

15 *(e) EVALUATIONS.—All proposals for awards under*
16 *subsections (a) and (b) shall include an evaluation plan*
17 *that includes the use of outcome-oriented measures to assess*
18 *the impact and efficacy of the award. Each recipient of an*
19 *award under this subsection shall include results from these*
20 *evaluative activities in annual and final projects.*

21 *(f) ACCOUNTABILITY AND DISSEMINATION.—*

22 *(1) EVALUATION REQUIRED.—The Director shall*
23 *evaluate the portfolio of awards made under sub-*
24 *sections (a) and (b). Such evaluation shall—*

1 (A) use a common set of benchmarks and
2 tools to assess the results of research conducted
3 under such awards and identify best practices;
4 and

5 (B) to the extent practicable, integrate the
6 findings of research resulting from the activity
7 or activities funded through such awards with
8 the findings of other research on rural students'
9 pursuit of degrees or careers in STEM.

10 (2) *REPORT ON EVALUATIONS.*—Not later than
11 180 days after the completion of the evaluation under
12 paragraph (1), the Director shall submit to Congress
13 and make widely available to the public a report that
14 includes—

15 (A) the results of the evaluation; and

16 (B) any recommendations for administra-
17 tive and legislative action that could optimize
18 the effectiveness of the awards made under this
19 subsection.

20 (g) *REPORT BY COMMITTEE ON EQUAL OPPORTUNI-*
21 *TIES IN SCIENCE AND ENGINEERING.*—As part of the first
22 report required by section 36(e) of the Science and Engi-
23 neering Equal Opportunities Act (42 U.S.C. 1885c(e))
24 transmitted to Congress after the date of enactment of this
25 division, the Committee on Equal Opportunities in Science

1 *and Engineering, in consultation with the Chief Diversity*
2 *Officer of the National Science Foundation, shall include—*

3 (1) *a description of past and present policies*
4 *and activities of the Foundation to encourage full*
5 *participation of students in rural communities in*
6 *science, mathematics, engineering, and computer*
7 *science fields;*

8 (2) *an assessment of trends in participation of*
9 *rural students in prekindergarten through grade 12*
10 *in Foundation activities; and*

11 (3) *an assessment of the policies and activities of*
12 *the Foundation, along with proposals for new strate-*
13 *gies or the broadening of existing successful strategies*
14 *towards facilitating the goal of increasing participa-*
15 *tion of rural students in prekindergarten through*
16 *grade 12 in Foundation activities.*

17 (h) *COORDINATION.*—*In carrying out this subsection,*
18 *the Director shall, for purposes of enhancing program effec-*
19 *tiveness and avoiding duplication of activities, consult, co-*
20 *operate, and coordinate with the programs and policies of*
21 *other relevant Federal agencies.*

22 (i) *AUTHORIZATION OF APPROPRIATIONS.*—*There are*
23 *authorized to be appropriated to the Director—*

1 (1) \$8,000,000 to carry out the activities under
2 subsection (a) for each of fiscal years 2023 through
3 2027; and

4 (2) \$12,000,000 to carry out the activities under
5 subsection (b) for each of fiscal years 2023 through
6 2027.

7 **SEC. 10513. OPPORTUNITIES FOR ONLINE EDUCATION.**

8 (a) *IN GENERAL.*—The Director shall make competi-
9 tive awards to institutions of higher education or nonprofit
10 organizations (or a consortium thereof, which may include
11 a private sector partner) to conduct research on online
12 STEM education courses for rural communities.

13 (b) *RESEARCH AREAS.*—The research areas eligible for
14 funding under this subsection shall include—

15 (1) evaluating the learning and achievement of
16 rural students in prekindergarten through grade 12
17 in STEM subjects;

18 (2) understanding how computer-based and on-
19 line professional development courses and mentor ex-
20 periences can be integrated to meet the needs of edu-
21 cators, principals, and other school leaders of rural
22 students in prekindergarten through grade 12;

23 (3) combining computer-based and online STEM
24 education and training with mentoring and other ap-
25 plied learning arrangements;

1 (4) *leveraging online programs to supplement*
2 *STEM studies for rural students that need physical*
3 *and academic accommodation; and*

4 (5) *any other activity the Director determines*
5 *will accomplish the goals of this subsection.*

6 (c) *EVALUATIONS.—All proposals for awards under*
7 *this section shall include an evaluation plan that includes*
8 *the use of outcome-oriented measures to assess the impact*
9 *and efficacy of the award. Each recipient of an award*
10 *under this subsection shall include results from these eval-*
11 *uative activities in annual and final projects.*

12 (d) *ACCOUNTABILITY AND DISSEMINATION.—*

13 (1) *EVALUATION REQUIRED.—The Director shall*
14 *evaluate the portfolio of awards made under this sub-*
15 *section. Such evaluation shall—*

16 (A) *use a common set of benchmarks and*
17 *tools to assess the results of research conducted*
18 *under such awards and identify best practices;*
19 *and*

20 (B) *to the extent practicable, integrate find-*
21 *ings from activities carried out pursuant to re-*
22 *search conducted under this section, with respect*
23 *to the pursuit of careers and degrees in STEM,*
24 *with those activities carried out pursuant to*

1 *other research on serving rural students and*
2 *communities.*

3 (2) *REPORT ON EVALUATIONS.*—*Not later than*
4 *180 days after the completion of the evaluation under*
5 *paragraph (1), the Director shall submit to Congress*
6 *and make widely available to the public a report that*
7 *includes—*

8 (A) *the results of the evaluation; and*

9 (B) *any recommendations for administra-*
10 *tive and legislative action that could optimize*
11 *the effectiveness of the awards made under this*
12 *section.*

13 (e) *COORDINATION.*—*In carrying out this section, the*
14 *Director shall, for purposes of enhancing program effective-*
15 *ness and avoiding duplication of activities, consult, cooper-*
16 *ate, and coordinate with the programs and policies of other*
17 *relevant Federal agencies.*

18 **SEC. 10514. NATIONAL ACADEMIES EVALUATION.**

19 (a) *STUDY.*—*Not later than 12 months after the date*
20 *of enactment of this division, the Director shall enter into*
21 *an agreement with the National Academies under which the*
22 *National Academies agree to conduct an evaluation and as-*
23 *essment that—*

24 (1) *evaluates the quality and quantity of current*
25 *Federal programming and research directed at exam-*

1 *ining STEM education for students in prekindergarten through grade 12 and workforce development*
2 *in rural areas;*

3 (2) *in coordination with the Federal Communications Commission, assesses the impact that the*
4 *scarcity of broadband connectivity in rural communities, and the affordability of broadband*
5 *connectivity, have on STEM and technical literacy*
6 *for students in prekindergarten through grade 12 in*
7 *rural areas;*

8 (3) *assesses the core research and data needed to*
9 *understand the challenges rural areas are facing in*
10 *providing quality STEM education and workforce development;*

11 (4) *makes recommendations for action at the*
12 *Federal, State, and local levels for improving STEM*
13 *education, including online STEM education, for students in prekindergarten through grade 12 and workforce*
14 *development in rural areas; and*

15 (5) *makes recommendations to inform the implementation of programs in sections 10512 and 10513*
16 *(_____ -LOG262) and (_____ -LOG263).*

17 (b) *REPORT TO DIRECTOR.—The agreement entered*
18 *into under subsection (a) shall require the National Acad-*
19 *emies, not later than 24 months after the date of enactment*

1 *of this division, to submit to the Director a report on the*
2 *study conducted under such paragraph, including the Na-*
3 *tional Academies' findings and recommendations.*

4 *(c) AUTHORIZATION OF APPROPRIATIONS.—There are*
5 *authorized to be appropriated to the Director to carry out*
6 *this section \$1,000,000 for fiscal year 2023.*

7 **SEC. 10515. GAO REVIEW.**

8 *Not later than 3 years after the date of enactment of*
9 *this division, the Comptroller General of the United States*
10 *shall conduct a study on the engagement of rural popu-*
11 *lations in Federal STEM education programs and submit*
12 *to Congress a report that includes—*

13 *(1) an assessment of how Federal STEM edu-*
14 *cation programs are serving rural populations;*

15 *(2) a description of initiatives carried out by*
16 *Federal agencies that are targeted at supporting*
17 *STEM education in rural areas;*

18 *(3) an assessment of what is known about the*
19 *impact and effectiveness of Federal investments in*
20 *STEM education programs that are targeted to rural*
21 *areas; and*

22 *(4) an assessment of challenges that State and*
23 *Federal STEM education programs face in reaching*
24 *rural population centers.*

1 **SEC. 10516. NIST ENGAGEMENT WITH RURAL COMMU-**
2 **NITIES.**

3 (a) *PRIZE COMPETITION.*—Pursuant to section 24 of
4 the Stevenson-Wydler Technology Innovation Act of 1980
5 (15 U.S.C. 3719), the Secretary of Commerce shall carry
6 out a program to award prizes competitively to stimulate
7 research and development of creative technologies to support
8 the deployment of affordable and reliable broadband
9 connectivity in rural communities, including unserved
10 rural communities.

11 (b) *PLAN FOR DEPLOYMENT IN RURAL COMMU-*
12 *NITIES.*—Each proposal submitted pursuant to subsection
13 (a) shall include a proposed plan for deployment of the tech-
14 nology that is the subject of such proposal.

15 (c) *PRIZE AMOUNT.*—In carrying out the program
16 under subsection (a), the Secretary may award not more
17 than a total of \$5,000,000 to one or more winners of the
18 prize competition.

19 (d) *REPORT.*—Not later than 60 days after the date
20 on which a prize is awarded under the prize competition,
21 the Secretary shall submit to the relevant committees of
22 Congress a report that describes the winning proposal of
23 the prize competition.

24 (e) *CONSULTATION.*—In carrying out the program
25 under this section, the Secretary shall consult with the Fed-

1 eral Communications Commission and the heads of relevant
2 departments and agencies of the Federal Government.

3 **Subtitle C—MSI STEM Achievement**

4 **SEC. 10521. GAO REVIEW.**

5 *Not later than three years after the date of the enact-*
6 *ment of this Act, the Comptroller General of the United*
7 *States shall report to Congress—*

8 *(1) an inventory of competitive funding pro-*
9 *grams and initiatives carried out by Federal research*
10 *agencies that are targeted to HBCUs, TCUs, and*
11 *MSIs or partnerships with HBCUs, TCUs, and MSIs;*

12 *(2) an assessment of Federal research agency*
13 *outreach activities to increase the participation and*
14 *competitiveness of HBCUs, TCUs, and MSIs in the*
15 *funding programs and initiatives identified in para-*
16 *graph (1); and*

17 *(3) recommendations of the Comptroller General*
18 *to increase the participation of and the rate of success*
19 *of HBCUs, TCUs, and MSIs in competitive funding*
20 *programs offered by Federal research agencies.*

21 **SEC. 10522. AGENCY RESPONSIBILITIES.**

22 *(a) IN GENERAL.—In consultation with outside stake-*
23 *holders and the heads of Federal research agencies and the*
24 *Interagency Working Group on Inclusion in STEM, the Di-*
25 *rector of the Office of Science and Technology Policy shall*

1 *develop a uniform set of policy guidelines for Federal re-*
2 *search agencies to carry out a sustained program of out-*
3 *reach activities to increase clarity, transparency, and ac-*
4 *countability for Federal research agency investments in*
5 *STEM education and research activities at HBCUs, TCUs,*
6 *and MSIs, including such institutions in rural areas.*

7 (b) *OUTREACH ACTIVITIES.*—*In developing policy*
8 *guidelines under subsection (a) the Director of the Office*
9 *of Science and Technology Policy shall include guidelines*
10 *that require each Federal research agency—*

11 (1) *to designate a liaison for HBCUs, TCUs,*
12 *and MSIs responsible for—*

13 (A) *enhancing direct communication with*
14 *HBCUs, TCUs, and MSIs to increase the Fed-*
15 *eral research agency’s understanding of the ca-*
16 *capacity and needs of such institutions and to*
17 *raise awareness of available Federal funding op-*
18 *portunities at such institutions;*

19 (B) *coordinating programs, activities, and*
20 *initiatives while accounting for the capacity and*
21 *needs of HBCUs, TCUs, and MSIs;*

22 (C) *tracking Federal research agency invest-*
23 *ments in and engagement with HBCUs, TCUs,*
24 *and MSIs; and*

1 (D) reporting progress toward increasing
2 participation of HBCUs, TCUs, and MSIs in
3 award programs;

4 (2) to the extent practicable, to produce an an-
5 nual summary of funding opportunities and proposal
6 deadlines targeted at HBCUs, TCUs, and MSIs, in-
7 cluding for grants, contracts, subcontracts, and coop-
8 erative agreements;

9 (3) to the extent practicable, identifying in an-
10 nual budget requests potential areas for collaboration
11 with HBCUs, TCUs, and MSIs in the relevant fiscal
12 year, including relating to potential meetings and
13 workshops;

14 (4) to investigate proposal structures that sup-
15 port broader participation by emerging research in-
16 stitutions, including HBCUs, TCUs, and MSIs;

17 (5) to conduct on-site reviews of research facili-
18 ties at HBCUs, TCUs, and MSIs, as practicable, and
19 make recommendations regarding strategies for be-
20 coming more competitive in research;

21 (6) to hold geographically accessible or virtual
22 workshops on research priorities of the Federal re-
23 search agency and on how to write competitive award
24 proposals and how to bolster award management ca-

1 *capacity for the entire award lifecycle, from application*
2 *to completion;*

3 *(7) to ensure opportunities for HBCUs, TCUs,*
4 *and MSIs to directly communicate with Federal re-*
5 *search agency officials responsible for managing com-*
6 *petitive award programs in order to receive feedback*
7 *on research ideas and proposals, including guidance*
8 *on the Federal research agency's merit review process;*
9 *and*

10 *(8) to foster mutually beneficial public-private*
11 *collaboration among Federal research agencies, indus-*
12 *try, Federal laboratories, academia, and nonprofit or-*
13 *ganizations to—*

14 *(A) identify alternative sources of funding*
15 *for STEM education and research at HBCUs,*
16 *TCUs, and MSIs;*

17 *(B) provide access to high-quality, relevant*
18 *research experiences for students and faculty of*
19 *HBCUs, TCUs, and MSIs;*

20 *(C) expand the professional networks of stu-*
21 *dents and faculty of HBCUs, TCUs, and MSIs;*

22 *(D) broaden STEM educational opportuni-*
23 *ties for students and faculty of HBCUs, TCUs,*
24 *and MSIs; and*

1 (E) support the transition of students of
2 HBCUs, TCUs, and MSIs into the STEM work-
3 force;

4 (c) STRATEGIC PLAN.—

5 (1) IN GENERAL.—Not later than one year after
6 the date of the enactment of this Act, the Director of
7 the Office of Science and Technology Policy, in col-
8 laboration with the head of each Federal research
9 agency, shall submit to Congress a report containing
10 a strategic plan which reflects the plans of each Fed-
11 eral research agency to increase the capacity of
12 HBCUs, TCUs, and MSIs to compete effectively for
13 grants, contracts, or cooperative agreements and to
14 encourage HBCUs, TCUs, and MSIs to participate in
15 Federal programs.

16 (2) CONSIDERATIONS.—In developing a strategic
17 plan under paragraph (1), the Director and the head
18 of each Federal research agency shall consider the fol-
19 lowing:

20 (A) Issuing new or expanding existing
21 funding opportunities targeted to HBCUs,
22 TCUs, and MSIs.

23 (B) Modifying existing research and devel-
24 opment program solicitations to incentivize effec-

1 *tive partnerships with HBCUs, TCUs, and*
2 *MSIs.*

3 *(C) Offering planning grants for HBCUs,*
4 *TCUs, and MSIs to develop or equip grant of-*
5 *fices with the requisite depth of knowledge to sub-*
6 *mit competitive grant proposals and manage*
7 *awarded grants.*

8 *(D) Offering additional training programs,*
9 *including individualized and timely guidance to*
10 *grant officers, faculty, and postdoctoral research-*
11 *ers at HBCUs, TCUs, and MSIs to ensure their*
12 *understanding of the requirements for an effec-*
13 *tive grant proposal.*

14 *(E) Other approaches for making current*
15 *competitive funding models more accessible for*
16 *underresourced HBCUs, TCUs, and MSIs.*

17 *(d) REPORT ON POLICY GUIDELINES.—Not later than*
18 *two years after the date of the enactment of this Act and*
19 *every five years thereafter, the Director of the Office of*
20 *Science and Technology Policy shall report to Congress on*
21 *the implementation by Federal research agencies of the pol-*
22 *icy guidelines developed under this section.*

23 *(e) REPORT ON COORDINATION OF FEDERAL STEM*
24 *EDUCATION.—Subsection (d) of section 101(d) of the Amer-*

1 *ica COMPETES Reauthorization Act of 2010 (42 U.S.C.*
2 *6621) is amended—*

3 *(1) in paragraph (7) by striking “and”;*

4 *(2) in paragraph (8) by striking the period at*
5 *the end;*

6 *(3) by adding at the end the following:*

7 *“(9) an account of Federal research agency in-*
8 *vestments in HBCUs, TCUs, and MSIs, including, to*
9 *the degree practicable, data on the level of participa-*
10 *tion of HBCUs, TCUs, and MSIs as prime recipients,*
11 *contractors, subrecipients, or subcontractors of an*
12 *award, or reasonable estimates thereof; and*

13 *“(10) a description of material changes to the*
14 *implementation of section 10522 of the Research and*
15 *Development, Competition, and Innovation Act.”.*

16 **SEC. 10523. RESEARCH AT THE NATIONAL SCIENCE FOUN-**
17 **DATION.**

18 *(a) IN GENERAL.—The Director shall make awards,*
19 *on a competitive basis, to institutions of higher education*
20 *or nonprofit organizations (or consortia thereof) to—*

21 *(1) conduct research described in subsection (b)*
22 *with respect to HBCUs, TCUs, and MSIs; and*

23 *(2) identify and broadly disseminate effective*
24 *models for programs and practices at HBCUs, TCUs,*
25 *and MSIs that promote the education and workforce*

1 *preparation of minority students pursuing STEM*
2 *studies and careers in which such students are under-*
3 *represented.*

4 *(b) RESEARCH.—Research described in this subsection*
5 *is research on the contribution of HBCUs, TCUs, and MSIs*
6 *to the education and training of underrepresented minority*
7 *students in STEM fields and to the meeting of national*
8 *STEM workforce needs, including relating to the following:*

9 *(1) The diversity with respect to local context,*
10 *cultural differences, and institutional structure*
11 *among HBCUs, TCUs, and MSIs and any associated*
12 *impact on education and research endeavors.*

13 *(2) Effective practices at HBCUs, TCUs, and*
14 *MSIs and associated outcomes on student recruit-*
15 *ment, retention, and advancement in STEM fields,*
16 *including the ability for students to compete for fel-*
17 *lowships, employment, and advancement in the work-*
18 *force.*

19 *(3) Contributions made by HBCUs, TCUs, and*
20 *MSIs to local, regional, and national workforces.*

21 *(4) The challenges and opportunities for HBCUs,*
22 *TCUs, and MSIs in attaining the resources needed for*
23 *integrating effective practices in STEM education, in-*
24 *cluding providing research experiences for underrep-*
25 *resented minority students.*

1 (5) *The access of students at HBCUs, TCUs, and*
2 *MSIs to STEM infrastructure and any associated*
3 *outcomes for STEM competency.*

4 (6) *Models of STEM curriculum, learning, and*
5 *teaching successful at HBCUs, TCUs, and MSIs for*
6 *increasing participation, retention, and success of*
7 *underrepresented minority students.*

8 (7) *Successful or promising partnerships between*
9 *HBCUs, TCUs, and MSIs and other institutions of*
10 *higher education, private sector and nonprofit organi-*
11 *zations, Federal laboratories, and international re-*
12 *search institutions.*

13 (c) *RESEARCH EXPERIENCES.—Awards under this*
14 *section may fund the development or expansion of opportu-*
15 *nities for the exchange of students and faculty to conduct*
16 *research, facilitate professional development, and provide*
17 *mentorship, including through partnerships with institu-*
18 *tions of higher education that are not HBCUs, TCUs, or*
19 *MSIs, private sector and nonprofit organizations, Federal*
20 *laboratories, and international research institutions.*

21 **SEC. 10524. CAPACITY-BUILDING PROGRAM FOR DEVEL-**
22 **OPING UNIVERSITIES.**

23 (a) *AWARDS.—*

24 (1) *IN GENERAL.—The Director shall make*
25 *awards, on a competitive basis, to eligible institutions*

1 *described in subsection (b) to support the mission of*
2 *the Foundation and to build institutional research ca-*
3 *capacity at eligible institutions.*

4 (2) *ADMINISTRATION.—The Director may ad-*
5 *minister separate competitions for each category of el-*
6 *igible institution described in subparagraphs (A)*
7 *through (C) of subsection (b)(1) in order to ensure*
8 *fair competition for institutions with significantly*
9 *different research capacities.*

10 (b) *ELIGIBLE INSTITUTIONS.—To be eligible to receive*
11 *an award under this subsection, an entity—*

12 (1) *shall be—*

13 (A) *a historically Black college or univer-*
14 *sity;*

15 (B) *a Tribal College or University;*

16 (C) *a minority-serving institution;*

17 (D) *an institution of higher education with*
18 *an established STEM capacity-building program*
19 *focused on Native Hawaiians and Alaska Na-*
20 *tives; or*

21 (E) *consortia thereof;*

22 (2) *shall—*

23 (A) *have not more than \$50,000,000 in an-*
24 *annual federally financed research and development*
25 *expenditures for science and engineering as re-*

1 *ported through the National Science Foundation*
2 *Higher Education Research and Development*
3 *Survey; or*

4 *(B) not be an institution classified as hav-*
5 *ing very high research activity by the Carnegie*
6 *Classification of Institutions of Higher Edu-*
7 *cation.*

8 *(c) PARTNERSHIPS.—In making awards under this*
9 *section, the Director shall—*

10 *(1) encourage entities that are consortia of eligi-*
11 *ble institutions to submit proposals and require such*
12 *proposals to include a plan for establishing a sus-*
13 *tained partnership that is jointly developed and man-*
14 *aged, draws from the capacities of each institution,*
15 *and is mutually beneficial;*

16 *(2) encourage proposals submitted in partner-*
17 *ship with the private sector, nonprofit organizations,*
18 *Federal laboratories, and international research insti-*
19 *tutions, as appropriate;*

20 *(3) require proposals described in paragraphs (1)*
21 *and (2) to include a plan to strengthen the adminis-*
22 *trative and research capacity of the partnering*
23 *HBCUs, TCUs, or MSIs to lead future proposals.*

24 *(d) VERY HIGH RESEARCH ACTIVITY STATUS HIS-*
25 *TORICALLY BLACK COLLEGES AND UNIVERSITIES PRO-*

1 *GRAM.—Awards under this section may be used to enable*
2 *HBCUs which have high research activity status to achieve*
3 *very high research activity status, as classified under the*
4 *Carnegie Classification of Institutions of Higher Edu-*
5 *cation, by enabling—*

6 (1) *faculty professional development;*

7 (2) *stipends for graduate and undergraduate stu-*
8 *dents, and postdoctoral scholars;*

9 (3) *acquisition of laboratory equipment and in-*
10 *strumentation; and*

11 (4) *other activities as necessary to build research*
12 *capacity.*

13 (e) *PROPOSALS.—To receive an award under this sub-*
14 *section, an eligible institution shall submit an application*
15 *to the Director at such time, in such manner, and con-*
16 *taining such information as the Director may require, in-*
17 *cluding—*

18 (1) *a plan that describes how the eligible institu-*
19 *tion will establish or expand research office capacity*
20 *and how such award would be used to—*

21 (A) *conduct an assessment of capacity-*
22 *building and research infrastructure needs of an*
23 *eligible institution;*

1 (B) enhance institutional resources to pro-
2 vide administrative research development sup-
3 port to faculty at an eligible institution;

4 (C) bolster the institutional research com-
5 petitiveness of an eligible institution to support
6 awards made by the Foundation;

7 (D) support the acquisition of instrumenta-
8 tion necessary to build research capacity at an
9 eligible institution in research areas directly as-
10 sociated with the Foundation;

11 (E) increase capability of an eligible insti-
12 tution to move technology into the marketplace;

13 (F) increase engagement with industry to
14 execute research through the SBIR and STTR
15 programs (as such terms are defined in section
16 9(e) of the Small Business Act (15 U.S.C.
17 638(e)) and direct contracts at an eligible insti-
18 tution;

19 (G) enhance STEM curriculum and re-
20 search training opportunities at the under-
21 graduate, graduate, and postdoctoral levels at an
22 eligible institution;

23 (H) further faculty development initiatives
24 and strengthen institutional research training

1 *infrastructure, capacity, and competitiveness of*
2 *an eligible institution;*

3 *(I) address plans and prospects for long-*
4 *term sustainability of institutional enhance-*
5 *ments at an eligible institution resulting from*
6 *the award including, if applicable, how the*
7 *award may be leveraged by an eligible institu-*
8 *tion to build a broader base of support; and*

9 *(J) develop and implement mechanisms for*
10 *institutions of higher education to partner with*
11 *HBCUs, TCUs, and MSIs on STEM education,*
12 *including the facilitation of student exchanges,*
13 *course and resource sharing, collaboration, and*
14 *matriculation of students to either institution's*
15 *graduate programs, mentoring programs for stu-*
16 *dents and junior faculty, joint research projects,*
17 *and student access to graduate education; and*

18 *(2) as relevant, a plan, which shall be updated*
19 *every three years, that describes the institution's*
20 *strategy to achieve very high research activity status,*
21 *including making investments with institutional and*
22 *non-Federal funds, to achieve that status within a*
23 *decade of the grant award, to the extent practicable.*

24 *(f) MSI CENTERS OF INNOVATION.—Awards under*
25 *this section may fund the establishment of not more than*

1 *five MSI Centers of Innovation to leverage successes of*
2 *HBCUs, TCUs, and MSIs in STEM education and research*
3 *training of underrepresented minority students as models*
4 *for other institutions, including both HBCUs, TCUs, and*
5 *MSIs and institutions of higher education that are not*
6 *HBCUs, TCUs, or MSIs. Such centers will be located on*
7 *campuses of selected HBCUs, TCUs, or MSIs, and serve as*
8 *incubators to allow institutions of higher education to ex-*
9 *periment, pilot, evaluate, and scale up promising practices.*

10 (g) *AWARDS.—Awards made under this subsection*
11 *shall be for periods of three years and may be extended for*
12 *periods of not more than five years.*

13 (h) *AUTHORIZATION OF APPROPRIATIONS.—There are*
14 *authorized to be appropriated to the Director \$200,000,000*
15 *for fiscal year 2023 and \$250,000,000 for each of fiscal*
16 *years 2024 through 2027 to carry out the activities in this*
17 *section and section 10523.*

18 (i) *REPORT ON IMPROVING THE RESEARCH CAPACITY*
19 *AT HIGH RESEARCH ACTIVITY HISTORICALLY BLACK COL-*
20 *LEGES AND UNIVERSITIES.—*

21 (1) *IN GENERAL.—Not later than one year after*
22 *the date of the enactment of this Act, the National*
23 *Science and Technology Council shall prepare and*
24 *submit a report that—*

1 (A) identifies challenges and barriers to
2 Federal research and development awards for
3 high research activity status HBCUs; and

4 (B) identifies recommendations for Federal
5 research agencies to sustainably boost the re-
6 search capacity of high research activity status
7 HBCUs through awards-making authorities.

8 (2) *REPORT SUBMISSION.*—The National Science
9 and Technology Council shall transmit the report re-
10 quired under paragraph (1) to the Director, the Ad-
11 ministrator of the National Aeronautics and Space
12 Administration, the Secretary of Agriculture, the Sec-
13 retary of Commerce, the Secretary of Defense, the Sec-
14 retary of Energy, the Secretary of Health and
15 Human Services, and the heads of other such agencies
16 as determined relevant by the National Science and
17 Technology Council.

18 (3) *INFORMATION FROM FEDERAL AGENCIES.*—
19 The National Science and Technology Council may
20 secure directly from a Federal department or agency
21 such information as the National Science and Tech-
22 nology Council considers necessary to prepare the re-
23 port required under paragraph (1). Upon a request
24 from the National Science and Technology Council,
25 the head of a Federal department or agency shall fur-

1 *nish such information as is requested to the National*
2 *Science and Technology Council.*

3 **SEC. 10525. TRIBAL COLLEGES AND UNIVERSITIES PRO-**
4 **GRAM.**

5 *(a) AWARDS TO BROADEN TRIBAL COLLEGE AND UNI-*
6 *VERSITY STUDENT PARTICIPATION IN COMPUTER*
7 *SCIENCE.—Section 525 of the America COMPETES Reau-*
8 *thorization Act of 2010 (42 U.S.C. 1862p–13) is amended*
9 *by adding at the end the following:*

10 *“(d) AWARDS TO BROADEN TRIBAL COLLEGE AND*
11 *UNIVERSITY STUDENT PARTICIPATION IN COMPUTER*
12 *SCIENCE.—*

13 *“(1) IN GENERAL.—The Director, as part of the*
14 *program authorized under this section, shall make*
15 *awards on a competitive, merit-reviewed basis to eli-*
16 *gible entities to increase the participation of Tribal*
17 *populations in computer science and computational*
18 *thinking education programs to enable students to de-*
19 *velop skills and competencies in coding, problem-solv-*
20 *ing, critical thinking, creativity and collaboration.*

21 *“(2) PURPOSE.—Awards made under this sub-*
22 *section shall support—*

23 *“(A) research and development needed to*
24 *bring computer science and computational think-*

1 *ing courses and degrees to Tribal Colleges or*
2 *Universities;*

3 *“(B) research and development of instruc-*
4 *tional materials needed to integrate computer*
5 *science and computational thinking into pro-*
6 *grams that are culturally relevant to students at-*
7 *tending Tribal Colleges or Universities;*

8 *“(C) research, development and evaluation*
9 *of distance education for computer science and*
10 *computational thinking courses and degree pro-*
11 *grams for students attending Tribal Colleges and*
12 *Universities; and*

13 *“(D) other activities consistent with the ac-*
14 *tivities described in paragraphs (1) through (4)*
15 *of subsection (b), as determined by the Director.*

16 *“(3) PARTNERSHIPS.—A Tribal College or Uni-*
17 *versity seeking an award under this subsection, or*
18 *consortia thereof, may partner with an institution of*
19 *higher education or nonprofit organization with dem-*
20 *onstrated expertise in academic program development.*

21 *“(4) COORDINATION.—In carrying out this sub-*
22 *section, the Director shall consult and cooperate with*
23 *the programs and policies of other relevant Federal*
24 *agencies to avoid duplication with and enhance the*
25 *effectiveness of the program under this subsection.*

1 “(5) *AUTHORIZATION OF APPROPRIATIONS.*—
2 *There are authorized to be appropriated to the Direc-*
3 *tor \$2,000,000 in each of fiscal years 2023 through*
4 *2027 to carry out this subsection.”.*

5 *(b) EVALUATION.*—

6 (1) *IN GENERAL.*—*Not later than two years after*
7 *the date of the enactment of this Act, the Director*
8 *shall evaluate the award program authorized under*
9 *section 525 of the America COMPETES Reauthoriza-*
10 *tion Act of 2010 (42 U.S.C. 1862p–13), as amended*
11 *by subsection (a).*

12 (2) *REQUIREMENTS.*—*In conducting the evalua-*
13 *tion under paragraph (1), the Director shall, as prac-*
14 *ticable—*

15 (A) *use a common set of benchmarks and*
16 *assessment tools to identify best practices and*
17 *materials developed or demonstrated by the re-*
18 *search conducted pursuant to award programs*
19 *under section 525 of the America COMPETES*
20 *Reauthorization Act of 2010 (42 U.S.C. 1862p–*
21 *13), as amended by subsection (a);*

22 (B) *include an assessment of the effective-*
23 *ness of such award programs in expanding ac-*
24 *cess to high quality STEM education, research,*

1 *and outreach at Tribal Colleges or Universities,*
2 *as applicable;*

3 *(C) assess the number of students who par-*
4 *ticipated in such award programs; and*

5 *(D) assess the percentage of students par-*
6 *ticipating in such award programs who success-*
7 *fully complete their education programs.*

8 *(3) REPORT.—Not later than 180 days after the*
9 *date on which the evaluation under paragraph (1) is*
10 *completed, the Director shall submit to Congress and*
11 *make available to the public, a report on the results*
12 *of the evaluation, including any recommendations for*
13 *legislative action that could optimize the effectiveness*
14 *of the award program authorized under section 525 of*
15 *the America COMPETES Reauthorization Act of*
16 *2010, as amended by subsection (a).*

17 **SEC. 10526. DEFINITIONS.**

18 *In this subtitle:*

19 *(1) DIRECTOR.—The term “Director” means the*
20 *Director of the National Science Foundation.*

21 *(2) HBCU.—The term “HBCU” has the mean-*
22 *ing given the term “part B institution” in section*
23 *322 of the Higher Education Act of 1965 (20 U.S.C.*
24 *1061).*

1 (3) *MINORITY SERVING INSTITUTION.*—*The term*
2 *“minority serving institution” or “MSI” means His-*
3 *panic-Serving Institutions as defined in section 502*
4 *of the Higher Education Act of 1965 (20 U.S.C.*
5 *1101a); Alaska Native Serving Institutions and Na-*
6 *tive Hawaiian-Serving Institutions as defined in sec-*
7 *tion 317 of the Higher Education Act of 1965 (20*
8 *U.S.C. 1059d); and Predominantly Black Institu-*
9 *tions, Asian American and Native American Pacific*
10 *Islander-Serving Institutions, and Native American-*
11 *Serving Nontribal Institutions as defined in section*
12 *371 of the Higher Education Act of 1965 (20 U.S.C.*
13 *1067q(c)).*

14 (4) *TCU.*—*The term “TCU” has the meaning*
15 *given the term “Tribal College or University” in sec-*
16 *tion 316 of the Higher Education Act of 1965 (20*
17 *U.S.C. 1059c).*

18 ***Subtitle D—Combating Sexual***
19 ***Harassment in Science***

20 ***SEC. 10531. FINDINGS.***

21 *Congress makes the following findings:*

22 (1) *According to the report issued by the Na-*
23 *tional Academies of Sciences, Engineering, and Medi-*
24 *cine in 2018 entitled “Sexual Harassment of Women:*

1 *Climate, Culture, and Consequences in Academic*
2 *Sciences, Engineering, and Medicine*”—

3 (A) *sexual harassment is pervasive in insti-*
4 *tutions of higher education;*

5 (B) *the most common type of sexual harass-*
6 *ment is gender harassment;*

7 (C) *58 percent of individuals in the aca-*
8 *demie workplace experience sexual harassment,*
9 *the second highest rate when compared to the*
10 *military, the private sector, and Federal, State,*
11 *and local government;*

12 (D) *women who are members of racial or*
13 *ethnic minority groups are more likely to experi-*
14 *ence sexual harassment and to feel unsafe at*
15 *work than White women, White men, or men*
16 *who are members of such groups;*

17 (E) *the training for each individual who*
18 *has a Doctor of Philosophy in the science, tech-*
19 *nology, engineering, and mathematics fields is*
20 *estimated to cost approximately \$500,000; and*

21 (F) *attrition of an individual so trained re-*
22 *sults in a loss of talent and money.*

23 (2) *According to a 2017 University of Illinois*
24 *study, among astronomers and planetary scientists,*
25 *18 percent of women who are members of racial or*

1 *ethnic minority groups and 12 percent of White*
2 *women skipped professional events because they did*
3 *not feel safe attending.*

4 *(3) Reporting procedures with respect to sexual*
5 *harassment are inconsistent among Federal research*
6 *agencies and have varying degrees of accessibility.*

7 *(4) There is not adequate communication among*
8 *Federal research agencies and between such agencies*
9 *and recipients regarding reports of sexual harass-*
10 *ment, which has resulted in harassers receiving Fed-*
11 *eral funding after moving to a different institution.*

12 **SEC. 10532. PURPOSE.**

13 *The purpose of this subtitle is to increase under-*
14 *standing of the causes and consequences of sex-based and*
15 *sexual harassment, as discussed in the report issued by the*
16 *National Academies in 2018 entitled “Sexual Harassment*
17 *of Women: Climate, Culture, and Consequences in Academic*
18 *Sciences, Engineering, and Medicine”, and to advance evi-*
19 *dence-based approaches to reduce the prevalence and nega-*
20 *tive impact of such harassment.*

21 **SEC. 10533. DEFINITION.**

22 *In this subtitle, the term “Director” means the Direc-*
23 *tor of the National Science Foundation.*

1 **SEC. 10534. RESEARCH AWARDS.**

2 (a) *IN GENERAL.*—*The Director shall make awards,*
3 *on a competitive basis, to institutions of higher education*
4 *or nonprofit organizations (or consortia of such institutions*
5 *or organizations)—*

6 (1) *to expand research efforts to better under-*
7 *stand the factors contributing to, and consequences of,*
8 *sex-based and sexual harassment affecting individuals*
9 *in the STEM workforce, including students and*
10 *trainees; and*

11 (2) *to examine approaches to reduce the inci-*
12 *dence and negative consequences of such harassment.*

13 (b) *USE OF FUNDS.*—*Activities funded by an award*
14 *under this section may include—*

15 (1) *research on the sex-based and sexual harass-*
16 *ment experiences of individuals, including in racial*
17 *and ethnic minority groups, disabled individuals, for-*
18 *foreign nationals, sexual-minority individuals, and oth-*
19 *ers;*

20 (2) *development and assessment of policies, pro-*
21 *cedures, trainings, and interventions, with respect to*
22 *sex-based and sexual harassment, conflict manage-*
23 *ment, and ways to foster respectful and inclusive cli-*
24 *mates;*

1 (3) *research on approaches for remediating the*
2 *negative impacts and outcomes of such harassment on*
3 *individuals experiencing such harassment;*

4 (4) *support for institutions of higher education*
5 *or nonprofit organizations to develop, adapt, imple-*
6 *ment, and assess the impact of innovative, evidence-*
7 *based strategies, policies, and approaches to policy*
8 *implementation to prevent and address sex-based and*
9 *sexual harassment;*

10 (5) *research on alternatives to the power dynam-*
11 *ics, hierarchical, and dependent relationships, includ-*
12 *ing but not limited to the mentor-mentee relationship,*
13 *in academia that have been shown to create higher*
14 *levels of risk for and lower levels of reporting of sex-*
15 *based and sexual harassment; and*

16 (6) *establishing a center for the ongoing compila-*
17 *tion, management, and analysis of organizational cli-*
18 *mate survey data.*

19 **SEC. 10535. RESPONSIBLE CONDUCT GUIDE.**

20 (a) *IN GENERAL.*—*Not later than 180 days after the*
21 *date of enactment of this Act, the Director shall enter into*
22 *an agreement with the National Academies to update the*
23 *report entitled “On Being a Scientist: A Guide to Respon-*
24 *sible Conduct in Research” issued by the National Acad-*
25 *emies. The report, as so updated, shall include—*

1 (1) *updated professional standards of conduct in*
2 *research;*

3 (2) *promising practices for preventing, address-*
4 *ing, and mitigating the negative impact of sex-based*
5 *and sexual harassment, to include—*

6 (A) *standards of treatment individuals can*
7 *expect to receive under updated standards of con-*
8 *duct;*

9 (B) *evidence-based practices for fostering a*
10 *climate intolerant of sex-based, sexual, and other*
11 *forms of harassment;*

12 (C) *methods, including bystander interven-*
13 *tion, for identifying and addressing incidents of*
14 *such harassment; and*

15 (D) *professional standards for mentorship*
16 *and teaching with an emphasis on power diffu-*
17 *sion mechanisms and preventing such harass-*
18 *ment; and*

19 (3) *promising practices for mitigating potential*
20 *security risks that threaten research security.*

21 (b) *REPORT.—Not later than 18 months after the effec-*
22 *tive date of the agreement under subsection (a), the National*
23 *Academies, as part of such agreement, shall submit to the*
24 *Director and the Committee on Science, Space, and Tech-*
25 *nology of the House of Representatives and the Committee*

1 *on Commerce, Science, and Transportation of the Senate*
2 *the report referred to in such subparagraph, as updated*
3 *pursuant to such subparagraph.*

4 **SEC. 10536. INTERAGENCY WORKING GROUP.**

5 (a) *IN GENERAL.*—*The Director of the Office of Science*
6 *and Technology Policy, acting through the National Science*
7 *and Technology Council, shall establish or designate an*
8 *interagency working group for the purpose of coordinating*
9 *Federal research agency efforts to reduce the prevalence of*
10 *sex-based and sexual harassment involving award per-*
11 *sonnel. In coordination with the working group on inclu-*
12 *sion in STEM fields established under section 308 of the*
13 *American Innovation and Competitiveness Act (42 U.S.C.*
14 *6626) and the Safe Inclusive Research Environments Sub-*
15 *committee of the National Science and Technology Council,*
16 *and in consultation with representatives from each Federal*
17 *research agency, the Office for Civil Rights at the Depart-*
18 *ment of Health and Human Services, the Office for Civil*
19 *Rights at the Department of Education, and the Equal Em-*
20 *ployment Opportunity Commission, the working group*
21 *shall—*

22 (1) *not later than 90 days after the date of the*
23 *enactment of this Act, submit to the Committee on*
24 *Science, Space, and Technology, the Committee on*
25 *Education and Labor, and the Committee on Energy*

1 *and Commerce of the House of Representatives and*
2 *the Committee on Commerce, Science, and Transpor-*
3 *tation and the Committee on Health, Education,*
4 *Labor, and Pensions of the Senate an inventory of*
5 *Federal research agency policies, procedures, and re-*
6 *sources dedicated to preventing and responding to re-*
7 *ports of sex-based and sexual harassment;*

8 (2) *not later than 6 months after the date on*
9 *which the inventory is submitted under paragraph*
10 *(1)—*

11 (A) *in consultation with outside stake-*
12 *holders, develop a consistent set of policy guide-*
13 *lines for Federal research agencies; and*

14 (B) *submit a report to the committees re-*
15 *ferred to in paragraph (1) containing such*
16 *guidelines;*

17 (3) *encourage and monitor efforts of Federal re-*
18 *search agencies to develop or maintain and imple-*
19 *ment policies based on the guidelines developed under*
20 *paragraph (2);*

21 (4) *not later than 1 year after the date on which*
22 *the inventory under paragraph (1) is submitted, and*
23 *every 5 years thereafter, the Director of the Office of*
24 *Science and Technology Policy shall report to Con-*
25 *gress on the implementation by Federal research*

1 *agencies of the policy guidelines developed under*
2 *paragraph (2); and*

3 *(5) update such policy guidelines as needed.*

4 *(b) REQUIREMENTS.—In developing policy guidelines*
5 *under subsection (a)(2), the Director of the Office of Science*
6 *and Technology Policy shall include guidelines that require,*
7 *to the extent practicable—*

8 *(1) recipients to submit to the Federal research*
9 *agency or agencies from which the recipients receive*
10 *funding reports relating to—*

11 *(A) any decision made to launch a formal*
12 *investigation of sex-based or sexual harassment,*
13 *including bullying, retaliation, or hostile work-*
14 *ing conditions by, or of, award personnel;*

15 *(B) administrative action, related to an al-*
16 *legation against award personnel of any such*
17 *harassment, as set forth in organizational poli-*
18 *cies or codes of conduct, statutes, regulations, or*
19 *executive orders, that affects the ability of award*
20 *personnel or their trainees to carry out the ac-*
21 *tivities of the award;*

22 *(C) the total number of investigations with*
23 *no findings or determinations of misconduct in-*
24 *cluding such harassment;*

1 (D) findings or determinations of such har-
2 assment, as set forth in organizational policies
3 or codes of conduct, statutes, regulations, or Ex-
4 ecutive orders by, or of, award personnel, includ-
5 ing the final disposition of a matter involving a
6 violation of organizational policies and proc-
7 esses, to include the exhaustion of permissible ap-
8 peals, or a determination of a sexual offense in
9 a court of law, or any other disciplinary action
10 taken;

11 (2) the sharing, updating, and archiving of re-
12 ports of sex- based and sexual harassment from re-
13 cipients submitted under paragraph (1) with relevant
14 Federal research agencies, on a yearly basis and by
15 agency request; and

16 (3) consistency among Federal research agencies
17 with regard to the policies and procedures for receiv-
18 ing reports submitted pursuant to paragraph (1).

19 (4) FERPA.—The Director of the Office of
20 Science and Technology Policy shall ensure that such
21 guidelines and requirements are consistent with the
22 requirements of section 444 of the General Education
23 Provisions Act (20 U.S.C. 1232g) (commonly referred
24 to as the “Family Educational Rights and Privacy
25 Act of 1974”).

1 (5) *PRIVACY PROTECTIONS.*—*The Director of the*
2 *Office of Science and Technology Policy shall ensure*
3 *that such guidelines and requirements—*

4 (A) *do not infringe upon the privacy rights*
5 *of individuals associated with reports submitted*
6 *to Federal research agencies; and*

7 (B) *do not require recipients to provide in-*
8 *terim reports to Federal research agencies.*

9 (c) *CONSIDERATIONS.*—*In carrying out subsection*
10 *(a)(2), the Director of the Office of Science and Technology*
11 *Policy shall consider issuing guidelines that require or*
12 *incent—*

13 (1) *recipients to periodically assess their organi-*
14 *zational climate, which may include the use of cli-*
15 *mate surveys, focus groups, or exit interviews;*

16 (2) *recipients to publish on a publicly available*
17 *internet website the results of assessments conducted*
18 *pursuant to paragraph (1), disaggregated by sex and,*
19 *if practicable, race, ethnicity, disability status, and*
20 *sexual orientation, and in a manner that does not in-*
21 *clude personally identifiable information;*

22 (3) *recipients to make public on an annual basis*
23 *the number of reports of sex-based and sexual harass-*
24 *ment at that institution or organization;*

1 (4) recipients to regularly assess and improve
2 policies, procedures, and interventions to reduce the
3 prevalence of and improve the reporting of sex-based
4 and sexual harassment;

5 (5) each entity applying for a research and de-
6 velopment award certify that a code of conduct is in
7 place for maintaining a healthy and welcoming work-
8 place for award personnel and posted on their public
9 website;

10 (6) each recipient and Federal research agency to
11 have in place mechanisms for addressing the needs of
12 individuals who have experienced sex-based and sex-
13 ual harassment, including those individuals seeking
14 to reintegrate at the recipient entity; and

15 (7) recipients to work to create a climate intoler-
16 ant of sex- based and sexual harassment and that val-
17 ues and promotes diversity and inclusion.

18 (d) *FEDERAL RESEARCH AGENCY IMPLEMENTA-*
19 *TION.*—Not later than 270 days after receiving the guide-
20 lines under paragraph (a)(2), each Federal research agency
21 shall—

22 (1) develop or maintain and implement policies
23 with respect to sex-based and sexual harassment that
24 are consistent with policy guidelines under subsection
25 (a)(2) and that protect the privacy of all parties in-

1 *involved in any report and investigation of sex-based or*
2 *sexual harassment, to the maximum extent prac-*
3 *ticable; and*

4 *(2) broadly disseminate such policies to current*
5 *and potential recipients of research and development*
6 *awards made by such agency.*

7 **SEC. 10537. NATIONAL ACADEMIES ASSESSMENT.**

8 *Not later than 3 years after the date of enactment of*
9 *this Act, the Director shall enter into an agreement with*
10 *the National Academies to undertake a study and issue a*
11 *report on the influence of sex-based and sexual harassment*
12 *in institutions of higher education on the career advance-*
13 *ment of individuals in the STEM workforce. The study shall*
14 *assess—*

15 *(1) the state of research on sex-based and sexual*
16 *harassment in such workforce;*

17 *(2) whether research demonstrates a decrease in*
18 *the prevalence of sex-based and sexual harassment in*
19 *such workforce;*

20 *(3) the progress made with respect to imple-*
21 *menting recommendations promulgated in the Na-*
22 *tional Academies consensus study report entitled*
23 *“Sexual Harassment of Women: Climate, Culture,*
24 *and Consequences in Academic Sciences, Engineering,*
25 *and Medicine”;*

1 (4) *where to focus future efforts with respect to*
2 *decreasing the prevalence of sex-based and sexual har-*
3 *assment in such institutions, including specific rec-*
4 *ommendations; and*

5 (5) *other recommendations and issues, as the Na-*
6 *tional Academies determines appropriate.*

7 **SEC. 10538. GAO STUDY.**

8 *Not later than 3 years after the date of enactment of*
9 *this division, the Comptroller General of the United States*
10 *shall—*

11 (1) *complete a study that assesses the degree to*
12 *which Federal research agencies have implemented the*
13 *policy guidelines developed under section 10536(a)(2)*
14 *and the effectiveness of that implementation; and*

15 (2) *submit a report to the Committee on Science,*
16 *Space, and Technology of the House of Representa-*
17 *tives and the Committee on Commerce, Science, and*
18 *Transportation of the Senate on the results of such*
19 *study, including recommendations on potential*
20 *changes to practices and policies to improve those*
21 *guidelines and that implementation.*

22 **SEC. 10539. AUTHORIZATION OF APPROPRIATIONS.**

23 *There is authorized to be appropriated to the Director*
24 *to carry out this subtitle, \$32,500,000.*

1 **TITLE VI—MISCELLANEOUS**
2 **SCIENCE AND TECHNOLOGY**
3 **PROVISIONS**

4 **Subtitle A—Supporting Early-**
5 **career Researchers**

6 **SEC. 10601. EARLY-CAREER RESEARCH FELLOWSHIP PRO-**
7 **GRAM.**

8 (a) *IN GENERAL.*—The Director of the National
9 Science Foundation may establish a 2-year pilot program
10 to make awards to highly qualified early-career investiga-
11 tors to carry out an independent research program at the
12 institution of higher education or participating Federal re-
13 search facility chosen by such investigator, to last for a pe-
14 riod not greater than two years.

15 (b) *SELECTION PROCESS.*—The Director of the Na-
16 tional Science Foundation shall select recipients under sub-
17 section (a) from among citizens, nationals, and lawfully ad-
18 mitted permanent resident aliens of the United States.

19 (c) *OUTREACH.*—The Director of the National Science
20 Foundation shall conduct program outreach to recruit fel-
21 lowship applicants—

22 (1) from all regions of the country;

23 (2) from historically underrepresented popu-
24 lations in the fields of science, technology, engineer-
25 ing, and mathematics; and

1 (3) *who graduate from or intend to carry out re-*
2 *search at a variety of types of institutions of higher*
3 *education, including—*

4 (A) *historically Black colleges and univer-*
5 *sities;*

6 (B) *Tribal Colleges and Universities;*

7 (C) *minority-serving institutions;*

8 (D) *institutions of higher education that are*
9 *not among the top 50 institutions in annual*
10 *Federal funding for research; and*

11 (E) *EPSCoR institutions.*

12 (d) *SPECIAL CONSIDERATION.—The Director of the*
13 *National Science Foundation shall give special consider-*
14 *ation and priority to an application from an individual*
15 *who graduated from or is intending to carry out research*
16 *at an institution of the type specified in subsection (c)(3).*

17 (e) *REPORTS FROM FELLOWS.—Not later than 180*
18 *days after the end of the pilot program under this section,*
19 *each early-career investigator who receives an award under*
20 *the pilot program shall submit to the Director of the Na-*
21 *tional Science Foundation a report that describes how the*
22 *early-career investigator used the award funds.*

23 (f) *REPORT FROM THE DIRECTOR.—Not later than 90*
24 *days after the conclusion of the second year of the pilot pro-*

1 *gram, the Director of the National Science Foundation shall*
2 *submit to Congress a report that includes the following:*

3 (1) *A summary of the uses of award funds under*
4 *this section and the impact of the pilot program*
5 *under this section.*

6 (2) *Statistical summary data on fellowship*
7 *awardees disaggregated by race, ethnicity, sex, geog-*
8 *raphy, age, years since completion of doctoral degree,*
9 *and institution type.*

10 (3) *If determined effective, a plan for permanent*
11 *implementation of the pilot program.*

12 **SEC. 10602. AUTHORIZATION OF APPROPRIATIONS.**

13 *There is authorized to be appropriated to the Director*
14 *of the National Science Foundation \$250,000,000 for each*
15 *of fiscal years 2023 through 2024 to carry out the activities*
16 *in this subtitle.*

17 ***Subtitle B—National Science and***
18 ***Technology Strategy***

19 **SEC. 10611. NATIONAL SCIENCE AND TECHNOLOGY STRAT-**
20 ***EGY.***

21 *Section 206 of the National Science and Technology*
22 *Policy, Organization, and Priorities Act of 1976 (42 U.S.C.*
23 *6615) is amended to read as follows:*

1 **“SEC. 206. NATIONAL SCIENCE AND TECHNOLOGY STRAT-**
2 **EGY.**

3 “(a) *IN GENERAL.*—Not later than December 31 of the
4 year immediately after the calendar year in which a review
5 under section 206B is completed, the Director of the Office
6 of Science and Technology Policy shall, in coordination
7 with the National Science and Technology Council, develop
8 and submit to Congress a comprehensive national science
9 and technology strategy of the United States to meet na-
10 tional research and development objectives for the following
11 4-year period (in this section referred to as ‘the national
12 science and technology strategy’).

13 “(b) *REQUIREMENTS.*—In developing each national
14 science and technology strategy described in subsection (a),
15 the Director of the Office of Science and Technology Policy
16 shall—

17 “(1) consider—

18 “(A) the recommendations and priorities
19 developed by the review under section 206B;

20 “(B) the most recently published interim or
21 final national security strategy report submitted
22 pursuant to section 108 of the National Security
23 Act of 1947 (50 U.S.C. 3043);

24 “(C) other relevant national plans, reports,
25 and strategies; and

1 “(D) the strategic plans of relevant Federal
2 departments and agencies; and

3 “(2) include a description of—

4 “(A) strategic objectives and research prior-
5 ities necessary to maintain and advance—

6 “(i) the leadership of the United States
7 in science and technology, including in the
8 key technology focus areas, including near-
9 term, medium-term, and long-term eco-
10 nomic competitiveness; and

11 “(ii) the leadership of the United
12 States in technologies required to address
13 societal and national challenges, including
14 a transition to a circular economy;

15 “(B) programs, policies, and activities that
16 the President recommends across all Federal de-
17 partments and agencies to achieve the strategic
18 objectives and research priorities described in
19 subparagraph (A);

20 “(C) plans to promote sustainability prac-
21 tices and strategies for increasing jobs in the
22 United States;

23 “(D) global trends in science and tech-
24 nology, including potential threats to the leader-
25 ship of the United States in science and tech-

1 *nology and opportunities for international col-*
2 *laboration in science and technology; and*

3 “(E) *plans to foster the development of*
4 *international partnerships to reinforce domestic*
5 *policy actions, build new markets, engage in col-*
6 *laborative research, and create an international*
7 *environment that reflects United States values*
8 *and protects United States interests.*

9 “(c) *CONSULTATION.—The Director of the Office of*
10 *Science and Technology Policy shall consult as necessary*
11 *with the Office of Management and Budget and other ap-*
12 *propriate elements of the Executive Office of the President*
13 *to ensure that the recommendations and priorities delin-*
14 *eated in the science and technology strategy are incor-*
15 *porated in the development of annual budget requests.*

16 “(d) *BI-ANNUAL BRIEFING TO CONGRESS.—The Di-*
17 *rector of the Office of Science and Technology Policy shall*
18 *provide on a bi-annual basis, after each release of the na-*
19 *tional science and technology strategy, a briefing to the rel-*
20 *evant congressional committees, which may include updates*
21 *on the following:*

22 “(1) *The status and development of the national*
23 *science and technology strategy, including any sig-*
24 *nificant changes.*

1 “(2) *The implementation of the national science*
2 *and technology strategy.*”

3 “(3) *Any other information about the national*
4 *science and technology strategy, as determined by the*
5 *Director of the Office of Science and Technology Pol-*
6 *icy.*”

7 “(e) *PUBLICATION.—The Director of the Office of*
8 *Science and Technology Policy shall, consistent with the*
9 *protection of national security and other sensitive matters*
10 *to the maximum extent practicable, make each national*
11 *science and technology strategy publicly available on an*
12 *internet website of the Office. Each report may include a*
13 *classified annex if the Director of the Office of Science and*
14 *Technology Policy determines such is appropriate.*”

15 “(f) *TERMINATION.—This section terminates on the*
16 *date that is ten years after the date of the enactment of*
17 *this section.*”

18 **SEC. 10612. STRATEGY AND REPORT ON THE NATION'S ECO-**
19 **NOMIC SECURITY, SCIENCE, RESEARCH, AND**
20 **INNOVATION TO SUPPORT THE NATIONAL SE-**
21 **CURITY STRATEGY.**

22 “(a) *DEFINITIONS.—In this section:*

23 (1) *FOREIGN COUNTRY OF CONCERN.—The term*
24 *“foreign country of concern” means the People’s Re-*
25 *public of China, the Democratic People’s Republic of*

1 *Korea, the Russian Federation, the Islamic Republic*
2 *of Iran, or any other country determined to be a*
3 *country of concern by the Department of State.*

4 (2) *FOREIGN ENTITY OF CONCERN.*—*The term*
5 *“foreign entity of concern” means a foreign entity*
6 *that is—*

7 (A) *designated as a foreign terrorist organi-*
8 *zation by the Secretary of State under section*
9 *219(a) of the Immigration and Nationality Act*
10 *(8 U.S.C. 1189(a));*

11 (B) *included on the list of specially des-*
12 *ignated nationals and blocked persons main-*
13 *tained by the Office of Foreign Assets Control of*
14 *the Department of the Treasury (commonly*
15 *known as the SDN list);*

16 (C) *owned by, controlled by, or subject to*
17 *the jurisdiction or direction of a government of*
18 *a foreign country that is a covered nation (as*
19 *such term is defined in section 4872 of title 10,*
20 *United States Code);*

21 (D) *alleged by the Attorney General to have*
22 *been involved in activities for which a conviction*
23 *was obtained under—*

- 1 (i) chapter 37 of title 18, United States
2 Code (commonly known as the Espionage
3 Act);
- 4 (ii) section 951 or 1030 of title 18,
5 United States Code;
- 6 (iii) chapter 90 of title 18, United
7 States Code (commonly known as the Eco-
8 nomic Espionage Act of 1996);
- 9 (iv) the Arms Export Control Act (22
10 U.S.C. 2751 et seq.);
- 11 (v) section 224, 225, 226, 227, or 236
12 of the Atomic Energy Act of 1954 (42
13 U.S.C. 2274, 2275, 2276, 2277, and 2284);
- 14 (vi) the Export Control Reform Act of
15 2018 (50 U.S.C. 4801 et seq.); or
- 16 (vii) the International Emergency Eco-
17 nomic Powers Act (50 U.S.C. 1701 et seq.);
- 18 or
- 19 (E) determined by the Secretary of Com-
20 merce, in consultation with the Secretary of De-
21 fense and the Director of National Intelligence,
22 to be engaged in unauthorized conduct that is
23 detrimental to the national security or foreign
24 policy of the United States.

1 (3) *NATIONAL SECURITY STRATEGY*.—*The term*
2 “*national security strategy*” *means the national secu-*
3 *urity strategy required under section 108 of the Na-*
4 *tional Security Act of 1947 (50 U.S.C. 3043).*

5 (b) *STRATEGY AND REPORT*.—

6 (1) *IN GENERAL*.—*Not later than 90 days after*
7 *the transmission of each national security strategy*
8 *under section 108(a) of the National Security Act of*
9 *1947 (50 U.S.C. 3043(a)), the President, acting*
10 *through the Director of the Office of Science and*
11 *Technology Policy, shall, in coordination with the Na-*
12 *tional Science and Technology Council, the National*
13 *Security Council, the Director of the National Eco-*
14 *nomics Council, and the heads of such other relevant*
15 *Federal agencies as the Director of the Office of*
16 *Science and Technology Policy considers appropriate*
17 *and in consultation with such nongovernmental part-*
18 *ners as the Director of the Office of Science and Tech-*
19 *nology Policy considers appropriate—*

20 (A) *review such strategy, including the na-*
21 *tional defense strategy under subsection (g) of*
22 *section 113 of title 10, United States Code, and*
23 *the national science and technology strategy*
24 *under section 206 of the National Science and*
25 *Technology Policy, Organization, and Priorities*

1 *Act of 1976 (42 U.S.C. 6615), programs, and re-*
2 *sources as the Director of the Office of Science*
3 *and Technology Policy determines pertain to*
4 *United States' national competitiveness in*
5 *science, technology, research, innovation, and*
6 *technology transfer activities, including pat-*
7 *enting and licensing, that support the national*
8 *security strategy;*

9 *(B) develop or revise a national strategy to*
10 *improve the national competitiveness of United*
11 *States science, technology, research, and innova-*
12 *tion to support the national security strategy;*
13 *and*

14 *(C) submit to Congress—*

15 *(i) a report on the findings of the Di-*
16 *rector of the Office of Science and Tech-*
17 *nology Policy with respect to the review*
18 *conducted pursuant to subparagraph (A);*
19 *and*

20 *(ii) the strategy developed or revised*
21 *pursuant to subparagraph (B).*

22 (2) *TERMINATION.*—*This subsection terminates*
23 *on the date that is 5 years after the date of the enact-*
24 *ment of this Act.*

25 (c) *ELEMENTS.*—

1 (1) *REPORT.*—*Each report submitted under sub-*
2 *section (b)(1)(C)(i) shall include the following:*

3 (A) *An assessment of the efforts of the*
4 *United States Government to preserve United*
5 *States leadership in key emerging technologies*
6 *and prevent United States strategic competitors*
7 *from leveraging advanced technologies to gain*
8 *strategic military or economic advantages over*
9 *the United States.*

10 (B) *An assessment of public and private in-*
11 *vestment in science and technology relevant to*
12 *national security purposes, and the implications*
13 *of such for the geostrategic position of the United*
14 *States.*

15 (C) *A description of the prioritized eco-*
16 *nomics security interests and objectives.*

17 (D) *An assessment of global trends in*
18 *science and technology, including potential*
19 *threats to the national security of the United*
20 *States in science and technology.*

21 (E) *An assessment of the national debt and*
22 *its implications for the economic and national*
23 *security of the United States.*

24 (F) *An assessment of how regional innova-*
25 *tion capacity efforts in STEM fields are contrib-*

1 *uting and could contribute to the national secu-*
2 *rity the United States, including programs run*
3 *by State and local governments.*

4 *(G) An assessment of the following:*

5 *(i) Workforce needs for competitiveness*
6 *in technology areas identified in the na-*
7 *tional security strategy.*

8 *(ii) Any efforts needed to expand path-*
9 *ways into technology fields to achieve the*
10 *goals of the national security strategy.*

11 *(H) An assessment of barriers to the devel-*
12 *opment, evolution, or competitiveness of start-*
13 *ups, small and mid-sized business entities, and*
14 *industries that are critical to national security.*

15 *(I) An assessment of the effectiveness of the*
16 *Federal Government, federally funded research*
17 *and development centers, and national labora-*
18 *tories in supporting and promoting the tech-*
19 *nology commercialization and technology trans-*
20 *fer of technologies critical to national security.*

21 *(J) An assessment of manufacturing capac-*
22 *ity, logistics, and supply chain dynamics of*
23 *major export sectors that are critical to national*
24 *security, including access to a skilled workforce,*

1 *physical infrastructure, and broadband network*
2 *infrastructure.*

3 *(K) An assessment of how the Federal Gov-*
4 *ernment is increasing the participation of under-*
5 *represented populations in science, research, in-*
6 *novation, and manufacturing.*

7 *(L) An assessment of public-private part-*
8 *nerships in technology commercialization in sup-*
9 *port of national security, including—*

10 *(i) the structure of current defense tech-*
11 *nology research and commercialization ar-*
12 *rangements with regard to public-private*
13 *partnerships; and*

14 *(ii) the extent to which intellectual*
15 *property developed with Federal defense*
16 *funding—*

17 *(I) is being used to manufacture*
18 *in the United States rather than in*
19 *other countries; and*

20 *(II) is being used by foreign busi-*
21 *ness entities that are majority owned*
22 *or controlled (as such term is defined*
23 *in section 800.208 of title 31, Code of*
24 *Federal Regulations, or a successor reg-*

1 *ulation), or minority owned greater*
2 *than 25 percent by—*

3 *(aa) any governmental orga-*
4 *nization of a foreign country of*
5 *concern; or*

6 *(bb) any other entity that*
7 *is—*

8 *(AA) known to be owned*
9 *or controlled by any govern-*
10 *mental organization of a for-*
11 *ign country of concern; or*

12 *(BB) organized under,*
13 *or otherwise subject to, the*
14 *laws of a foreign country of*
15 *concern.*

16 *(M) Recommendations to enhance the abil-*
17 *ity of the Federal Government to recruit into*
18 *Federal service and retain in such service indi-*
19 *viduals with critical skills relevant to national*
20 *security.*

21 *(N) Recommendations for policies to protect*
22 *United States leadership and the allies of the*
23 *United States in critical areas relevant to na-*
24 *tional security through targeted export controls,*

1 *investment screening, and counterintelligence ac-*
2 *tivities.*

3 (O) *Informed by the interagency process es-*
4 *tablished under section 1758 of the Export Con-*
5 *trol Reform Act of 2018, a technology annex,*
6 *which may be classified, describing an integrated*
7 *and enduring approach to the identification,*
8 *prioritization, development, and fielding of*
9 *emerging technologies relevant to national secu-*
10 *rity.*

11 (2) *STRATEGY.—Each strategy submitted under*
12 *subsection (b)(1)(C)(ii) shall, to the extent practicable,*
13 *include the following:*

14 (A) *A plan to utilize available tools to ad-*
15 *dress or minimize the leading threats and chal-*
16 *lenges and to take advantage of the leading op-*
17 *portunities, particularly in regards to tech-*
18 *nologies central to international competition in*
19 *science and technology relevant to national secu-*
20 *rity purposes, including the following:*

21 (i) *Specific objectives, tasks, metrics,*
22 *and milestones for each relevant Federal*
23 *agency.*

24 (ii) *Strategic objectives and priorities*
25 *necessary to maintain the leadership of the*

1 *United States in science and technology rel-*
2 *evant to national security purposes, includ-*
3 *ing near-term, medium-term, and long-term*
4 *research priorities.*

5 *(iii) Specific plans to safeguard re-*
6 *search and technology funded, as appro-*
7 *priate, in whole or in part, by the Federal*
8 *Government, including in technologies crit-*
9 *ical to national security, from theft or*
10 *exfiltration by foreign entities of concern.*

11 *(iv) Specific plans to support public*
12 *and private sector investment in research,*
13 *technology development, education and*
14 *workforce development, and domestic manu-*
15 *facturing supportive of the national security*
16 *of the United States and to foster the use of*
17 *public-private partnerships.*

18 *(v) A description of the following:*

19 *(I) How the strategy submitted*
20 *under subsection (b)(1)(C)(ii) supports*
21 *the national security strategy.*

22 *(II) How the strategy submitted*
23 *under such subsection is integrated and*
24 *coordinated with the most recent—*

1 (aa) *national defense strat-*
2 *egy under subsection (g) of section*
3 *113 of title 10, United States*
4 *Code; and*

5 (bb) *national science and*
6 *technology strategy under section*
7 *206 of the National Science and*
8 *Technology Policy, Organization,*
9 *and Priorities Act of 1976 (42*
10 *U.S.C. 6615).*

11 (vi) *A plan to encourage the govern-*
12 *ments of countries that are allies or part-*
13 *ners of the United States to cooperate with*
14 *the execution of such strategy, where appro-*
15 *priate.*

16 (vii) *A plan for strengthening the in-*
17 *dustrial base of the United States.*

18 (viii) *A plan to remove or update over-*
19 *ly burdensome or outdated Federal regula-*
20 *tions, as appropriate.*

21 (ix) *A plan—*

22 (I) *to further incentivize industry*
23 *participation in public-private part-*
24 *nerships for the purposes of accel-*
25 *erating technology research and com-*

1 *mercialization in support of national*
2 *security, including alternate ways of*
3 *accounting for in-kind contributions*
4 *and valuing partially manufactured*
5 *products;*

6 (II) *to ensure that intellectual*
7 *property developed with Federal fund-*
8 *ing is commercialized in the United*
9 *States; and*

10 (III) *to ensure, to the maximum*
11 *appropriate extent, that intellectual*
12 *property developed with Federal fund-*
13 *ing is not being used by foreign busi-*
14 *ness entities that are majority owned*
15 *or controlled (as such term is defined*
16 *in section 800.208 of title 31, Code of*
17 *Federal Regulations, or a successor reg-*
18 *ulation), or minority owned greater*
19 *than 25 percent by—*

20 (aa) *any governmental orga-*
21 *nization of a foreign country of*
22 *concern; or*

23 (bb) *any other entity that*
24 *is—*

1 (AA) known to be owned
2 or controlled by any govern-
3 mental organization of a for-
4 eign country of concern; or

5 (BB) organized under,
6 or otherwise subject to, the
7 laws of a foreign country of
8 concern.

9 (x) An identification of additional re-
10 sources, administrative action, or legislative
11 action recommended to assist with the im-
12 plementation of such strategy.

13 (d) *RESEARCH AND DEVELOPMENT FUNDING.*—The
14 *Director of the Office of Science and Technology Policy*
15 *shall, as the Director of the Office of Science and Technology*
16 *Policy considers necessary, consult with the Director of the*
17 *Office of Management and Budget and with the heads of*
18 *such other elements of the Executive Office of the President*
19 *as the Director of the Office of Science and Technology Pol-*
20 *icy considers appropriate to ensure the recommendations*
21 *and priorities with respect to research and development*
22 *funding relevant to national security, as expressed in the*
23 *most recent report and strategy submitted under subsection*
24 *(b)(1)(C) are incorporated into the development of annual*
25 *budget requests for Federal research agencies.*

1 (e) *PUBLICATION.*—*The Director of the Office of*
 2 *Science and Technology Policy shall, consistent with the*
 3 *protection of national security and other sensitive matters*
 4 *and to the maximum extent practicable, make each report*
 5 *submitted under subsection (b)(1)(C)(i) publicly available*
 6 *on an internet website of the Office of Science and Tech-*
 7 *nology Policy. Each such report may include a classified*
 8 *annex if the Director of the Office of Science and Technology*
 9 *Policy determines such is appropriate.*

10 **SEC. 10613. QUADRENNIAL SCIENCE AND TECHNOLOGY RE-**
 11 **VIEW.**

12 *The National Science and Technology Policy, Organi-*
 13 *zation, and Priorities Act of 1976 (42 U.S.C. 6601 et seq.)*
 14 *is amended by inserting after section 206 the following new*
 15 *section:*

16 **“SEC. 206B. QUADRENNIAL SCIENCE AND TECHNOLOGY RE-**
 17 **VIEW.**

18 “(a) *REQUIREMENTS.*—

19 “(1) *QUADRENNIAL REVIEWS REQUIRED.*—*Not*
 20 *later than December 31, 2023, and every four years*
 21 *thereafter, the Director of the Office of Science and*
 22 *Technology Policy shall complete a review of the*
 23 *science and technology enterprise of the United States*
 24 *(in this section referred to as the ‘quadrennial science*
 25 *and technology review’).*

1 “(2) *SCOPE.*—*The quadrennial science and tech-*
2 *nology review shall be a comprehensive examination*
3 *of the science and technology strategy of the United*
4 *States, including recommendations for maintaining*
5 *global leadership in science and technology and ad-*
6 *vancing science and technology to address the societal*
7 *and national challenges and guidance regarding the*
8 *coordination of programs, assets, capabilities, budget,*
9 *policies, and authorities across all Federal research*
10 *and development programs.*

11 “(3) *CONSULTATION.*—*The Director of the Office*
12 *of Science and Technology Policy shall conduct each*
13 *quadrennial science and technology review in con-*
14 *sultation with the following:*

15 “(A) *The National Science and Technology*
16 *Council.*

17 “(B) *The President’s Council of Advisors on*
18 *Science and Technology.*

19 “(C) *The National Science Board.*

20 “(D) *The National Security Council.*

21 “(E) *The heads of other relevant Federal*
22 *agencies.*

23 “(F) *Other relevant governmental and non-*
24 *governmental entities, including representatives*
25 *from industry, institutions of higher education,*

1 *nonprofit organizations, Members of Congress,*
2 *and other policy experts.*

3 “(4) *COORDINATION.*—*The Director of the Office*
4 *of Science and Technology Policy shall ensure that*
5 *each quadrennial science and technology review is co-*
6 *ordinated with other relevant statutorily required re-*
7 *views, and to the maximum extent practicable incor-*
8 *porates information and recommendations from exist-*
9 *ing reviews to avoid duplication.*

10 “(b) *CONTENTS.*—*In each quadrennial science and*
11 *technology review, the Director of the Office of Science and*
12 *Technology Policy shall—*

13 “(1) *provide an integrated view of, and rec-*
14 *ommendations for, science and technology policy*
15 *across the Federal Government, while considering eco-*
16 *nomie and national security and other societal and*
17 *national challenges;*

18 “(2) *assess and recommend priorities for re-*
19 *search, development, and demonstration programs to*
20 *maintain United States leadership in science and*
21 *technology, including in manufacturing and indus-*
22 *trial innovation;*

23 “(3) *assess and recommend priorities for re-*
24 *search, development, and demonstration programs to*
25 *address societal and national challenges;*

1 “(4) assess the global competition in science and
2 technology and identify potential threats to the lead-
3 ership of the United States in science and technology
4 and opportunities for international collaboration;

5 “(5) assess and make recommendations on the
6 science, technology, engineering, mathematics, and
7 computer science workforce of the United States;

8 “(6) assess and make recommendations to im-
9 prove regional innovation across the United States;

10 “(7) identify and assess sectors critical for the
11 long-term resilience of United States innovation lead-
12 ership across design, manufacturing, supply chains,
13 and markets;

14 “(8) assess and make recommendations to im-
15 prove translation of basic and applied research and
16 the enhancement of technology transfer of federally
17 funded research;

18 “(9) identify, assess, and make recommendations
19 to address science and technology gaps that would not
20 be met without Federal investment;

21 “(10) review administrative and legislative poli-
22 cies and funding opportunities that affect private sec-
23 tor science and technology activities, and identify and
24 make recommendations regarding policies that main-

1 *tain and grow the participation and competitiveness*
2 *of small- and medium-sized businesses;*

3 *“(11) assess and identify the infrastructure and*
4 *tools needed to maintain the leadership of the United*
5 *States in science and technology and address other so-*
6 *cietal and national challenges; and*

7 *“(12) review administrative or legislative poli-*
8 *cies that affect the science and technology enterprise*
9 *and identify and make recommendations regarding*
10 *policies that hinder research and development in the*
11 *United States.*

12 *“(c) REPORTING.—*

13 *“(1) IN GENERAL.—Not later than December 31*
14 *of the year in which a quadrennial science and tech-*
15 *nology review is conducted, the Director of the Office*
16 *of Science and Technology Policy shall submit to Con-*
17 *gress a report relating to such review.*

18 *“(2) PUBLICATION.—The Director of the Office of*
19 *Science and Technology Policy shall, consistent with*
20 *the protection of national security and other sensitive*
21 *matters to the maximum extent practicable, make*
22 *each report submitted under paragraph (1) publicly*
23 *available on an internet website of the Office of*
24 *Science and Technology Policy. Each report may in-*
25 *clude a classified annex if the Director of the Office*

1 of Science and Technology Policy determines such ap-
2 propriate.

3 “(d) *TERMINATION.*—*This section shall terminate on*
4 *the date that is ten years after the date of the enactment*
5 *of this section.*”.

6 ***Subtitle C—Regional Innovation***

7 ***SEC. 10621. REGIONAL INNOVATION CAPACITY.***

8 (a) *IN GENERAL.*—*The Stevenson-Wydler Technology*
9 *Innovation Act of 1980 (Public Law 96–480; 15 U.S.C.*
10 *3701 et seq.) is amended—*

11 (1) *by redesignating section 28 as section 30;*
12 *and*

13 (2) *by inserting after section 27 the following:*

14 ***“SEC. 28. REGIONAL TECHNOLOGY AND INNOVATION HUB*** 15 ***PROGRAM.***

16 “(a) *DEFINITIONS.*—*In this section:*

17 “(1) *APPROPRIATE COMMITTEES OF CON-*
18 *GRESS.*—*The term ‘appropriate committees of Con-*
19 *gress’ means—*

20 “(A) *the Committee on Commerce, Science,*
21 *and Transportation, the Committee on Environ-*
22 *ment and Public Works, and the Committee on*
23 *Appropriations of the Senate; and*

1 “(B) *the Committee on Science, Space, and*
2 *Technology and the Committee on Appropria-*
3 *tions of the House of Representatives.*

4 “(2) *COOPERATIVE EXTENSION SERVICES.—The*
5 *term ‘cooperative extension services’ has the meaning*
6 *given the term in section 1404 of the Food and Agri-*
7 *culture Act of 1977 (7 U.S.C. 3103).*

8 “(3) *SITE CONNECTIVITY INFRASTRUCTURE.—*
9 *The term ‘site connectivity infrastructure’ means lo-*
10 *calized driveways and access roads to a facility as*
11 *well as hookups to the new facility for drinking*
12 *water, waste water, broadband, and other basic infra-*
13 *structure services already present in the area.*

14 “(4) *VENTURE DEVELOPMENT ORGANIZATION.—*
15 *The term ‘venture development organization’ has the*
16 *meaning given such term in section 27(a) of the Ste-*
17 *venson-Wydler Act of 1980 (15 U.S.C. 3722(a)).*

18 “(5) *COMMUNITY DEVELOPMENT FINANCIAL IN-*
19 *STITUTION.—The term ‘community development fi-*
20 *nancial institution’ has the meaning given in section*
21 *103 of the Community Development Banking and Fi-*
22 *nancial Institutions Act of 1994 (12 U.S.C. 4702).*

23 “(6) *MINORITY DEPOSITORY INSTITUTION.—The*
24 *term ‘minority depository institution’ means an enti-*
25 *ty that is—*

1 “(A) a minority depository institution, as
2 defined in section 308 of the *Financial Institu-*
3 *tions Reform, Recovery, and Enforcement Act of*
4 *1989 (12 U.S.C. 1463 note); or*

5 “(B) considered to be a minority depository
6 institution by—

7 “(i) the appropriate Federal banking
8 agency; or

9 “(ii) the National Credit Union Ad-
10 ministration, in the case of an insured cred-
11 it union.

12 “(7) *LOW POPULATION STATE.*—The term ‘low
13 population State’ means a State without an urban-
14 ized area with a population greater than 250,000 as
15 reported in the decennial census.

16 “(8) *SMALL AND RURAL COMMUNITIES.*—The
17 term ‘small and rural community’ means a noncore
18 area, a micropolitan area, or a small metropolitan
19 statistical area with a population of not more than
20 250,000.

21 “(b) *REGIONAL TECHNOLOGY AND INNOVATION HUB*
22 *PROGRAM.*—

23 “(1) *IN GENERAL.*—Subject to the availability of
24 appropriations, the Secretary shall carry out a pro-
25 gram—

1 “(A) to encourage new and constructive col-
2 laborations among local, State, Tribal, and Fed-
3 eral government entities, institutions of higher
4 education, the private sector, economic develop-
5 ment organizations, labor organizations, non-
6 profit organizations, and community organiza-
7 tions that promote broad-based regional innova-
8 tion initiatives;

9 “(B) to support eligible consortia in the de-
10 velopment and implementation of regional inno-
11 vation strategies;

12 “(C) to designate eligible consortia as re-
13 gional technology and innovation hubs and fa-
14 cilitate activities by consortia designated as re-
15 gional technology and innovation hubs in imple-
16 menting their regional innovation strategies—

17 “(i) to enable United States leadership
18 in technology and innovation sectors crit-
19 ical to national and economic security;

20 “(ii) to support regional economic de-
21 velopment and resilience, including in small
22 cities and rural areas, and promote in-
23 creased geographic diversity of innovation
24 across the United States;

1 “(iii) to promote the benefits of tech-
2 nology development and innovation for all
3 Americans, including underserved commu-
4 nities and vulnerable communities;

5 “(iv) to support the modernization and
6 expansion of United States manufacturing
7 based on advances in technology and inno-
8 vation;

9 “(v) to support domestic job creation
10 and broad-based economic growth; and

11 “(vi) to improve the pace of market
12 readiness, industry maturation, and overall
13 commercialization and domestic production
14 of innovative research;

15 “(D) to ensure that the regional technology
16 and innovation hubs address the intersection of
17 emerging technologies and either regional chal-
18 lenges or national challenges; and

19 “(E) to conduct ongoing research, evalua-
20 tion, analysis, and dissemination of best prac-
21 tices for regional development and competitive-
22 ness in technology and innovation.

23 “(2) AWARDS.—The Secretary shall carry out
24 the program required by paragraph (1) through the
25 award of the following:

1 “(A) *Strategy development grants or cooper-*
2 *ative agreements to eligible consortia under sub-*
3 *section (e).*

4 “(B) *Strategy implementation grants or co-*
5 *operative agreements to regional technology and*
6 *innovation hubs under subsection (f).*

7 “(3) *ADMINISTRATION.—The Secretary shall*
8 *carry out this section through the Assistant Secretary*
9 *of Commerce for Economic Development in coordina-*
10 *tion with the Under Secretary of Commerce for*
11 *Standards and Technology.*

12 “(c) *ELIGIBLE CONSORTIA.—For purposes of this sec-*
13 *tion, an eligible consortium is a consortium that—*

14 “(1) *includes 1 or more of each of the fol-*
15 *lowing—*

16 “(A) *institutions of higher education, which*
17 *may include Historically Black Colleges and*
18 *Universities, Tribal Colleges or Universities, and*
19 *minority-serving institutions;*

20 “(B) *State, territorial, local, or Tribal gov-*
21 *ernments or other political subdivisions of a*
22 *State, including State and local agencies, or a*
23 *consortium thereof;*

24 “(C) *industry or firms in relevant tech-*
25 *nology, innovation, or manufacturing sectors;*

1 “(D) economic development organizations or
2 similar entities that are focused primarily on
3 improving science, technology, innovation, entre-
4 preneurship, or access to capital; and

5 “(E) labor organizations or workforce train-
6 ing organizations, which may include State and
7 local workforce development boards as established
8 under sections 101 and 107 of the Workforce In-
9 vestment and Opportunity Act (29 U.S.C. 3111;
10 3122); and

11 “(2) may include 1 or more—

12 “(A) economic development entities with rel-
13 evant expertise, including a district organization
14 (as defined in section 300.3 of title 13, Code of
15 Federal Regulations, or successor regulation);

16 “(B) organizations that contribute to in-
17 creasing the participation of underserved popu-
18 lations in science, technology, innovation, and
19 entrepreneurship;

20 “(C) venture development organizations;

21 “(D) organizations that promote local eco-
22 nomic stability, high-wage domestic jobs, and
23 broad-based economic opportunities, such as em-
24 ployee ownership membership associations and
25 State or local employee ownerships and coopera-

1 *tive development centers, financial institutions*
2 *and investment funds, including community de-*
3 *velopment financial institutions and minority*
4 *depository institutions;*

5 “(E) *elementary schools and secondary*
6 *schools, including area career and technical edu-*
7 *cation schools (as defined in section 3 of the Carl*
8 *D. Perkins Career and Technical Education Act*
9 *of 2006 (29 U.S.C. 2302);*

10 “(F) *National Laboratories (as defined in*
11 *section 2 of the Energy Policy Act of 2005 (42*
12 *U.S.C. 15801));*

13 “(G) *Federal laboratories;*

14 “(H) *Manufacturing extension centers;*

15 “(I) *Manufacturing USA institutes;*

16 “(J) *transportation planning organizations;*

17 “(K) *a cooperative extension services;*

18 “(L) *organizations that represent the per-*
19 *spectives of underserved communities in eco-*
20 *nomie development initiatives; and*

21 “(M) *institutions receiving an award under*
22 *section 10388 of the Research and Development,*
23 *Competition, and Innovation Act.*

24 “(d) *DESIGNATION OF REGIONAL TECHNOLOGY AND*
25 *INNOVATION HUBS.—*

1 “(1) *IN GENERAL.*—*In carrying out subsection*
2 *(b)(1)(C), the Secretary shall use a competitive,*
3 *merit-review process to designate eligible consortia as*
4 *regional technology and innovation hubs.*

5 “(2) *DISTRIBUTION.*—*In conducting the competi-*
6 *tive process under paragraph (1), the Secretary shall*
7 *ensure geographic and demographic diversity in the*
8 *designation of regional technology hubs by, subject to*
9 *available appropriations, designating at least 20 tech-*
10 *nology hubs, and—*

11 “(A) *seeking to designate at least three tech-*
12 *nology hubs in each region covered by a regional*
13 *office of the Economic Development Administra-*
14 *tion, while—*

15 “(i) *ensuring that not fewer than one-*
16 *third of eligible consortia so designated as*
17 *regional technology hubs significantly ben-*
18 *efit a small and rural community, which*
19 *may include a State or territory described*
20 *in clauses (ii) and (iii);*

21 “(ii) *ensuring that not fewer than one-*
22 *third of eligible consortia so designated as*
23 *regional technology hubs include as a mem-*
24 *ber of the eligible consortia at least 1 mem-*
25 *ber that is a State or territory that is eligi-*

1 *ble to receive funding from the Established*
2 *Program to Stimulate Competitive Research*
3 *of the National Science Foundation; and*

4 *“(iii) ensuring that at least one eligible*
5 *consortium so designated as a regional tech-*
6 *nology hub is headquartered in a low popu-*
7 *lation State that is eligible to receive fund-*
8 *ing from the Established Program to Stim-*
9 *ulate Competitive Research of the National*
10 *Science Foundation;*

11 *“(B) seeking to designate an additional two*
12 *regional technology hubs based on selection fac-*
13 *tors which shall include likelihood of success and*
14 *may include regional factors such as the extent*
15 *to which the regional technology and innovation*
16 *hub significantly engages and benefits under-*
17 *served communities in and near metropolitan*
18 *areas;*

19 *“(C) encouraging eligible consortia to lever-*
20 *age institutions of higher education serving pop-*
21 *ulations historically underrepresented in STEM,*
22 *including historically Black Colleges and Uni-*
23 *versities, Tribal Colleges or Universities, and mi-*
24 *nority-serving institutions to significantly ben-*
25 *efit an area or region; and*

1 “(D) encouraging proposals from eligible
2 consortia that would significantly benefit an
3 area or region whose economy significantly relies
4 on or has recently relied on coal, oil, or natural
5 gas production or development.

6 “(3) RELATION TO CERTAIN GRANT AWARDS.—
7 The Secretary shall not require an eligible consortium
8 to receive a grant or cooperative agreement under
9 subsection (e) in order to be designated as a regional
10 technology and innovation hub under paragraph (1)
11 of this subsection.

12 “(e) STRATEGY DEVELOPMENT GRANTS AND COOPER-
13 ATIVE AGREEMENTS.—

14 “(1) IN GENERAL.—The Secretary shall use a
15 competitive, merit-review process to award grants or
16 cooperative agreements to eligible consortia for the de-
17 velopment of regional innovation strategies.

18 “(2) NUMBER OF RECIPIENTS.—Subject to avail-
19 ability of appropriations, the Secretary shall seek to
20 award a grant or cooperative agreement under para-
21 graph (1) to not fewer than 60 eligible consortia.

22 “(3) GEOGRAPHIC DIVERSITY AND REPRESENTA-
23 TION.—

24 “(A) IN GENERAL.—The Secretary shall
25 carry out paragraph (1) in a manner that en-

1 *sure geographic diversity and representation*
2 *from communities of differing populations.*

3 “(B) AWARDS TO SMALL AND RURAL COM-
4 MUNITIES.—*In carrying out paragraph (1), the*
5 *Secretary shall—*

6 “(i) *award not fewer than one-third of*
7 *the grants and cooperative agreements*
8 *under such paragraph to eligible consortia*
9 *that significantly benefit a small and rural*
10 *community, which may include a State de-*
11 *scribed in clause (ii); and*

12 “(ii) *award not fewer than one-third of*
13 *the grants and cooperative agreements*
14 *under such paragraph to eligible consortia*
15 *that include as a member of the eligible con-*
16 *sortia at least 1 member that is a State or*
17 *territory that is eligible to receive funding*
18 *from the Established Program to Stimulate*
19 *Competitive Research of the National*
20 *Science Foundation.*

21 “(4) USE OF FUNDS.—

22 “(A) *Use of funds under this grant shall in-*
23 *clude—*

24 “(i) *coordination of a locally defined*
25 *planning processes, across jurisdictions and*

1 *agencies, relating to developing a com-*
2 *prehensive regional technology strategy;*

3 *“(ii) identification of regional partner-*
4 *ships for developing and implementing a*
5 *comprehensive regional technology strategy;*

6 *“(iii) implementation or updating of*
7 *assessments to determine regional needs and*
8 *capabilities;*

9 *“(iv) development or updating of goals*
10 *and strategies to implement an existing*
11 *comprehensive regional plan;*

12 *“(v) identification or implementation*
13 *of planning and local zoning and other code*
14 *changes necessary to implement a com-*
15 *prehensive regional technology strategy; and*

16 *“(vi) development of plans for pro-*
17 *moting broad-based economic growth in a*
18 *region.*

19 *“(B) Use of funds under this grant may in-*
20 *clude the formation of a workforce development*
21 *strategy, according to the needs for a skilled and*
22 *technical workforce at all skill and degree levels*
23 *in the region proposed to be served by the eligible*
24 *consortia. Any workforce development strategy*

1 *submitted pursuant to paragraph (1) should in-*
2 *clude—*

3 “(i) *how the eligible consortia will de-*
4 *velop, offer, or improve educational or ca-*
5 *reer training programs and curriculum for*
6 *a skilled and technical workforce;*

7 “(ii) *the extent to which such programs*
8 *developed and offered by the eligible con-*
9 *sortia will meet the educational or career*
10 *training needs of a skilled and technical*
11 *workforce in the region to be served;*

12 “(iii) *how the eligible consortia will*
13 *provide facilities for students to receive*
14 *training under such programs developed*
15 *and offered by the eligible consortia; and*

16 “(iv) *how the eligible consortia will en-*
17 *hance outreach and recruitment for such*
18 *programs developed and offered by the eligi-*
19 *ble consortia to populations underrep-*
20 *resented in STEM.*

21 “(5) *FEDERAL SHARE.—The Federal share of the*
22 *cost of an effort carried out using a grant or coopera-*
23 *tive agreement awarded under this subsection may*
24 *not exceed 80 percent—*

1 “(A) where in-kind contributions may be
2 used for all or part of the non-Federal share, but
3 Federal funding from other government sources
4 may not count towards the non-Federal share;

5 “(B) except in the case of an eligible consor-
6 tium that represents all or part of a small and
7 rural or other underserved community, the Fed-
8 eral share may be up to 90 percent of the total
9 cost, subject to subparagraph (A); and

10 “(C) except in the case of an eligible consor-
11 tium that is led by a Tribal government, the
12 Federal share may be up to 100 percent of the
13 total cost of the project.

14 “(f) STRATEGY IMPLEMENTATION GRANTS AND COOP-
15 ERATIVE AGREEMENTS.—

16 “(1) IN GENERAL.—The Secretary shall use a
17 competitive, merit-review process to award grants or
18 cooperative agreements to regional technology and in-
19 novation hubs for the implementation of regional in-
20 novation strategies, including regional strategies for
21 infrastructure and site development, in support of the
22 regional innovation and technology and innovation
23 hub’s plans and programs. The Secretary should de-
24 termine the size and number of awards based on ap-
25 propriations available to ensure the success of re-

1 *gional technology and innovation hubs as outlined in*
2 *subsection (h).*

3 “(2) *USE OF FUNDS.*—*Grants or cooperative*
4 *agreements awarded under paragraph (1) to a re-*
5 *gional technology and innovation hub may be used by*
6 *the regional technology and innovation hub to sup-*
7 *port any of the following activities, consistent with*
8 *the most current regional innovation strategy of the*
9 *regional technology and innovation hub, which may*
10 *have been developed with or without financial assist-*
11 *ance received under subsection (e) of this section:*

12 “(A) *WORKFORCE DEVELOPMENT ACTIVI-*
13 *TIES.*—*Workforce development activities includ-*
14 *ing activities relating to the following:*

15 “(i) *The creation of partnerships be-*
16 *tween industry, workforce, nonprofit, and*
17 *educational institutions, which may include*
18 *community colleges, to create and align*
19 *technical training and educational pro-*
20 *grams, including for a skilled technical*
21 *workforce.*

22 “(ii) *The design, development, and up-*
23 *dating of educational and training cur-*
24 *riculum and programs, including training*
25 *of trainers, teachers, or instructors tied to*

1 *demonstrated regional skilled and technical*
2 *workforce needs.*

3 “(iii) *The procurement of facilities and*
4 *equipment, as required to train a skilled*
5 *and technical workforce.*

6 “(iv) *The development and execution of*
7 *programs, including traineeships and ap-*
8 *prenticeships, to rapidly provide training*
9 *and award certificates or credentials recog-*
10 *nized by regional industries or other orga-*
11 *nizations.*

12 “(v) *The matching of regional employ-*
13 *ers with a potential new entrant, under-*
14 *employed, underrepresented, reentering, or*
15 *incumbent workforce, as well as the securing*
16 *of commitments from employers to hire*
17 *workers who successfully complete training*
18 *programs, or who are awarded certificates*
19 *or credentials.*

20 “(vi) *The expansion of successful train-*
21 *ing programs at a scale required by the re-*
22 *gion served by the regional technology and*
23 *innovation hub, including through the use*
24 *of online education and mentoring.*

1 “(vii) *The development and expansion*
2 *of programs with the goal of increasing the*
3 *participation of persons historically under-*
4 *represented in STEM and manufacturing*
5 *in the workforce development plans of the*
6 *regional technology and innovation hub.*

7 “(viii) *The provision of support serv-*
8 *ices for attendees of training programs de-*
9 *veloped, updated, or expanded pursuant to*
10 *this subsection, including career counseling.*

11 “(ix) *The implementation of outreach*
12 *and recruitment for training programs de-*
13 *veloped, updated, or expanded pursuant to*
14 *this subsection, particularly at local edu-*
15 *cational institutions, including high schools*
16 *and community colleges.*

17 “(B) *BUSINESS AND ENTREPRENEUR DE-*
18 *VELOPMENT ACTIVITIES.—Business and entre-*
19 *preneur development activities, including activi-*
20 *ties relating to the following:*

21 “(i) *The development and growth of*
22 *local and regional businesses and the train-*
23 *ing of entrepreneurs, which may include*
24 *support for the expansion of employee*
25 *owned businesses and cooperatives.*

1 “(ii) *The support of technology com-*
2 *mercialization, including funding for ac-*
3 *tivities relevant to the protection of intellec-*
4 *tual property and for advancing potential*
5 *ventures such as acceleration, incubation,*
6 *early-stage production and other relevant*
7 *programming.*

8 “(iii) *The development of local and re-*
9 *gional capital networks and consortia to at-*
10 *tract necessary private funding to busi-*
11 *nesses and entrepreneurs in the region.*

12 “(iv) *The development of local and re-*
13 *gional networks for business and entre-*
14 *preneur mentorship.*

15 “(C) *TECHNOLOGY DEVELOPMENT AND MAT-*
16 *URATION ACTIVITIES.—Technology maturation*
17 *activities, including activities relating to the fol-*
18 *lowing:*

19 “(i) *The development and deployment*
20 *of technologies in sectors critical to the re-*
21 *gion served by the regional technology and*
22 *innovation hub or to national and economic*
23 *security, including industry-university re-*
24 *search cooperation, proof of concept, proto-*

1 *type development, testing, and scale-up for*
2 *manufacturing.*

3 “(ii) *The development of programming*
4 *to support the creation and transfer of in-*
5 *tellectual property into private use, such as*
6 *through startup creation.*

7 “(iii) *The provision of facilities for*
8 *technology maturation, including incuba-*
9 *tors and production testbeds for collabo-*
10 *rative development of technologies by pri-*
11 *vate sector, academic, nonprofit, and other*
12 *entities.*

13 “(iv) *Activities to provide or ensure ac-*
14 *cess to capital for new business and business*
15 *expansion, including by attracting new pri-*
16 *vate, public, and philanthropic investment*
17 *and by establishing local and regional ven-*
18 *ture and loan funds, community develop-*
19 *ment financial institutions, and minority*
20 *depository institutions.*

21 “(D) *INFRASTRUCTURE-RELATED ACTIVI-*
22 *TIES.—The building of facilities and site*
23 *connectivity infrastructure necessary to carry*
24 *out activities described in subparagraphs (A),*

1 (B), and (C), including activities relating to the
2 following:

3 “(i) Establishing a center with re-
4 quired tools and instrumentation for work-
5 force development.

6 “(ii) Establishing a facility for tech-
7 nology development, demonstration, and
8 testing.

9 “(iii) Establishing collaborative incu-
10 bators to support technology commercializa-
11 tion and entrepreneur training.

12 “(3) *TERM.*—

13 “(A) *INITIAL PERFORMANCE PERIOD.*—The
14 term of an initial grant or cooperative agree-
15 ment awarded under this subsection shall be for
16 a period that the Secretary deems appropriate
17 for the proposed activities but not less than 2
18 years.

19 “(B) *SUBSEQUENT PERFORMANCE PE-*
20 *RIOD.*—The Secretary may renew a grant or co-
21 operative agreement awarded to a regional tech-
22 nology and innovation hub under paragraph (1)
23 for such period as the Secretary considers appro-
24 priate, if the Secretary determines that the re-
25 gional technology and innovation hub has made

1 *satisfactory progress towards the metrics agreed*
2 *to under subsection (j).*

3 “(C) *FLEXIBLE APPROACH.*—*In renewing a*
4 *grant or cooperative agreement under subpara-*
5 *graph (B), the Secretary and the eligible consor-*
6 *tium may agree to new or additional uses of*
7 *funds in order to meet changes in the needs of*
8 *the region.*

9 “(4) *LIMITATION ON AMOUNT OF AWARDS.*—

10 “(A) *INITIAL PERFORMANCE PERIOD.*—*The*
11 *amount of an initial grant or cooperative agree-*
12 *ments awarded to a regional technology and in-*
13 *novation hub under paragraph (3)(A) shall be no*
14 *more than \$150,000,000.*

15 “(B) *SUBSEQUENT PERFORMANCE PE-*
16 *RIOD.*—*Upon renewal of a grant or cooperative*
17 *agreement under paragraph (3)(B), the Sec-*
18 *retary may award funding in the amount that*
19 *the Secretary considers appropriate, ensuring*
20 *that no single regional technology and innova-*
21 *tion hub receives more than 10 percent of the ag-*
22 *gregate amount of the grants and cooperative*
23 *agreements awarded under this subsection.*

24 “(5) *MATCHING REQUIRED.*—

1 “(A) *INITIAL PERFORMANCE PERIOD.*—*Ex-*
2 *cept in the case of a regional technology and in-*
3 *novation hub described in subparagraph (C), the*
4 *total amount of all grants awarded to a regional*
5 *technology and innovation hub under this sub-*
6 *section in phase one shall not exceed 90 percent*
7 *of the total operating costs of the regional tech-*
8 *nology and innovation hub during the initial*
9 *performance period.*

10 “(B) *SUBSEQUENT PERFORMANCE PE-*
11 *RIOD.*—*Except in the case of a regional tech-*
12 *nology and innovation hub described in subpara-*
13 *graph (C), the total amount of all grants award-*
14 *ed to a regional technology and innovation hub*
15 *in subsequent performance periods shall not ex-*
16 *ceed 75 percent of the total operating costs of the*
17 *regional technology and innovation hub in each*
18 *year of the grant or cooperative agreement.*

19 “(C) *SMALL AND RURAL COMMUNITIES, UN-*
20 *DERSERVED COMMUNITIES, AND INDIAN*
21 *TRIBES.*—

22 “(i) *IN GENERAL.*—*The total Federal*
23 *financial assistance awarded in a given*
24 *year to a regional technology and innova-*

1 *tion hub under this subsection shall not ex-*
2 *ceed amounts as follows:*

3 *“(I) In the case of a regional tech-*
4 *nology and innovation hub that pri-*
5 *marily serves a small and rural com-*
6 *munity or other underserved commu-*
7 *nity, in a fiscal year, 90 percent of the*
8 *total funding of the regional technology*
9 *and innovation hub in that fiscal year.*

10 *“(II) In the case of a regional*
11 *technology and innovation hub that is*
12 *led by a Tribal government, in a fiscal*
13 *year, 100 percent of the total funding*
14 *of the regional technology and innova-*
15 *tion hub in that fiscal year.*

16 *“(i) MINIMUM THRESHOLD OF RURAL*
17 *REPRESENTATION.—For purposes of clause*
18 *(i)(I), the Secretary shall establish a min-*
19 *imum threshold of rural representation in*
20 *the regional technology and innovation hub.*

21 *“(D) IN-KIND CONTRIBUTIONS.—For pur-*
22 *poses of this paragraph, in-kind contributions*
23 *may be used for part of the non-Federal share of*
24 *the total funding of a regional technology and*
25 *innovation hub in a fiscal year.*

1 “(6) *GRANTS FOR INFRASTRUCTURE.*—*Any*
2 *grant or cooperative agreement awarded under this*
3 *subsection to support the construction of facilities and*
4 *site connectivity infrastructure shall be awarded pur-*
5 *suant to section 201 of the Public Works and Eco-*
6 *nomie Development Act of 1965 (42 U.S.C. 3141) and*
7 *subject to the provisions of such Act, except that sub-*
8 *section (b) of such section and sections 204 and 301*
9 *of such Act (42 U.S.C. 3144; 3161) shall not apply.*

10 “(7) *RELATION TO CERTAIN GRANT AWARDS.*—
11 *The Secretary shall not require a regional technology*
12 *and innovation hub to receive a grant or cooperative*
13 *agreement under subsection (e) in order to receive a*
14 *grant or cooperative agreement under this subsection.*

15 “(g) *APPLICATIONS.*—*An eligible consortium seeking*
16 *designation as a regional technology and innovation hub*
17 *under subsection (d) or a grant or cooperative agreement*
18 *under subsection (e) or (f) shall submit to the Secretary an*
19 *application therefore at such time, in such manner, and*
20 *containing such information as the Secretary may specify.*

21 “(h) *CONSIDERATIONS FOR DESIGNATION AND AWARD*
22 *OF STRATEGY IMPLEMENTATION GRANTS AND COOPERA-*
23 *TIVE AGREEMENTS.*—*In selecting an eligible consortium*
24 *that submitted an application under subsection (g) for des-*
25 *ignation under subsection (d) or for a grant or cooperative*

1 *agreement under subsection (f), the Secretary shall consider*
2 *the following:*

3 “(1) *The potential of the eligible consortium to*
4 *advance the research, development, deployment, and*
5 *domestic manufacturing of technologies in a key tech-*
6 *nology focus area, as described in section 10387 of the*
7 *Research and Development, Competition, and Innova-*
8 *tion Act or other technology or innovation sector crit-*
9 *ical to national security and economic competitive-*
10 *ness.*

11 “(2) *The likelihood of positive regional economic*
12 *effect, including increasing the number of high wage*
13 *domestic jobs, creating new economic opportunities*
14 *for economically disadvantaged and underrepresented*
15 *populations, and building and retaining wealth in*
16 *the region.*

17 “(3) *How the eligible consortium plans to inte-*
18 *grate with and leverage the resources of 1 or more fed-*
19 *erally funded research and development centers, Na-*
20 *tional Laboratories, Federal laboratories, Manufac-*
21 *turing USA institutes, Hollings Manufacturing Ex-*
22 *tension Partnership centers, regional innovation en-*
23 *gines or translation accelerators established under sec-*
24 *tions 10388 and 10389 of the Research and Develop-*
25 *ment, Competition, and Innovation Act, test beds es-*

1 *tablished and operated under section 10390 of such*
2 *Act, or other Federal entities.*

3 *“(4) How the eligible consortium will engage*
4 *with the private sector, including small- and me-*
5 *dium-sized businesses and cooperatives, and employee-*
6 *owned businesses and cooperatives, to commercialize*
7 *new technologies and improve the resiliency and sus-*
8 *tainability of domestic supply chains in a key tech-*
9 *nology focus area, or other technology or innovation*
10 *sector critical to national security and economic com-*
11 *petitiveness.*

12 *“(5) How the eligible consortium will carry out*
13 *workforce development and skills acquisition pro-*
14 *gramming, including through partnerships with enti-*
15 *ties that include State and local workforce develop-*
16 *ment boards, institutions of higher education, includ-*
17 *ing community colleges, historically Black colleges*
18 *and universities, Tribal Colleges or Universities, and*
19 *minority-serving institutions, labor organizations,*
20 *nonprofit organizations, workforce development pro-*
21 *grams, and other related activities authorized by the*
22 *Secretary, to support the development of a skilled*
23 *technical workforce for the regional technology and*
24 *innovation hub, including key technology focus area*

1 *or other technology or innovation sector critical to na-*
2 *tional security and economic competitiveness.*

3 *“(6) How the eligible consortium will improve or*
4 *expand science, technology, engineering, and mathe-*
5 *matics education programs and opportunities in the*
6 *identified region in elementary and secondary school*
7 *and higher education institutions located in the iden-*
8 *tified region to support the development of a key tech-*
9 *nology focus area or other technology or innovation*
10 *sector critical to national security and economic com-*
11 *petitiveness.*

12 *“(7) How the eligible consortium plans to de-*
13 *velop partnerships with venture development organi-*
14 *zations, community development financial institu-*
15 *tions and minority depository institutions, and*
16 *sources of private investment in support of private*
17 *sector activity, including launching new or expanding*
18 *existing companies in a key technology focus area or*
19 *other technology or innovation sector critical to na-*
20 *tional security and economic competitiveness.*

21 *“(8) How the eligible consortium plans to orga-*
22 *nize the activities of regional partners across sectors*
23 *in support of a regional technology and innovation*
24 *hub.*

1 “(9) *How the eligible consortium considers op-*
2 *portunities to support local and regional businesses*
3 *through procurement, including from minority-owned*
4 *and women-owned businesses.*

5 “(10) *How the eligible consortium will ensure*
6 *that growth in technology, innovation, and advanced*
7 *manufacturing sectors produces opportunity across*
8 *the identified region and for economically disadvan-*
9 *taged, minority, underrepresented and rural popu-*
10 *lations, including, as appropriate, consideration of*
11 *how the eligible consortium takes into account the rel-*
12 *evant impact of existing regional status and plans or*
13 *may affect regional goals for affordable housing avail-*
14 *ability, local and regional transportation, high-speed*
15 *internet access, and primary and secondary edu-*
16 *cation.*

17 “(11) *How well the region’s education institu-*
18 *tions align their activities, including research, edu-*
19 *cational programs, training, with the proposed areas*
20 *of focus.*

21 “(12) *The likelihood efforts served by the consor-*
22 *tium will be sustained once Federal support ends.*

23 “(13) *How the eligible consortium will, as ap-*
24 *propriate—*

1 “(A) enhance the economic, environmental,
2 and energy security of the United States by pro-
3 moting domestic development, manufacture, and
4 deployment of innovative clean technologies and
5 advanced manufacturing practices; and

6 “(B) support translational research, tech-
7 nology development, manufacturing innovation,
8 and commercialization activities relating to
9 clean technology.

10 “(i) COORDINATION AND COLLABORATION.—

11 “(1) COORDINATION WITH REGIONAL INNOVATION
12 PROGRAM.—The Secretary shall ensure the activities
13 under this section do not duplicate activities or efforts
14 under section 27.

15 “(2) COORDINATION AMONG HUBS.—The Sec-
16 retary shall ensure eligible consortia that receive a
17 grant or cooperative agreement under this section co-
18 ordinate and share best practices for regional eco-
19 nomic development.

20 “(3) COORDINATION WITH PROGRAMS OF THE
21 NATIONAL INSTITUTE OF STANDARDS AND TECH-
22 NOLOGY.—The Secretary shall coordinate the activi-
23 ties of regional technology and innovation hubs des-
24 ignated under this section, the Hollings Manufac-
25 turing Extension Partnership, and the Manufacturing

1 *USA Program, as the Secretary considers appro-*
2 *prate, to maintain the effectiveness of a manufac-*
3 *turing extension center or a Manufacturing USA in-*
4 *stitute.*

5 *“(4) COORDINATION WITH DEPARTMENT OF EN-*
6 *ERGY PROGRAMS.—The Secretary shall, in collabora-*
7 *tion with the Secretary of Energy, coordinate the ac-*
8 *tivities and selection of regional technology and inno-*
9 *vation hubs designated under this section, as the Sec-*
10 *retaries consider appropriate, to maintain the effec-*
11 *tiveness of activities at the Department of Energy and*
12 *the National Laboratories.*

13 *“(5) INTERAGENCY COLLABORATION.—In desig-*
14 *nating regional technology and innovation hubs*
15 *under subsection (d) and awarding grants or coopera-*
16 *tive agreements under subsection (f), the Secretary—*

17 *“(A) shall collaborate with Federal depart-*
18 *ments and agencies whose missions contribute to*
19 *the goals of the regional technology and innova-*
20 *tion hub;*

21 *“(B) shall consult with the Director of the*
22 *National Science Foundation for the purpose of*
23 *ensuring that the regional technology and inno-*
24 *vation hubs are aligned with relevant science,*
25 *technology, and engineering expertise; and*

1 “(C) may accept funds from other Federal
2 agencies to support grants, cooperative agree-
3 ments, and activities under this section.

4 “(j) *PERFORMANCE MEASUREMENT, TRANSPARENCY,*
5 *AND ACCOUNTABILITY.*—

6 “(1) *METRICS, STANDARDS, AND ASSESSMENT.*—
7 *For each grant and cooperative agreement awarded*
8 *under subsection (f) for a regional technology and in-*
9 *novation hub, the Secretary shall—*

10 “(A) *in consultation with the regional tech-*
11 *nology and innovation hub, develop metrics,*
12 *which may include metrics relating to domestic*
13 *job creation, patent awards, increases in research*
14 *funding, business formation and expansion, and*
15 *participation of individuals or communities his-*
16 *torically underrepresented in STEM, to assess*
17 *the effectiveness of the activities funded in mak-*
18 *ing progress toward the purposes set forth under*
19 *subsection (b)(1);*

20 “(B) *establish standards for the perform-*
21 *ance of the regional technology and innovation*
22 *hub that are based on the metrics developed*
23 *under subparagraph (A); and*

24 “(C) *prior to any award made under a sub-*
25 *sequent performance period in subsection (f) and*

1 *every 2 years thereafter until Federal financial*
2 *assistance under this section for the regional*
3 *technology and innovation hub is discontinued,*
4 *conduct an assessment of the regional technology*
5 *and innovation hub to confirm whether the per-*
6 *formance of the regional technology and innova-*
7 *tion hub is meeting the standards for perform-*
8 *ance established under subparagraph (B) of this*
9 *paragraph.*

10 “(2) *FINAL REPORTS BY RECIPIENTS OF STRAT-*
11 *EGY IMPLEMENTATION GRANTS AND COOPERATIVE*
12 *AGREEMENTS.—*

13 “(A) *IN GENERAL.—The Secretary shall re-*
14 *quire each eligible consortium that receives a*
15 *grant or cooperative agreement under subsection*
16 *(f) for activities of a regional technology and in-*
17 *novation hub, as a condition of receipt of such*
18 *grant or cooperative agreement, to submit to the*
19 *Secretary, not later than 120 days after the last*
20 *day of the term of the grant or cooperative agree-*
21 *ment, a report on the activities of the regional*
22 *technology and innovation hub supported by the*
23 *grant or cooperative agreement.*

1 “(B) *CONTENTS OF REPORT.*—*Each report*
2 *submitted by an eligible consortium under sub-*
3 *paragraph (A) shall include the following:*

4 “(i) *A detailed description of the ac-*
5 *tivities carried out by the regional tech-*
6 *nology and innovation hub using the grant*
7 *or cooperative agreement described in sub-*
8 *paragraph (A), including the following:*

9 “(I) *A description of each project*
10 *the regional technology and innovation*
11 *hub completed using such grant or co-*
12 *operative agreement.*

13 “(II) *An explanation of how each*
14 *project described in subclause (I)*
15 *achieves a specific goal under this sec-*
16 *tion in the region of the regional tech-*
17 *nology and innovation hub with re-*
18 *spect to—*

19 “(aa) *the resiliency and sus-*
20 *tainability of a supply chain;*

21 “(bb) *research, development,*
22 *and deployment of a critical tech-*
23 *nology;*

24 “(cc) *workforce training and*
25 *development;*

- 1 “(dd) domestic job creation;
- 2 “(ee) entrepreneurship and
- 3 company formation;
- 4 “(ff) commercialization;
- 5 “(gg) access to private cap-
- 6 ital; or
- 7 “(hh) participation of indi-
- 8 viduals or communities histori-
- 9 cally underrepresented in STEM.
- 10 “(ii) A discussion of any obstacles en-
- 11 countered by the regional technology and in-
- 12 novation hub in the implementation of the
- 13 regional technology and innovation hub and
- 14 how the regional technology and innovation
- 15 hub overcame those obstacles.
- 16 “(iii) An evaluation of the success of
- 17 the projects of the regional technology and
- 18 innovation hub using the performance
- 19 standards and measures established under
- 20 paragraph (1), including an evaluation of
- 21 the planning process and how the project
- 22 contributes to carrying out the regional in-
- 23 novation strategy of the regional technology
- 24 and innovation hub.

1 “(iv) *The effectiveness of the regional*
2 *technology and innovation hub in ensuring*
3 *that, in the region of the regional technology*
4 *and innovation hub, growth in technology*
5 *and innovation sectors produces broadly*
6 *shared opportunity across the region, in-*
7 *cluding for economic disadvantaged and*
8 *underrepresented populations and rural*
9 *areas.*

10 “(v) *Information regarding such other*
11 *matters as the Secretary may require.*

12 “(3) *INTERIM REPORTS BY RECIPIENTS OF*
13 *GRANTS AND COOPERATIVE AGREEMENTS.—In addi-*
14 *tion to requiring submittal of final reports under*
15 *paragraph (2)(A), the Secretary may require a re-*
16 *gional technology and innovation hub described in*
17 *such paragraph to submit to the Secretary such in-*
18 *terim reports as the Secretary considers appropriate.*

19 “(4) *ANNUAL REPORTS TO CONGRESS.—Not less*
20 *frequently than once each year, the Secretary shall*
21 *submit to the appropriate committees of Congress an*
22 *annual report on the results of the assessments con-*
23 *ducted by the Secretary under paragraph (1)(C) dur-*
24 *ing the period covered by the report.*

1 “(k) *AUTHORIZATION OF APPROPRIATIONS.*—*There is*
2 *authorized to be appropriated to the Secretary—*

3 “(1) *\$50,000,000 to award grants and coopera-*
4 *tive agreements under subsection (e) for the period of*
5 *fiscal years 2023 through 2027;*

6 “(2) *\$2,950,000,000 to award grants and coopera-*
7 *tive agreements under subsection (f) for the period of*
8 *fiscal years 2023 and 2024; and*

9 “(3) *\$7,000,000,000 to award grants and coopera-*
10 *tive agreements under subsection (f) for the period of*
11 *fiscal years 2025 through 2027.*

12 “(l) *ADMINISTRATION.*—*The Secretary may use funds*
13 *made available to carry out this section for administrative*
14 *costs under this section.*

15 **“SEC. 29. DISTRESSED AREA RECOMPETE PILOT PROGRAM.**

16 “(a) *IN GENERAL.*—*Within the program authorized*
17 *under section 28, the Secretary is authorized to establish*
18 *a pilot program, to be known as the ‘Recompete Pilot Pro-*
19 *gram’, to provide grants to eligible recipients representing*
20 *eligible areas or Tribal lands to alleviate persistent eco-*
21 *nomie distress and support long-term comprehensive eco-*
22 *nomie development and job creation in eligible areas.*

23 “(b) *STRATEGY DEVELOPMENT GRANTS AND COOPER-*
24 *ATIVE AGREEMENTS.*—*Subject to available appropriations,*
25 *the Secretary is authorized, on the application of an eligible*

1 recipient, to award up to one half of the number of grants
2 under subsection (e) of section 28 to eligible recipients to
3 develop a recompetete plan and carry out related
4 predevelopment activities.

5 “(c) *STRATEGY IMPLEMENTATION GRANTS AND COOP-*
6 *ERATIVE AGREEMENTS.*—Subject to available appropri-
7 tions and subsection (f) , the Secretary shall award, on the
8 application of an eligible recipient, at least ten strategy im-
9 plementation grants, in accordance with a recompetete plan
10 review and approved by the Secretary, to carry out coordi-
11 nated and comprehensive economic development programs
12 and activities in an eligible area, consistent with a recom-
13 petete plan approved by the Secretary. Such activities may
14 include—

15 “(1) workforce development activities of the kind
16 described in section 28(f) or other job training and
17 workforce outreach programs oriented to local em-
18 ployer needs, such as—

19 “(A) customized job training programs car-
20 ried out by local community colleges and other
21 training or educational organizations in part-
22 nership with local businesses;

23 “(B) workforce outreach programs located
24 in, and targeted to, lower-income and under-
25 employed neighborhoods; and

1 “(C) programs to embed job placement and
2 training services in neighborhood institutions
3 such as churches, housing projects, and commu-
4 nity advocacy programs; and

5 “(D) job retention programs and activities,
6 such as the provision of career coaches;

7 “(2) business and entrepreneur development ac-
8 tivities of the kind described in section 28(f), tech-
9 nology development and maturation activities of the
10 kind described in such section, or the provision of
11 business advice and assistance to small and medium-
12 sized local businesses and entrepreneurs. Such advice
13 and assistance may include—

14 “(A) manufacturing extension services;

15 “(B) small business development centers;

16 “(C) centers to help businesses bid for Fed-
17 eral procurement contracts;

18 “(D) entrepreneurial assistance programs
19 that link entrepreneurs with available public
20 and private resources;

21 “(E) legal advice and resources; and

22 “(F) assistance in accessing capital;

23 “(3) infrastructure related activities of the kind
24 described in section 28(f) or other land and site devel-
25 opment programs, such as brownfield redevelopment,

1 *research and technology parks, business incubators,*
2 *business corridor development, and other infrastruc-*
3 *ture activities related to supporting job creation and*
4 *employment for residents, subject to the requirements*
5 *of section 28(f)(6); and*

6 *“(4) additional planning, predevelopment, tech-*
7 *nical assistance, and other administrative activities*
8 *as may be necessary for the ongoing implementation,*
9 *administration, and operation of the programs and*
10 *activities carried out with a grant or cooperative*
11 *agreement under this section, including but not lim-*
12 *ited to economic development planning and evalua-*
13 *tion.*

14 “(d) *TERM.*—

15 “(1) *INITIAL PERFORMANCE PERIOD.*—*The term*
16 *of an initial grant or cooperative agreement awarded*
17 *under subsection (c) shall be for a period that the Sec-*
18 *retary deems appropriate for the proposed activities*
19 *but not less than 2 years.*

20 “(2) *SUBSEQUENT PERFORMANCE PERIOD.*—*The*
21 *Secretary may renew a grant or cooperative agree-*
22 *ment awarded under subsection (c) for such period,*
23 *such amount, and such terms as the Secretary con-*
24 *siders appropriate, if the Secretary determines that*
25 *the recipient of an award under subsection (c) has*

1 *made satisfactory progress towards metrics or*
2 *benchmarking requirements established by the Sec-*
3 *retary at time of award.*

4 “(3) *FLEXIBLE APPROACH.*—*In renewing a*
5 *grant or cooperative agreement under subsection (c),*
6 *the Secretary may approve new or additional uses of*
7 *funds, consistent with the uses described in subsection*
8 *(c), to meet changes in the needs of the region.*

9 “(e) *LIMITATIONS.*—

10 “(1) *LIMITATION ON ELIGIBLE AREAS.*—*An eligi-*
11 *ble area may not benefit from more than 1 grant or*
12 *cooperative agreement described in subsection (b) and*
13 *1 grant or cooperative agreement described in sub-*
14 *section (c), provided that a renewal described in sub-*
15 *section (d)(2) shall not constitute an additional*
16 *grant.*

17 “(2) *LIMITATION ON RECIPIENTS.*—*For purposes*
18 *of the program under this section, an eligible recipi-*
19 *ent may not receive multiple grants described in sub-*
20 *section (c) on behalf of more than 1 eligible area.*

21 “(f) *AWARD AMOUNT.*—

22 “(1) *IN GENERAL.*—*In determining the amount*
23 *of a grant that an eligible recipient may be awarded*
24 *under subsection (c), the Secretary shall—*

1 “(A) take into consideration the proposed
2 activities and projected expenditures outlined in
3 an approved recompetete plan; and

4 “(B) award not more than the product ob-
5 tained by multiplying—

6 “(i) the prime-age employment gap of
7 the eligible area;

8 “(ii) the prime-age population of the
9 eligible area; and

10 “(iii) either—

11 “(I) \$70,585 for local labor mar-
12 kets; or

13 “(II) \$53,600 for local commu-
14 nities.

15 “(2) MINIMUM AMOUNT.—The Secretary may not
16 make an award that is less than \$20,000,000 to an
17 eligible recipient.

18 “(g) APPLICATIONS.—To be considered for a grant or
19 cooperative agreement under—

20 “(1) subsection (b) of this section, an eligible re-
21 cipient shall submit to the Secretary an application
22 at such time, in such manner, and containing such
23 information as the Secretary determines to be appro-
24 priate; and

1 “(2) subsection (c) of this section, an eligible re-
2 recipient shall submit to the Secretary an application
3 at such time, in such manner, and containing such
4 information as the Secretary determines to be appro-
5 priate, including a recompete plan approved by the
6 Secretary.

7 “(h) *RELATION TO CERTAIN GRANT AWARDS.*—The
8 Secretary shall not require an eligible recipient to receive
9 a grant or cooperative agreement under subsection (b) in
10 order to receive a grant or cooperative agreement under sub-
11 section (c).

12 “(i) *AUTHORIZATION OF APPROPRIATIONS.*—There is
13 authorized to be appropriated to the Secretary
14 \$1,000,000,000 to award grants and cooperative agreements
15 under subsection (c) of this section, for the period of fiscal
16 years 2022 through 2026.

17 “(j) *DEFINITIONS.*—In this section:

18 “(1) *ELIGIBLE AREA.*—The term ‘eligible area’
19 means either of the following:

20 “(A) A local labor market that—

21 “(i) has a prime-age employment gap
22 equal to not less than 2.5 percent; and

23 “(ii) meets additional criteria as the
24 Secretary may establish.

25 “(B) A local community that—

1 “(i) has a prime-age employment gap
2 equal to not less than 5 percent;

3 “(ii) is not located within an eligible
4 local labor market that meets the criteria
5 described in subparagraph (A);

6 “(iii) has a median annual household
7 income of not more than \$75,000; and

8 “(iv) meets additional criteria as the
9 Secretary may establish.

10 “(2) *ELIGIBLE RECIPIENT.*—The term ‘eligible
11 recipient’ means a specified entity that has been au-
12 thorized in a manner as determined by the Secretary
13 to represent and act on behalf of an eligible area for
14 the purposes of this section.

15 “(3) *LOCAL LABOR MARKET.*—The term ‘local
16 labor market’ means any of the following areas that
17 contains 1 or more specified entities described in sub-
18 paragraphs (A) through (D) of paragraph (6):

19 “(A) A metropolitan statistical area or
20 micropolitan statistical area, excluding any area
21 described in subparagraph (C).

22 “(B) A commuting zone, excluding any
23 areas described in subparagraphs (A) and (C).

1 “(C) *The Tribal land with a Tribal prime-*
2 *age population represented by a Tribal govern-*
3 *ment.*

4 “(4) *LOCAL COMMUNITY.*—*The term ‘local com-*
5 *munity’ means the area served by a general-purpose*
6 *unit of local government that is located within, but*
7 *does not cover the entire area of, a local labor market*
8 *that does not meet the criteria described in paragraph*
9 *(1)(A).*

10 “(5) *PRIME-AGE EMPLOYMENT GAP.*—

11 “(A) *IN GENERAL.*—*The term ‘prime-age*
12 *employment gap’ means the difference (expressed*
13 *as a percentage) between—*

14 “(i) *the national 5-year average prime-*
15 *age employment rate; and*

16 “(ii) *the 5-year average prime-age em-*
17 *ployment rate of the eligible area.*

18 “(B) *CALCULATION.*—*For the purposes of*
19 *subparagraph (A), an individual is prime-age if*
20 *such individual between the ages of 25 years and*
21 *54 years.*

22 “(6) *RECOMPETE PLAN.*—*The term ‘recompete*
23 *plan’ means a comprehensive multiyear economic de-*
24 *velopment plan that—*

25 “(A) *includes—*

1 “(i) proposed programs and activities
2 to be carried out with a grant awarded
3 under subsection (c) to address the economic
4 challenges of the eligible area in a com-
5 prehensive manner that promotes long-term,
6 sustained economic growth, lasting job cre-
7 ation, per capita wage increases, and reduc-
8 tion in the prime-age employment gap of
9 the eligible area;

10 “(ii) projected costs and annual ex-
11 penditures and proposed disbursement
12 schedule;

13 “(iii) the roles and responsibilities of
14 specified entities that may receive grant
15 funds awarded under subsection (c); and

16 “(iv) other information as the Sec-
17 retary determines appropriate;

18 “(B) is submitted to the Secretary for ap-
19 proval for an eligible recipient to be considered
20 for a grant described in subsection (c); and

21 “(C) may be modified over the term of the
22 grant by the eligible recipient, subject to the ap-
23 proval of the Secretary or at the direction of the
24 Secretary, if the Secretary determines
25 benchmarking requirements are repeatedly not

1 *met or if other circumstances necessitate a modi-*
2 *fication.*

3 “(7) *SPECIFIED ENTITY.*—*The term ‘specified en-*
4 *tity’ means—*

5 “(A) *a unit of local government;*

6 “(B) *the District of Columbia;*

7 “(C) *a territory of the United States;*

8 “(D) *a Tribal government;*

9 “(E) *political subdivision of a State or*
10 *other entity, including a special-purpose entity*
11 *engaged in economic development activities;*

12 “(F) *a public entity or nonprofit organiza-*
13 *tion, acting in cooperation with the officials of*
14 *a political subdivision of a State or other entity*
15 *described in subparagraph (E);*

16 “(G) *an economic development district (as*
17 *defined in section 3 of the Public Works and*
18 *Economic Development Act of 1965 (42 U.S.C.*
19 *3122); and*

20 “(H) *a consortium of any of the specified*
21 *entities described in this paragraph which serve*
22 *or are contained within the same eligible area.*

23 “(8) *TRIBAL LAND.*—*The term ‘Tribal land’*
24 *means any land—*

1 “(A) located within the boundaries of an
2 Indian reservation, pueblo, or rancharia; or

3 “(B) not located within the boundaries of
4 an Indian reservation, pueblo, or rancharia, the
5 title to which is held—

6 “(i) in trust by the United States for
7 the benefit of an Indian Tribe or an indi-
8 vidual Indian;

9 “(ii) by an Indian Tribe or an indi-
10 vidual Indian, subject to restriction against
11 alienation under laws of the United States;
12 or

13 “(iii) by a dependent Indian commu-
14 nity.

15 “(9) TRIBAL PRIME-AGE POPULATION.—

16 “(A) IN GENERAL.—The term ‘Tribal
17 prime-age population’ shall be equal to the sum
18 obtained by adding—

19 “(i) the product obtained by multi-
20 plying—

21 “(I) the total number of individ-
22 uals ages 25 through 54 residing on the
23 Tribal land of the Tribal government;
24 and

25 “(II) 0.65; and

1 “(ii) the product obtained by multi-
2 plying—

3 “(I) the total number of individ-
4 uals ages 25 through 54 included on
5 the membership roll of the Tribal gov-
6 ernment; and

7 “(II) 0.35

8 “(B) *USE OF DATA.*—A calculation under
9 subparagraph (A) shall be determined based on
10 data provided by the applicable Tribal govern-
11 ment to the Department of the Treasury under
12 the Coronavirus State and Local Fiscal Recovery
13 Fund programs under title VI of the Social Se-
14 curity Act (42 U.S.C. 801 et seq.).”

15 (b) *INITIAL DESIGNATIONS AND AWARDS.*—

16 (1) *COMPETITION REQUIRED.*—Not later than 1
17 year after the date of the enactment of this Act, sub-
18 ject to the availability of appropriations, the Sec-
19 retary of Commerce shall commence a competition
20 under subsection (d)(1) of section 28 of the Stevenson-
21 Wylder Technology Innovation Act of 1980 (as added
22 by this section).

23 (2) *DESIGNATION AND AWARD.*—Not later than
24 18 months after the date of the enactment of this Act,
25 if the Secretary has received at least 1 application

1 *under subsection (g) of section 28 of the Stevenson-*
2 *Wydler Technology Innovation Act of 1980 (as added*
3 *by this section) from an eligible consortium which the*
4 *Secretary considers suitable for designation under*
5 *subsection (d)(1) of such section 28, the Secretary*
6 *shall—*

7 *(A) designate at least 1 regional technology*
8 *and innovation hub under subsection (d)(1) of*
9 *such section 28; and*

10 *(B) award a grant or cooperative agreement*
11 *under subsection (f)(1) of such section 28 to each*
12 *regional technology and innovation hub des-*
13 *ignated pursuant to subparagraph (A) of this*
14 *paragraph.*

15 *(c) DISTRESSED AREA DESIGNATION AND AWARD.—*
16 *Not later than 18 months after the date of the enactment*
17 *of this section, subject to the availability of appropriations,*
18 *if the Secretary has received applications under section 29*
19 *of the Stevenson-Wydler Technology Innovation Act of 1980*
20 *(as added by this section) from an eligible recipient which*
21 *the Secretary considers suitable for award under such sec-*
22 *tion 29, the Secretary shall award grants or cooperative*
23 *agreement under subsections (b) and (c) of such section 29*
24 *to one or more eligible recipients.*

1 **SEC. 10622. REGIONAL CLEAN ENERGY INNOVATION PRO-**
2 **GRAM.**

3 *Subtitle C of title IX of the Energy Independence and*
4 *Security Act of 2007 is amended by adding at the end the*
5 *following:*

6 **“SEC. 936. REGIONAL CLEAN ENERGY INNOVATION PRO-**
7 **GRAM.**

8 *“(a) DEFINITIONS.—In this section:*

9 *“(1) REGIONAL CLEAN ENERGY INNOVATION*
10 *PARTNERSHIP.—The term ‘regional clean energy in-*
11 *novation partnership’ means a group of one or more*
12 *persons, including a covered consortium, who perform*
13 *a collection of activities that are coordinated by such*
14 *covered consortium to carry out the purposes of the*
15 *program under subsection (c) in a region of the*
16 *United States.*

17 *“(2) COVERED CONSORTIUM.—The term ‘covered*
18 *consortium’ means an individual or group of individ-*
19 *uals in partnership with a government entity, includ-*
20 *ing a State, territorial, local, or tribal government or*
21 *unit of such government, and at least 2 or more of*
22 *the following additional entities—*

23 *“(A) an institution of higher education or a*
24 *consortium of institutions of higher education,*
25 *including community colleges;*

26 *“(B) a workforce development program;*

- 1 “(C) a private sector entity or group of en-
2 tities, including a trade or industry association;
- 3 “(D) a nonprofit organization;
- 4 “(E) a community group or community-
5 based organization;
- 6 “(F) a labor organization or joint labor-
7 management organization;
- 8 “(G) a National Laboratory;
- 9 “(H) a venture development organization;
- 10 “(I) a community development financial in-
11 stitution or minority depository institution;
- 12 “(J) a worker cooperative membership asso-
13 ciation or state or local employee ownership or
14 cooperative development center;
- 15 “(K) an organization focused on clean en-
16 ergy technology innovation or entrepreneurship;
- 17 “(L) a business or clean energy accelerator
18 or incubator;
- 19 “(M) an economic development organiza-
20 tion;
- 21 “(N) a manufacturing facility or organiza-
22 tion;
- 23 “(O) a multi-institutional collaboration; or
- 24 “(P) any other entity that the Secretary de-
25 termines to be relevant.

1 “(3) *PROGRAM*.—The term ‘program’ means the
2 *Regional Clean Energy Innovation Program* author-
3 ized in subsection (b).

4 “(4) *INSTITUTION OF HIGHER EDUCATION*.—The
5 term ‘institution of higher education’ has the meaning
6 given such term in section 101 or 102(a)(1)(B) of the
7 *Higher Education Act of 1965*, as amended (20
8 U.S.C. 1001, 1002(a)(1)(B)).

9 “(5) *NATIONAL LABORATORY*.—The term ‘Na-
10 tional Laboratory’ has the meaning given that term
11 in section 2 of the *Energy Policy Act of 2005* (42 2
12 U.S.C. 15801).

13 “(6) *CLEAN ENERGY TECHNOLOGY*.—The term
14 ‘clean energy technology’ means a technology that sig-
15 nificantly reduces energy use, increases energy effi-
16 ciency, reduces greenhouse gas emissions, reduces
17 emissions of other pollutants, or mitigates other nega-
18 tive environmental consequences of energy production,
19 transmission or use.

20 “(7) *COMMUNITY-BASED ORGANIZATION*.—The
21 term ‘community-based organization’ has the mean-
22 ing given the term in section 3 of the *Workforce Inno-
23 vation and Opportunity Act* (29 U.S.C. 3102).

24 “(8) *COMMUNITY COLLEGE*.—The term ‘commu-
25 nity college’ means—

1 “(A) a public institution of higher edu-
2 cation, including additional locations, at which
3 the highest degree, or the predominantly awarded
4 degree, is an associate degree; or

5 “(B) any Tribal college or university (as
6 defined in section 316 of the Higher Education
7 Act of 1965 (20 U.S.C. 1059c)).

8 “(9) *WORKFORCE DEVELOPMENT PROGRAM.*—
9 The term ‘workforce development program’ has the
10 meaning given the term in section 3 of the Workforce
11 Innovation and Opportunity Act (29 U.S.C. 3102).

12 “(b) *IN GENERAL.*—The Secretary shall establish a Re-
13 gional Clean Energy Innovation Program, a research, de-
14 velopment, demonstration, and commercial application
15 program designed to enhance the economic, environmental,
16 and energy security of the United States and accelerate the
17 pace of innovation of diverse clean energy technologies
18 through the formation or support of regional clean energy
19 innovation partnerships.

20 “(c) *PURPOSES OF THE PROGRAM.*—The purposes of
21 the Program established under subsection (b) are to—

22 “(1) improve the competitiveness of United
23 States’ clean energy technology research, development,
24 demonstration, and commercial application; and

1 “(2) support the development of tools and tech-
2 nologies best suited for use in diverse regions of the
3 United States, including in rural, tribal, and low-in-
4 come communities.

5 “(d) *REGIONAL CLEAN ENERGY INNOVATION PART-*
6 *NERSHIPS.*—

7 “(1) *IN GENERAL.*—*The Secretary shall competi-*
8 *tively award grants to covered consortia to establish*
9 *or support regional clean energy innovation partner-*
10 *ships that achieve the purposes of the Program in sub-*
11 *section (c).*

12 “(2) *PERMISSIBLE ACTIVITIES.*—*Grants awarded*
13 *under this subsection shall be used for activities deter-*
14 *mined appropriate by the Secretary to achieve the*
15 *purposes of the Program in subsection (c), includ-*
16 *ing—*

17 “(A) *facilitating the commercial application*
18 *of clean energy products, processes, and services,*
19 *including through research, development, dem-*
20 *onstration, or technology transfer;*

21 “(B) *planning among participants of a re-*
22 *gional clean energy innovation partnership to*
23 *improve the strategic and cost-effective coordina-*
24 *tion of the partnership;*

1 “(C) *improving stakeholder involvement in*
2 *the development of goals and activities of a re-*
3 *gional clean energy innovation partnership;*

4 “(D) *assessing different incentive mecha-*
5 *nisms for clean energy development and commer-*
6 *cial application in the region;*

7 “(E) *hosting events and conferences; and*

8 “(F) *establishing and updating roadmaps*
9 *to measure progress on relevant goals, such as*
10 *those relevant to metrics developed under sub-*
11 *section (g).*

12 “(3) *APPLICATIONS.—Each application sub-*
13 *mitted to the Secretary under paragraph (1) may in-*
14 *clude—*

15 “(A) *a list of members and roles of members*
16 *of the covered consortia, as well as any other*
17 *stakeholders supporting the activities of the re-*
18 *gional clean energy innovation partnership;*

19 “(B) *an assessment of the relevant clean en-*
20 *ergy innovation assets needed in a region to*
21 *achieve proposed outcomes, such as education*
22 *and workforce development programs, research*
23 *facilities, infrastructure or site development, ac-*
24 *cess to capital, manufacturing capabilities, or*
25 *other assets;*

1 “(C) a description of proposed activities
2 that the regional clean energy innovation part-
3 nership plans to undertake and how the proposed
4 activities will achieve the purposes described in
5 subsection (c);

6 “(D) a plan for attracting additional funds
7 and identification of funding sources from non-
8 Federal sources to deliver the proposed outcomes
9 of the regional clean energy innovation partner-
10 ship;

11 “(E) a plan for partnering and collabo-
12 rating with community development financial
13 institutions and minority depository institu-
14 tions, labor organizations and community
15 groups, worker cooperative membership associa-
16 tions, local and state employee ownership and
17 cooperative development centers, and other local
18 institutions in order to promote employee, com-
19 munity, and public ownership in the clean en-
20 ergy sector, and advance models of local eco-
21 nomic development that build and retain wealth
22 in the region;

23 “(F) a plan for sustaining activities of the
24 regional clean energy innovation partnership

1 *after funds received under this program have*
2 *been expended; and*

3 “(G) *a proposed budget, including financial*
4 *contributions from non-Federal sources.*

5 “(4) *CONSIDERATIONS.—In selecting covered*
6 *consortia for funding under the Program, the Sec-*
7 *retary shall, to the maximum extent practicable—*

8 “(A) *give special consideration to applica-*
9 *tions from rural, tribal, and low-income commu-*
10 *nities; and*

11 “(B) *ensure that there is geographic diver-*
12 *sity among the covered consortia selected to re-*
13 *ceive funding.*

14 “(5) *AWARD AMOUNT.—Grants given out under*
15 *this Program shall be in an amount not greater than*
16 *\$10,000,000, with the total grant award in any year*
17 *less than that in the previous year.*

18 “(6) *COST SHARE.—For grants that are dis-*
19 *bursed over the course of three or more years, the Sec-*
20 *retary shall require, as a condition of receipt of funds*
21 *under this section, that a covered consortium provide*
22 *not less than 50 percent of the funding for the activi-*
23 *ties of the regional clean energy partnership under*
24 *this section for years 3, 4, and 5.*

1 “(7) *DURATION.*—*Each grant under paragraph*
2 *shall be for a period of not longer than 5 years.*

3 “(8) *RENEWAL.*—*A grant awarded under this*
4 *section may be renewed for a period of not more than*
5 *5 years, subject to a rigorous merit review based on*
6 *the progress of a regional clean energy innovation*
7 *partnership towards achieving the purposes of the*
8 *program in subsection (c) and the metrics developed*
9 *under subsection (g).*

10 “(9) *TERMINATION.*—*Consistent with the exist-*
11 *ing authorities of the Department, the Secretary may*
12 *terminate grant funding under this subsection to cov-*
13 *ered consortia during the performance period if the*
14 *Secretary determines that the regional clean energy*
15 *innovation partnership is underperforming.*

16 “(10) *ADMINISTRATIVE COSTS.*—*The Secretary*
17 *may allow a covered consortium that receives funds*
18 *under this section to allocate a portion of the funding*
19 *received to be used for administrative or indirect*
20 *costs.*

21 “(11) *FUNDING.*—*The Secretary may accept*
22 *funds from other Federal agencies to support funding*
23 *and activities under this section.*

24 “(e) *PLANNING FUNDS.*—*The Secretary may competi-*
25 *tively award grants in an amount no greater than*

1 \$2,000,000 for a period not longer than 2 years to an entity
2 consisting of a government entity, including a State, terri-
3 torial, local, or tribal government or unit of such govern-
4 ment or any entity listed under subsection (a)(2) to plan
5 a regional clean energy innovation partnership or establish
6 a covered consortium for the purpose of applying for funds
7 under subsection (b).

8 “(f) *INFORMATION SHARING.*—As part of the program,
9 the Secretary shall support the gathering, analysis, and dis-
10 semination of information on best practices for developing
11 and operating successful regional clean energy innovation
12 partnerships.

13 “(g) *METRICS.*—In evaluating a grant renewal under
14 subsection (d)(8), the Secretary shall work with program
15 evaluation experts to develop and make publicly available
16 metrics to assess the progress of a regional clean energy in-
17 novation partnership towards achieving the purposes of the
18 program in subsection (c).

19 “(h) *COORDINATION.*—In carrying out the program,
20 the Secretary shall coordinate with, and avoid unnecessary
21 duplication of, the activities carried out under this section
22 with the activities of other research entities of the Depart-
23 ment or relevant programs at other Federal agencies.

24 “(i) *CONFLICTS OF INTEREST.*—In carrying out the
25 program, the Secretary shall maintain conflict of interest

1 *procedures, consistent with the conflict of interest proce-*
2 *dures of the Department.*

3 “(j) *EVALUATION BY COMPTROLLER GENERAL.*—Not
4 *later than 3 years after the date of the enactment of the*
5 *Research and Development, Competition, and Innovation*
6 *Act, and again 3 years later, the Comptroller General shall*
7 *submit to the Committee on Science, Space, and Technology*
8 *of the House of Representatives and the Committee on En-*
9 *ergy and Natural Resources of the Senate an evaluation on*
10 *the operation of the program during the most recent 3-year*
11 *period, including—*

12 “(1) *an assessment of the progress made towards*
13 *achieving the purposes specified in subsection (c)*
14 *based on the metrics developed under subsection (g);*

15 “(2) *the short-term and long-term metrics used*
16 *to determine the success of the program under sub-*
17 *section (g), and any changes recommended to the*
18 *metrics used;*

19 “(3) *the regional clean energy innovation part-*
20 *nerships established or supported by covered consortia*
21 *that have received grants under subsection (d); and*

22 “(4) *any recommendations on how the program*
23 *may be improved.*

24 “(k) *NATIONAL LABORATORIES.*—*In supporting tech-*
25 *nology transfer activities at the National Laboratories, the*

1 *Secretary shall encourage partnerships with entities that*
2 *are located in the same region or State as the National Lab-*
3 *oratory.*

4 “(l) *SECURITY.—In carrying out the activities under*
5 *this section, the Secretary shall ensure proper security con-*
6 *trols are in place to protect sensitive information, as appro-*
7 *priate.*

8 “(m) *NO FUNDS FOR CONSTRUCTION.—No funds pro-*
9 *vided to the Department of Energy under this section shall*
10 *be used for construction.*

11 “(n) *AUTHORIZATION OF APPROPRIATIONS.—There*
12 *are authorized to be appropriated to the Secretary to carry*
13 *out this section \$50,000,000 for each of fiscal years 2023*
14 *through 2027.”.*

15 ***Subtitle D—Research Security***

16 ***SEC. 10631. REQUIREMENTS FOR FOREIGN TALENT RE-*** 17 ***CRUITMENT PROGRAMS.***

18 (a) *PURPOSE.—The purpose of this subtitle is to direct*
19 *actions to prohibit participation in any foreign talent re-*
20 *cruitment program by personnel of Federal research agen-*
21 *cies and to prohibit participation in a malign foreign tal-*
22 *ent recruitment program by covered individuals involved*
23 *with research and development awards from those agencies.*

24 (b) *GUIDANCE.—Not later than 180 days after the date*
25 *of the enactment of this Act, the Director of the Office of*

1 *Science and Technology Policy, in coordination with the*
2 *interagency working group established under section 1746*
3 *of the National Defense Authorization Act for Fiscal Year*
4 *2020 (42 U.S.C. 6601 note; Public Law 116–92), shall pub-*
5 *lish and widely distribute a uniform set of guidelines for*
6 *Federal research agencies regarding foreign talent recruit-*
7 *ment programs. Such policy guidelines shall—*

8 (1) *prohibit all personnel of each Federal re-*
9 *search agency, including Federal employees, contract*
10 *employees, independent contractors, individuals serv-*
11 *ing under the Intergovernmental Personnel Act of*
12 *1970 (42 U.S.C. 4701 et seq), Visiting Scientist, En-*
13 *gineering, and Educator appointments, and special*
14 *government employees other than peer reviewers, from*
15 *participating in a foreign talent recruitment pro-*
16 *gram;*

17 (2) *as part of the requirements under section 223*
18 *of the William (Mac) Thornberry NDAA of Fiscal*
19 *Year 2021 (10 U.S.C. 6605; Public Law 116–283), re-*
20 *quire covered individuals to disclose if such individ-*
21 *uals are a party to a foreign talent recruitment pro-*
22 *gram contract, agreement, or other arrangement;*

23 (3) *prohibit research and development awards*
24 *from being made for any proposal in which a covered*

1 *individual is participating in a malign foreign talent*
2 *recruitment program; and*

3 *(4) to the extent practicable, require recipient in-*
4 *stitutions to prohibit covered individuals partici-*
5 *pating in malign foreign talent recruitment programs*
6 *from working on projects supported by research and*
7 *development awards.*

8 *(c) DEFINITION OF FOREIGN TALENT RECRUITMENT*
9 *PROGRAMS.—As part of the guidance under subsection (b),*
10 *the Director of the Office of Science and Technology Policy*
11 *shall define and describe the characteristics of a foreign tal-*
12 *ent recruitment program.*

13 *(d) IMPLEMENTATION.—Not later than one year after*
14 *the date of the enactment of this Act, each Federal research*
15 *agency shall issue a policy utilizing the guidelines under*
16 *subsection (b).*

17 *(e) CONSISTENCY.—The Director of the Office of*
18 *Science and Technology Policy shall ensure that the policies*
19 *issued by the Federal research agencies under subsection (d)*
20 *are consistent to the greatest extent practicable.*

21 **SEC. 10632. MALIGN FOREIGN TALENT RECRUITMENT PRO-**
22 **GRAM PROHIBITION.**

23 *(a) IN GENERAL.—Not later than 24 months after the*
24 *date of enactment of this Act, each Federal research agency*

1 *shall establish a policy that, as part of a proposal for a*
2 *research and development award from the agency—*

3 (1) *each covered individual listed in such pro-*
4 *posal certify that each such individual is not a party*
5 *to a malign foreign talent recruitment program in the*
6 *proposal submission of each such individual and an-*
7 *nually thereafter for the duration of the award; and*

8 (2) *each institution of higher education or other*
9 *organization applying for such an award certify that*
10 *each covered individual who is employed by such in-*
11 *stitution of higher education or other organization*
12 *has been made aware of the requirements under this*
13 *section and complied with the requirement under*
14 *paragraph (1).*

15 (b) *STAKEHOLDER INPUT.—In establishing a policy*
16 *under subsection (a), Federal research agencies shall publish*
17 *a description of the proposed policy in the Federal Register*
18 *and provide an opportunity for submission of public com-*
19 *ment for a period of not more than 60 days.*

20 (c) *COMPLIANCE WITH EXISTING LAW.—Each Federal*
21 *research agency and recipient shall comply with title VI*
22 *of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.)*
23 *in the establishment of policies pursuant to under sub-*
24 *section (a).*

1 (d) *INTERNATIONAL COLLABORATION.*—*Each policy*
2 *developed under subsection (a) shall not prohibit, unless*
3 *such activities are funded, organized, or managed by an*
4 *academic institution or a foreign talent recruitment pro-*
5 *gram on the lists developed under paragraphs (8) and (9)*
6 *of section 1286(c) of the John S. McCain National Defense*
7 *Authorization Act for Fiscal Year 2019 (10 U.S.C. 4001*
8 *note; Public Law 115–232)—*

9 (1) *making scholarly presentations and pub-*
10 *lishing written materials regarding scientific infor-*
11 *mation not otherwise controlled under current law;*

12 (2) *participation in international conferences or*
13 *other international exchanges, research projects or*
14 *programs that involve open and reciprocal exchange*
15 *of scientific information, and which are aimed at ad-*
16 *vancing international scientific understanding and*
17 *not otherwise controlled under current law;*

18 (3) *advising a foreign student enrolled at an in-*
19 *stitution of higher education or writing a rec-*
20 *ommendation for such a student, at such student’s re-*
21 *quest; and*

22 (4) *other international activities determined ap-*
23 *propriate by the Federal research agency head or des-*
24 *ignee.*

1 (e) *LIMITATION.*—*The certifications required under*
2 *subsection (a) shall not apply retroactively to research and*
3 *development awards made or applied for prior to the estab-*
4 *lishment of the policy by the Federal research agency.*

5 (f) *TRAINING.*—*Each Federal research agency shall en-*
6 *sure that, as a requirement of an award from each such*
7 *agency, recipient institutions provide training on the risks*
8 *of malign foreign talent recruitment programs to covered*
9 *individuals employed at such institutions, including those*
10 *individuals who are participating in activities described in*
11 *subsection (d).*

12 **SEC. 10633. REVIEW OF CONTRACTS AND AGREEMENTS.**

13 (a) *IN GENERAL.*—*In addition to existing authorities*
14 *for preventing waste, fraud, abuse, and mismanagement of*
15 *Federal funds, each Federal research agency shall have the*
16 *authority to—*

17 (1) *require, upon request, the submission to such*
18 *agency, by an institution of higher education or other*
19 *organization applying for a research and development*
20 *award, of supporting documentation, including copies*
21 *of contracts, grants, or any other agreement specific*
22 *to foreign appointments, employment with a foreign*
23 *institution, participation in a foreign talent recruit-*
24 *ment program and other information reported as cur-*

1 *rent and pending support for all covered individuals*
2 *in a research and development award application;*

3 *(2) require such institution of higher education*
4 *or other organization to review any documents re-*
5 *quested under paragraph (1) for compliance with the*
6 *Federal research agency's award terms and condi-*
7 *tions, including guidance on conflicts of interest and*
8 *conflicts of commitment; and*

9 *(3) upon receipt and review of the information*
10 *provided under paragraph (1) and in consultation*
11 *with the institution of higher education or other orga-*
12 *nization submitting such information, initiate the*
13 *substitution or removal of a covered individual from*
14 *a research and development award, reduce the award*
15 *funding amount, or suspend or terminate the award*
16 *if the agency head determines such contracts, grants,*
17 *or agreements include obligations that—*

18 *(A) interfere with the capacity for agency-*
19 *supported activities to be carried out; or*

20 *(B) create duplication with agency-sup-*
21 *ported activities.*

22 *(b) LIMITATIONS.—In exercising the authorities under*
23 *subsection (a), each Federal research agency shall—*

24 *(1) take necessary steps, as practicable, to protect*
25 *the privacy of all covered individuals and other par-*

1 *ties specified in the documentation submitted under*
2 *paragraph (1) of such subsection;*

3 *(2) endeavor to provide justification for requests*
4 *for supporting documentation made under such para-*
5 *graph;*

6 *(3) require that allegations be proven by a pre-*
7 *ponderance of evidence; and*

8 *(4) as practicable, afford subjects an opportunity*
9 *to provide comments and rebuttal and an opportunity*
10 *to appeal before final administrative action is taken.*

11 **SEC. 10634. RESEARCH SECURITY TRAINING REQUIREMENT**
12 **FOR FEDERAL RESEARCH AWARD PER-**
13 **SONNEL.**

14 *(a) ANNUAL TRAINING REQUIREMENT.—*

15 *(1) IN GENERAL.—Not later than 12 months*
16 *after the date of the enactment of this Act, each Fed-*
17 *eral research agency shall establish a requirement*
18 *that, as part of an application for a research and de-*
19 *velopment award from the agency—*

20 *(A) each covered individual listed on the*
21 *application for a research and development*
22 *award certify that each such individual has com-*
23 *pleted within one year of such application re-*
24 *search security training that meets the guidelines*
25 *developed under subsection (b); and*

1 (B) each institution of higher education or
2 other organization applying for such an award
3 certify that each covered individual who is em-
4 ployed by such institution or organization and
5 listed on the application has completed such
6 training.

7 (2) *CONSISTENCY.*—The Director of the Office of
8 Science and Technology Policy shall ensure that the
9 training requirements established by Federal research
10 agencies pursuant to paragraph (1) are consistent.

11 (b) *TRAINING GUIDELINES.*—The Director of the Office
12 of Science and Technology Policy, acting through the Na-
13 tional Science and Technology Council and in accordance
14 with the authority provided under section 1746(a) of the
15 National Defense Authorization Act for Fiscal Year 2020
16 (Public Law 116–92; 42 U.S.C. 6601 note), shall, taking
17 into consideration stakeholder input, develop guidelines for
18 institutions of higher education and other organizations re-
19 ceiving Federal research and development funds to use in
20 developing their own training programs to address the
21 unique needs, challenges, and risk profiles of such institu-
22 tions and other organizations, including adoption of secu-
23 rity training modules developed under subsection (c), to en-
24 sure compliance with National Security Presidential
25 Memorandum–33 (relating to strengthening protections of

1 *the United States Government-supported research and de-*
2 *velopment against foreign government interference and ex-*
3 *ploitation) or any successor documents.*

4 *(c) SECURITY TRAINING MODULES.—*

5 *(1) IN GENERAL.—Not later than 90 days after*
6 *the date of the enactment of this Act, the Director of*
7 *the Office of Science and Technology Policy, in co-*
8 *ordination with the Director of the National Science*
9 *Foundation, the Director of the National Institutes of*
10 *Health, the Secretary of Energy, and the Secretary of*
11 *Defense, and in consultation with the heads of rel-*
12 *evant Federal research agencies, shall enter into an*
13 *agreement or contract with a qualified entity for the*
14 *development of online research security training mod-*
15 *ules for the research community and participants in*
16 *the United States research and development enterprise*
17 *to ensure compliance with National Security Presi-*
18 *dential Memorandum–33 or successor documents, in-*
19 *cluding modules—*

20 *(A) focused on cybersecurity, international*
21 *collaboration and international travel, foreign*
22 *interference, and rules for proper use of funds,*
23 *disclosure, conflict of commitment, and conflict*
24 *of interest; and*

25 *(B) tailored to the unique needs of—*

- 1 (i) covered individuals;
- 2 (ii) undergraduate students, graduate
- 3 students, and postdoctoral researchers; and
- 4 (iii) applicants for awards under the
- 5 SBIR and STTR programs (as such terms
- 6 are defined in section 9(e) of the Small
- 7 Business Act (15 U.S.C. 638(e)).

8 (2) *STAKEHOLDER INPUT.*—Prior to entering

9 into the agreement under paragraph (1), the Director

10 of the Office of Science and Technology Policy shall

11 seek input from academic, private sector, intelligence,

12 and law enforcement stakeholders regarding the scope

13 and content of security training modules, including

14 the diversity of needs across institutions of higher

15 education and other recipients of different sizes and

16 types, and recommendations for minimizing adminis-

17 trative burden on recipients and researchers.

18 (3) *DEVELOPMENT.*—The Director of the Office

19 of Science and Technology Policy shall ensure that the

20 entity referred to in paragraph (1)—

21 (A) develops security training modules that

22 can be adapted and utilized across Federal re-

23 search agencies; and

24 (B) develops and implements a plan for reg-

25 ularly updating such modules as needed.

1 **SEC. 10635. RESEARCH FUNDS ACCOUNTING.**

2 (a) *STUDY PERIOD DEFINED.*—*In this section the*
3 *term “study period” means the 5-year period ending on the*
4 *date of the enactment of this Act.*

5 (b) *STUDY.*—*The Comptroller General of the United*
6 *States shall conduct a study on Federal funding made*
7 *available to foreign entities of concern for research, during*
8 *the study period.*

9 (c) *MATTERS TO BE INCLUDED.*—*The study conducted*
10 *under subsection (b) shall include, to the extent practicable*
11 *with respect to the study period, an assessment of—*

12 (1) *the total amount of Federal funding made*
13 *available to foreign entities of concern for research;*

14 (2) *the total number and types of foreign entities*
15 *of concern to which such funding was made available;*

16 (3) *the requirements relating to the awarding,*
17 *tracking, and monitoring of such funding;*

18 (4) *any other data available with respect to Fed-*
19 *eral funding made available to foreign entities of con-*
20 *cern for research; and*

21 (5) *such other matters as the Comptroller Gen-*
22 *eral of the United States determines appropriate.*

23 (d) *BRIEFING ON AVAILABLE DATA.*—*Not later than*
24 *120 days after the date of the enactment of this Act, the*
25 *Comptroller General of the United States shall brief the*
26 *Committee on Commerce, Science, and Transportation, the*

1 *Committee on Health, Education, Labor, and Pensions, and*
2 *the Committee on Foreign Relations of the Senate and the*
3 *Committee on Science, Space, and Technology, the Com-*
4 *mittee on Energy and Commerce, and the Committee on*
5 *Foreign Affairs of the House of Representatives on the study*
6 *conducted under subsection (b) and the data that is avail-*
7 *able with respect to Federal funding made available to for-*
8 *eign entities of concern for research.*

9 *(e) REPORT.—The Comptroller General of the United*
10 *States shall submit to the congressional committees specified*
11 *in subsection (d), by a date agreed upon by the Comptroller*
12 *General and the committees on the date of the briefing*
13 *under such subsection, a report on the findings of the study*
14 *conducted under subsection (b).*

15 **SEC. 10636. PERSON OR ENTITY OF CONCERN PROHIBITION.**

16 *No person published on the list under section 1237(b)*
17 *of the Strom Thurmond National Defense Authorization Act*
18 *for Fiscal Year 1999 (Public Law 105–261; 50 U.S.C. 1701*
19 *note) or entity identified under section 1260h of the Wil-*
20 *liam M. (Mac) Thornberry National Defense Authorization*
21 *Act for Fiscal Year 2021 (10 U.S.C. 113 note; Public Law*
22 *116–283) may receive or participate in any grant, award,*
23 *program, support, or other activity under—*

24 *(1) the Directorate established in subtitle G of*
25 *title III of this division;*

1 (2) *section 28(b)(1) of the Stevenson-Wydler*
2 *Technology Innovation Act of 1980 (15 U.S.C. 3701*
3 *et seq.), as added by section 10621; or*

4 (3) *the Manufacturing USA Program, as im-*
5 *proved and expanded under subtitle E of title II of*
6 *this division.*

7 **SEC. 10637. NONDISCRIMINATION.**

8 *In carrying out requirements under this subtitle, each*
9 *Federal research agency shall ensure that policies and ac-*
10 *tivities developed and implemented pursuant to this subtitle*
11 *are carried out in a manner that does not target, stig-*
12 *matize, or discriminate against individuals on the basis of*
13 *race, ethnicity, or national origin, consistent with title VI*
14 *of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.).*

15 **SEC. 10638. DEFINITIONS.**

16 *In this subtitle:*

17 (1) *COVERED INDIVIDUAL.—The term “covered*
18 *individual” means an individual who—*

19 (A) *contributes in a substantive, meaningful*
20 *way to the scientific development or execution of*
21 *a research and development project proposed to*
22 *be carried out with a research and development*
23 *award from a Federal research agency; and*

24 (B) *is designated as a covered individual by*
25 *the Federal research agency concerned.*

1 (2) *FOREIGN COUNTRY OF CONCERN.*—*The term*
2 *“foreign country of concern” means the People’s Re-*
3 *public of China, the Democratic People’s Republic of*
4 *Korea, the Russian Federation, the Islamic Republic*
5 *of Iran, or any other country determined to be a*
6 *country of concern by the Secretary of State.*

7 (3) *FOREIGN ENTITY OF CONCERN.*—*The term*
8 *“foreign entity of concern” means a foreign entity*
9 *that is—*

10 (A) *designated as a foreign terrorist organi-*
11 *zation by the Secretary of State under section*
12 *219(a) of the Immigration and Nationality Act*
13 *(8 U.S.C. 1189(a));*

14 (B) *included on the list of specially des-*
15 *ignated nationals and blocked persons main-*
16 *tained by the Office of Foreign Assets Control of*
17 *the Department of the Treasury (commonly*
18 *known as the SDN list);*

19 (C) *owned by, controlled by, or subject to*
20 *the jurisdiction or direction of a government of*
21 *a foreign country that is a covered nation (as*
22 *such term is defined in section 4872 of title 10,*
23 *United States Code);*

1 (D) alleged by the Attorney General to have
2 been involved in activities for which a conviction
3 was obtained under—

4 (i) chapter 37 of title 18, United States
5 Code (commonly known as the Espionage
6 Act);

7 (ii) section 951 or 1030 of title 18,
8 United States Code;

9 (iii) chapter 90 of title 18, United
10 States Code (commonly known as the Eco-
11 nomic Espionage Act of 1996);

12 (iv) the Arms Export Control Act (22
13 U.S.C. 2751 et seq.);

14 (v) section 224, 225, 226, 227, or 236
15 of the Atomic Energy Act of 1954 (42
16 U.S.C. 2274, 2275, 2276, 2277, and 2284);

17 (vi) the Export Control Reform Act of
18 2018 (50 U.S.C. 4801 et seq.); or

19 (vii) the International Emergency Eco-
20 nomic Powers Act (50 U.S.C. 1701 et seq.);

21 or

22 (E) determined by the Secretary of Com-
23 merce, in consultation with the Secretary of De-
24 fense and the Director of National Intelligence,
25 to be engaged in unauthorized conduct that is

1 *detrimental to the national security or foreign*
2 *policy of the United States.*

3 (4) *MALIGN FOREIGN TALENT RECRUITMENT*
4 *PROGRAM.—The term “malign foreign talent recruit-*
5 *ment program” means—*

6 (A) *any program, position, or activity that*
7 *includes compensation in the form of cash, in-*
8 *kind compensation, including research funding,*
9 *promised future compensation, complimentary*
10 *foreign travel, things of non de minimis value,*
11 *honorific titles, career advancement opportuni-*
12 *ties, or other types of remuneration or consider-*
13 *ation directly provided by a foreign country at*
14 *any level (national, provincial, or local) or their*
15 *designee, or an entity based in, funded by, or af-*
16 *filiated with a foreign country, whether or not*
17 *directly sponsored by the foreign country, to the*
18 *targeted individual, whether directly or indi-*
19 *rectly stated in the arrangement, contract, or*
20 *other documentation at issue, in exchange for the*
21 *individual—*

22 (i) *engaging in the unauthorized trans-*
23 *fer of intellectual property, materials, data*
24 *products, or other nonpublic information*
25 *owned by a United States entity or devel-*

1 *oped with a Federal research and develop-*
2 *ment award to the government of a foreign*
3 *country or an entity based in, funded by, or*
4 *affiliated with a foreign country regardless*
5 *of whether that government or entity pro-*
6 *vided support for the development of the in-*
7 *tellectual property, materials, or data prod-*
8 *ucts;*

9 *(ii) being required to recruit trainees*
10 *or researchers to enroll in such program,*
11 *position, or activity;*

12 *(iii) establishing a laboratory or com-*
13 *pany, accepting a faculty position, or un-*
14 *dertaking any other employment or ap-*
15 *pointment in a foreign country or with an*
16 *entity based in, funded by, or affiliated*
17 *with a foreign country if such activities are*
18 *in violation of the standard terms and con-*
19 *ditions of a Federal research and develop-*
20 *ment award;*

21 *(iv) being unable to terminate the for-*
22 *ign talent recruitment program contract or*
23 *agreement except in extraordinary cir-*
24 *cumstances;*

1 (v) through funding or effort related to
2 the foreign talent recruitment program,
3 being limited in the capacity to carry out
4 a research and development award or re-
5 quired to engage in work that would result
6 in substantial overlap or duplication with a
7 Federal research and development award;

8 (vi) being required to apply for and
9 successfully receive funding from the spon-
10 soring foreign government's funding agen-
11 cies with the sponsoring foreign organiza-
12 tion as the recipient;

13 (vii) being required to omit acknowl-
14 edgment of the recipient institution with
15 which the individual is affiliated, or the
16 Federal research agency sponsoring the re-
17 search and development award, contrary to
18 the institutional policies or standard terms
19 and conditions of the Federal research and
20 development award;

21 (viii) being required to not disclose to
22 the Federal research agency or employing
23 institution the participation of such indi-
24 vidual in such program, position, or activ-
25 ity; or

1 *(ix) having a conflict of interest or*
2 *conflict of commitment contrary to the*
3 *standard terms and conditions of the Fed-*
4 *eral research and development award; and*

5 *(B) a program that is sponsored by—*

6 *(i) a foreign country of concern or an*
7 *entity based in a foreign country of concern,*
8 *whether or not directly sponsored by the for-*
9 *foreign country of concern;*

10 *(ii) an academic institution on the list*
11 *developed under section 1286(c)(8) of the*
12 *John S. McCain National Defense Author-*
13 *ization Act for Fiscal Year 2019 (10 U.S.C.*
14 *2358 note; Public Law 115-232); or*

15 *(iii) a foreign talent recruitment pro-*
16 *gram on the list developed under section*
17 *1286(c)(9) of the John S. McCain National*
18 *Defense Authorization Act for Fiscal Year*
19 *2019 (10 U.S.C. 2358 note; Public Law*
20 *115-232).*

1 ***Subtitle E—Coastal and Ocean***
2 ***Acidification Research and In-***
3 ***novation***

4 **SEC. 10641. SHORT TITLE.**

5 *This subtitle may be cited as the “Coastal and Ocean*
6 *Acidification Research and Innovation Act of 2021”.*

7 **SEC. 10642. PURPOSES.**

8 *(a) IN GENERAL.—Section 12402(a) of the Federal*
9 *Ocean Acidification Research and Monitoring Act of 2009*
10 *(33 U.S.C. 3701(a)) is amended—*

11 *(1) in paragraph (1)—*

12 *(A) in the matter preceding subparagraph*
13 *(A), by striking “development and coordination”*
14 *and inserting “development coordination and*
15 *implementation”;*

16 *(B) in subparagraph (A), by striking*
17 *“acidification on marine organisms” and insert-*
18 *ing “acidification and coastal acidification on*
19 *marine organisms”; and*

20 *(C) in subparagraph (B), by striking “es-*
21 *tablish” and all that follows through the semi-*
22 *colon and inserting “maintain and advise an*
23 *interagency research, monitoring, and public*
24 *outreach program on ocean acidification and*
25 *coastal acidification;”;*

1 (2) in paragraph (2), by striking “establish-
2 ment” and inserting “maintenance”;

3 (3) in paragraph (3), by inserting “and coastal
4 acidification” after “ocean acidification”; and

5 (4) in paragraph (4), by striking “techniques
6 for” and all that follows through the period and in-
7 serting “mitigating the impacts of ocean and coastal
8 acidification and related co-stressors on marine eco-
9 systems.”.

10 (b) *TECHNICAL AND CONFORMING AMENDMENT.*—*Sec-*
11 *tion 12402 of the Federal Ocean Acidification Research and*
12 *Monitoring Act of 2009 (33 U.S.C. 3701(a)) is amended*
13 *by striking “(a) PURPOSES.—”.*

14 **SEC. 10643. DEFINITIONS.**

15 *Section 12403 of the Federal Ocean Acidification Re-*
16 *search and Monitoring Act of 2009 (33 U.S.C. 3702) is*
17 *amended—*

18 (1) in paragraph (1), by striking “of the Earth’s
19 oceans” and all that follows before the period at the
20 end and inserting “and changes in the water chem-
21 istry of the Earth’s oceans, coastal estuaries, marine
22 waterways, and Great Lakes caused by carbon dioxide
23 from the atmosphere and the breakdown of organic
24 matter”;

1 (2) *in paragraph (3), by striking “Joint Sub-*
2 *committee on Ocean Science and Technology of the*
3 *National Science and Technology Council” and in-*
4 *serting “National Science and Technology Council*
5 *Subcommittee on Ocean Science and Technology”;*

6 (3) *by redesignating paragraphs (1), (2), and (3)*
7 *as paragraphs (2), (3), and (4), respectively;*

8 (4) *by inserting before paragraph (2), as so re-*
9 *designated, the following:*

10 “(1) *COASTAL ACIDIFICATION.—The term ‘coast-*
11 *al acidification’ means the decrease in pH and*
12 *changes in the water chemistry of coastal oceans, estu-*
13 *aries, and Great Lakes from atmospheric pollution,*
14 *freshwater inputs, and excess nutrient run-off from*
15 *land.”; and*

16 (5) *by adding at the end the following:*

17 “(5) *STATE.—The term ‘State’ means each State*
18 *of the United States, the District of Columbia, the*
19 *Commonwealth of Puerto Rico, American Samoa,*
20 *Guam, the Commonwealth of the Northern Mariana*
21 *Islands, the Virgin Islands of the United States, and*
22 *any other territory or possession of the United*
23 *States.”.*

1 **SEC. 10644. INTERAGENCY WORKING GROUP.**

2 *Section 12404 of the Federal Ocean Acidification Re-*
3 *search and Monitoring Act of 2009 (33 U.S.C. 3703) is*
4 *amended—*

5 (1) *in the heading, by striking “SUB-*
6 ***COMMITTEE*” and inserting “WORKING GROUP”;**

7 (2) *in subsection (a)—*

8 (A) *in paragraph (1), by striking “Joint*
9 *Subcommittee on Ocean Science and Technology*
10 *of the National Science and Technology Council*
11 *shall coordinate Federal activities on ocean*
12 *acidification and establish” and insert “Sub-*
13 *committee shall coordinate Federal activities on*
14 *ocean and coastal acidification and establish and*
15 *maintain”;*

16 (B) *in paragraph (2), by striking “Wildlife*
17 *Service,” and inserting “Wildlife Service, the*
18 *Bureau of Ocean Energy Management, the Envi-*
19 *ronmental Protection Agency, the Department of*
20 *Agriculture, the Department of State, the De-*
21 *partment of Energy, the Department of the*
22 *Navy, the National Park Service, the Bureau of*
23 *Indian Affairs, the National Institute of Stand-*
24 *ards and Technology, the Smithsonian Institu-*
25 *tion,”; and*

- 1 (C) in paragraph (3), in the heading, by
2 striking “CHAIRMAN” and inserting “CHAIR”;
3 (3) in subsection (b)—
4 (A) in paragraph (2)—
5 (i) in subparagraph (A), by inserting
6 “and coastal acidification” after “ocean
7 acidification”; and
8 (ii) in subparagraph (B), by inserting
9 “and coastal acidification” after “ocean
10 acidification”;
11 (B) in paragraph (4), by striking “; and”
12 and inserting a semicolon; and
13 (C) in paragraph (5)—
14 (i) by inserting “, and contribute to as
15 appropriate,” after “designate”;
16 (ii) by striking “developed” and insert-
17 ing “and coastal acidification developed”;
18 and
19 (iii) by striking the period at the end
20 and inserting “and coastal acidification;
21 and”.
- 22 (4) in subsection (c)—
23 (A) in paragraph (2)—
24 (i) by inserting “until 2032” after
25 “every 2 years thereafter”;

1 (ii) by inserting “, and to the Office of
2 Management and Budget,” after “House of
3 Representatives”; and
4 (iii) in subparagraph (B), by striking
5 “the interagency research” and inserting
6 “interagency strategic research”;
7 (B) in paragraph (3), by inserting “until
8 2031” after “at least once every 5 years”; and
9 (C) in paragraph (4), by inserting “until
10 2032” after “and every 6 years thereafter”;
11 (5) by redesignating subsection (c) as subsection
12 (e); and
13 (6) by inserting after subsection (b) the fol-
14 lowing:
15 “(c) *ADVISORY BOARD.*—
16 “(1) *ESTABLISHMENT.*—The Chair of the Sub-
17 committee shall establish an Ocean Acidification Ad-
18 visory Board.
19 “(2) *DUTIES.*—The Advisory Board shall—
20 “(A) maintain a process for reviewing and
21 making recommendations to the Subcommittee
22 on—
23 “(i) the biennial report specified in
24 subsection (d)(2); and

1 “(ii) the strategic research plan in sub-
2 section (d)(3);

3 “(B) provide ongoing advice to the Sub-
4 committee and the interagency working group on
5 matters related to Federal activities on ocean
6 and coastal acidification, including impacts and
7 mitigation of ocean and coastal acidification;
8 and

9 “(C) advise the Subcommittee and the inter-
10 agency working group on—

11 “(i) efforts to coordinate research and
12 monitoring activities related to ocean acidi-
13 fication and coastal acidification; and

14 “(ii) the best practices for the stand-
15 ards developed for data archiving under sec-
16 tion 12406(d).

17 “(3) MEMBERSHIP.—The Advisory Board shall
18 consist of 25 members as follows:

19 “(A) Two representatives of the shellfish,
20 lobster, or crab industry.

21 “(B) One representative of the finfish indus-
22 try.

23 “(C) One representative of seafood proc-
24 essors.

1 “(D) Three representatives from academia,
2 including both natural and social sciences.

3 “(E) One representative of recreational fish-
4 ing.

5 “(F) One representative of a relevant non-
6 governmental organization.

7 “(G) Six representatives from relevant State
8 and local governments with policy or regulatory
9 authorities related to ocean acidification and
10 coastal acidification.

11 “(H) One representative from the Alaska
12 Ocean Acidification Network or a subsequent en-
13 tity that represents the same geographical region
14 and has a similar purpose.

15 “(I) One representative from the California
16 Current Acidification Network or a subsequent
17 entity that represents the same geographical re-
18 gion and has a similar purpose.

19 “(J) One representative from the Northeast
20 Coastal Acidification Network or a subsequent
21 entity that represents the same geographical re-
22 gion and has a similar purpose.

23 “(K) One representative from the Southeast
24 Coastal Acidification Network or a subsequent

1 *entity that represents the same geographical re-*
2 *gion and has a similar purpose.*

3 *“(L) One representative from the Gulf of*
4 *Mexico Coastal Acidification Network or a subse-*
5 *quent entity that represents the same geo-*
6 *graphical region and has a similar purpose.*

7 *“(M) One representative from the Mid-At-*
8 *lantic Coastal Acidification Network or a subse-*
9 *quent entity that represents the same geo-*
10 *graphical region and has a similar purpose.*

11 *“(N) One representative from the Pacific Is-*
12 *lands Ocean Observing System or a subsequent*
13 *entity that represents the island territories and*
14 *possessions of the United States in the Pacific*
15 *Ocean, and the State of Hawaii and has a simi-*
16 *lar purpose.*

17 *“(O) One representative from the Caribbean*
18 *Regional Association for Coastal Ocean Observ-*
19 *ing or a subsequent entity that represents Puerto*
20 *Rico and the United States Virgin Islands and*
21 *has a similar purpose.*

22 *“(P) One representative from the National*
23 *Oceanic and Atmospheric Administration Olym-*
24 *pic Coast Ocean Acidification Sentinel Site or a*

1 *subsequent entity that represents the same geo-*
2 *graphical representation.*

3 “(Q) *One representative from the National*
4 *Oceanic and Atmospheric Administration shall*
5 *serve as an ex-officio member of the Advisory*
6 *Board without a vote.*

7 “(4) *APPOINTMENT OF MEMBERS.—The Chair of*
8 *the Subcommittee shall—*

9 “(A) *appoint members to the Advisory*
10 *Board (taking into account the geographical in-*
11 *terests of each individual to be appointed as a*
12 *member of the Advisory Board to ensure that an*
13 *appropriate balance of geographical interests are*
14 *represented by the members of the Advisory*
15 *Board) who—*

16 “(i) *represent the interest group for*
17 *which each seat is designated;*

18 “(ii) *demonstrate expertise on ocean*
19 *acidification or coastal acidification and its*
20 *scientific, economic, industry, cultural, and*
21 *community impacts; and*

22 “(iii) *have a record of distinguished*
23 *service with respect to ocean acidification or*
24 *coastal acidification, and such impacts;*

1 “(B) give consideration to nominations and
2 recommendations from the members of the inter-
3 agency working group and the public for such
4 appointments; and

5 “(C) ensure that an appropriate balance of
6 scientific, industry, State and local resource
7 managers, and geographical interests are rep-
8 resented by the members of the Advisory Board.

9 “(5) *TERM OF MEMBERSHIP.*—Each member of
10 the Advisory Board—

11 “(A) shall be appointed for a 5-year term;
12 and

13 “(B) may be appointed to no more than two
14 terms.

15 “(6) *CHAIR.*—The Chair of the Subcommittee
16 shall appoint one member of the Advisory Board to
17 serve as the Chair of the Advisory Board.

18 “(7) *MEETINGS.*—Not less than once each cal-
19 endar year, the Advisory Board shall meet at such
20 times and places as may be designated by the Chair
21 of the Advisory Board, in consultation with the Chair
22 of the Subcommittee and the Chair of the interagency
23 working group.

24 “(8) *BRIEFING.*—The Chair of the Advisory
25 Board shall brief the Subcommittee and the inter-

1 *agency working group on the progress of the Advisory*
2 *Board as necessary or at the request of the Sub-*
3 *committee.*

4 “(9) *TRIBAL GOVERNMENT ENGAGEMENT AND*
5 *COORDINATION.—*

6 “(A) *IN GENERAL.—The Advisory Board*
7 *shall maintain mechanisms for coordination,*
8 *and engagement with Tribal governments.*

9 “(i) *RULE OF CONSTRUCTION.—Nothing in*
10 *subparagraph (A) may be construed as affecting*
11 *any requirement to consult with Indian Tribes*
12 *under Executive Order 13175 (25 U.S.C. 5301*
13 *note; relating to consultation and coordination*
14 *with Tribal governments) or any other applica-*
15 *ble law or policy.*

16 “(10) *FEDERAL ADVISORY COMMITTEE ACT.—*
17 *Section 14 of the Federal Advisory Committee Act*
18 *shall not apply to the Advisory Board for 10 years*
19 *from the date of enactment of this Act.*

20 “(d) *PRIZE COMPETITIONS.—*

21 “(1) *IN GENERAL.—Any Federal agency with a*
22 *representative serving on the interagency working*
23 *group established under this section may, either indi-*
24 *vidually or in cooperation with one or more agencies,*
25 *carry out a program to award prizes competitively*

1 *under section 24 of the Stevenson-Wydler Technology*
2 *Innovation Act of 1980 (15 U.S.C. 3719). An agency*
3 *seeking to carry out such a program shall carry out*
4 *such program in coordination with the chair of such*
5 *interagency working group.*

6 *“(2) PURPOSES.—Any prize competition carried*
7 *out under this subsection shall be for the purpose of*
8 *stimulating innovation to advance our Nation’s abil-*
9 *ity to understand, research, or monitor ocean acidifi-*
10 *cation or its impacts, or to develop management or*
11 *adaptation options for responding to ocean and coast-*
12 *al acidification.*

13 *“(3) PRIORITY PROGRAMS.—Priority shall be*
14 *given to establishing programs under this section that*
15 *address communities, environments, or industries that*
16 *are in distress due to the impacts of ocean and coastal*
17 *acidification.”.*

18 **SEC. 10645. STRATEGIC RESEARCH PLAN.**

19 *Section 12405 of the Federal Ocean Acidification Re-*
20 *search and Monitoring Act of 2009 (33 U.S.C. 3704) is*
21 *amended—*

22 *(1) in subsection (a)—*

23 *(A) by striking “acidification” each place it*
24 *appears and inserting “acidification and coastal*
25 *acidification”;*

1 (B) *in the first sentence—*

2 (i) *by inserting “, and not later than*
3 *every 5 years following the publication of*
4 *each subsequent strategic research plan*
5 *until 2035” after “the date of enactment of*
6 *this Act”;*

7 (ii) *by inserting “address the socio-*
8 *economic impacts of ocean acidification and*
9 *coastal acidification and to” after “mitiga-*
10 *tion strategies to”; and*

11 (iii) *by striking “marine ecosystems”*
12 *each place it appears and inserting “eco-*
13 *systems”;* and

14 (C) *in the second sentence, by striking “Na-*
15 *tional Academy of Sciences in the review of the*
16 *plan required under subsection (d)”*, and insert-
17 *ing “Advisory Board established in section*
18 *12404(c)”;*

19 (2) *in subsection (b)—*

20 (A) *in paragraph (1), by inserting “and so-*
21 *cial sciences” after “among the ocean sciences”;*

22 (B) *in paragraph (2)—*

23 (i) *in subparagraph (B)—*

1 (I) by striking “improve the abil-
2 ity to assess the” and inserting “assess
3 the short-term and long-term”; and

4 (II) by striking “; and” at the end
5 and inserting a semicolon;

6 (ii) by amending subparagraph (C) to
7 read as follows:

8 “(C) provide information for the develop-
9 ment of adaptation and mitigation strategies to
10 address—

11 “(i) socioeconomic impacts of ocean
12 acidification and coastal acidification;

13 “(ii) conservation of marine organisms
14 and ecosystems;

15 “(iii) assessment of the effectiveness of
16 such adaptation and mitigation strategies;
17 and”;

18 (iii) by adding at the end the following
19 new subparagraph:

20 “(D) improve research on—

21 “(i) ocean acidification and coastal
22 acidification;

23 “(ii) the interactions between and ef-
24 fects of ocean and coastal acidification and
25 multiple combined stressors including

1 *changes in water chemistry, changes in*
2 *sediment delivery, hypoxia, and harmful*
3 *algal blooms, on ocean acidification and*
4 *coastal acidification; and*

5 *“(iii) the effect or effects of clauses (i)*
6 *and (ii) on marine resources and eco-*
7 *systems;”;*

8 *(C) in paragraph (3)—*

9 *(i) in subparagraph (F), by striking*
10 *“database development” and inserting*
11 *“data management”;*

12 *(ii) in subparagraph (H) by striking*
13 *“and” at the end; and*

14 *(iii) by adding at the end the following*
15 *new subparagraphs:*

16 *“(J) assessment of adaptation and mitiga-*
17 *tion strategies; and*

18 *“(K) education and outreach activities;”;*

19 *(D) in paragraph (4), by striking “set*
20 *forth” and inserting “ensure an appropriate bal-*
21 *ance of contribution in establishing”;*

22 *(E) in paragraph (5), by striking “reports”*
23 *and inserting “the best available peer-reviewed*
24 *scientific reports”;*

25 *(F) in paragraph (6)—*

1 (i) by inserting “and coastal acidifica-
2 tion” after “ocean acidification”; and

3 (ii) by striking “of the United States”
4 and inserting “within the United States”;

5 (G) in paragraph (8)—

6 (i) by inserting “and coastal acidifica-
7 tion” after “ocean acidification” each place
8 it appears;

9 (ii) by striking “its” and inserting
10 “their”; and

11 (iii) by striking “; and” at the end
12 and inserting a semicolon;

13 (H) in paragraph (9), by striking “and” at
14 the end

15 (I) in paragraph (10), by striking the pe-
16 riod at the end and inserting a semicolon; and

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

18 “(11) describe monitoring needs necessary to
19 support potentially affected industry members, coastal
20 stakeholders, fishery management councils and com-
21 missions, Tribal governments, non-Federal resource
22 managers, and scientific experts on decision-making
23 and adaptation related to ocean acidification and
24 coastal acidification; and

1 “(12) describe the extent to which the Sub-
2 committee incorporated feedback from the Advisory
3 Board established in section 12404(c).”;

4 (3) in subsection (c)—

5 (A) in paragraph (1)(C), by striking “sur-
6 face”;

7 (B) in paragraph (2), by inserting “and
8 coastal acidification” after “ocean acidification”
9 each place it appears;

10 (C) in paragraph (3)—

11 (i) by striking “input, and” and in-
12 serting “inputs,”;

13 (ii) by inserting “, marine food webs,”
14 after “marine ecosystems”; and

15 (iii) by inserting “, and modeling that
16 supports fisheries management” after “ma-
17 rine organisms”;

18 (D) in paragraph (5), by inserting “and
19 coastal acidification” after “ocean acidification”;
20 and

21 (E) by adding at the end the following new
22 paragraph:

23 “(8) Research to understand related and cumu-
24 lative stressors and other biogeochemical processes oc-

1 *curing in conjunction with ocean acidification and*
2 *coastal acidification.”; and*

3 *(4) by striking subsections (d) and (e) and in-*
4 *serting the following:*

5 *“(d) PUBLICATION.—Concurrent with the submission*
6 *of the plan to Congress, the Subcommittee shall publish the*
7 *plan on a public website.”.*

8 **SEC. 10646. NOAA OCEAN ACIDIFICATION ACTIVITIES.**

9 *Section 12406 of the Federal Ocean Acidification Re-*
10 *search and Monitoring Act of 2009 (33 U.S.C. 3705) is*
11 *amended—*

12 *(1) in subsection (a)—*

13 *(A) in the matter preceding paragraph (1),*
14 *by inserting “coordination,” after “research,*
15 *monitoring,”;*

16 *(B) in paragraph (1)—*

17 *(i) in subparagraph (B), by inserting*
18 *“including leveraging, as appropriate, the*
19 *Integrated Ocean Observing System and the*
20 *ocean observing assets of other Federal,*
21 *State, and Tribal agencies,” after “ocean*
22 *observing assets,”;*

23 *(ii) by redesignating subparagraphs*
24 *(C), (D), (E), and (F) as subparagraphs*
25 *(E), (G), (H), and (I), respectively;*

1 (iii) by inserting after subparagraph
2 (B) the following new subparagraphs:

3 “(C) prioritization of the location of moni-
4 toring instruments, assets, and projects to maxi-
5 mize the efficiency of resources and agency and
6 department missions;

7 “(D) an optimization of understanding of
8 socioeconomic impacts and ecosystem health”.

9 (iv) in subparagraph (E), as so redes-
10 ignated, by striking “adaptation” and in-
11 serting “adaptation and mitigation”;

12 (v) by inserting after subparagraph
13 (E), as so redesignated, the following new
14 subparagraph:

15 “(F) technical assistance to
16 socioeconomically vulnerable States, local govern-
17 ments, Tribal governments, communities, and in-
18 dustries impacted by ocean and coastal acidifica-
19 tion to support their development of ocean and
20 coastal acidification mitigation strategies;”.

21 (vi) in subparagraph (H), as so redes-
22 ignated—

23 (I) by striking “its impacts” and
24 inserting “their respective impacts”;

25 (II) by striking “and” at the end;

1 (vii) in subparagraph (I), as so reded-
2 ignated—

3 (I) by striking “monitoring and
4 impacts research” and inserting “re-
5 search, monitoring, and adaptation
6 and mitigation strategies”; and

7 (II) by striking the period at the
8 end and inserting a semicolon; and

9 (viii) by adding at the end the fol-
10 lowing new subparagraphs:

11 “(J) research to improve understanding
12 of—

13 “(i) the impact of ocean acidification
14 and coastal acidification; and

15 “(ii) how multiple environmental
16 stressors may contribute to and exacerbate
17 ocean and coastal acidification on living
18 marine resources and coastal ecosystems;
19 and

20 “(K) research to support the development of
21 adaptation and mitigation strategies to address
22 the socioeconomic impacts of ocean and coastal
23 acidification on coastal communities;”;

24 (C) in paragraph (2), by striking “critical
25 research projects that explore” and inserting

1 *“critical research, education, and outreach*
2 *projects that explore and communicate”*; and

3 *(D) in paragraphs (1) and (2), by striking*
4 *“acidification” each place it appears and insert-*
5 *ing “acidification and coastal acidification”*;
6 *and*

7 *(2) by adding at the end the following new sub-*
8 *sections:*

9 *“(c) RELATIONSHIP TO INTERAGENCY WORKING*
10 *GROUP.—The National Oceanic and Atmospheric Adminis-*
11 *tration shall serve as the lead Federal agency responsible*
12 *for coordinating the Federal response to ocean and coastal*
13 *acidification. The Administration may enter into Memo-*
14 *randa of Understanding to—*

15 *“(1) coordinate monitoring and research efforts*
16 *among Federal agencies in cooperation with State,*
17 *local, and Tribal governments and international*
18 *partners; this may include analysis and synthesis of*
19 *the results of monitoring and research;*

20 *“(2) maintain an Ocean Acidification Informa-*
21 *tion Exchange described under section 12404(b)(5) to*
22 *allow for information to be electronically accessible,*
23 *including information—*

1 “(A) on ocean acidification developed
2 through or used by the ocean acidification pro-
3 gram described under subsection (a); or

4 “(B) that would be useful to State govern-
5 ments, local governments, Tribal governments,
6 resource managers, policymakers, researchers,
7 and other stakeholders in mitigating or adapting
8 to the impacts of ocean acidification and coastal
9 acidification; and

10 “(3) establishing and maintaining the data ar-
11 chive system under subsection (d).

12 “(d) DATA ARCHIVE SYSTEM.—

13 “(1) IN GENERAL.—The Secretary, in coordina-
14 tion with the members of the interagency working
15 group, shall support the long-term stewardship of,
16 and access to, data relating to ocean and coastal
17 acidification through providing the data on a pub-
18 licly accessible data archive system. To the extent pos-
19 sible, this data archive system shall collect and pro-
20 vide access to ocean and coastal acidification data—

21 “(A) from relevant federally funded re-
22 search;

23 “(B) provided by a Federal, State, or local
24 government, academic scientist, citizen scientist,
25 or industry organization;

1 “(C) voluntarily submitted by Tribes or
2 Tribal governments; and

3 “(D) from existing global or national data
4 assets that are currently maintained within Fed-
5 eral agencies.

6 “(2) *DATA STANDARDS.*—The Secretary to, the
7 extent possible, shall ensure all such data adheres to
8 data and metadata standards to support the public
9 findability, accessibility, interoperability, and
10 reusability of such data.”.

11 **SEC. 10647. NSF OCEAN ACIDIFICATION ACTIVITIES.**

12 Section 12407 of the Federal Ocean Acidification Re-
13 search and Monitoring Act of 2009 (33 U.S.C. 3706) is
14 amended—

15 (1) by striking “ocean acidification” each place
16 it appears and inserting “ocean acidification and
17 coastal acidification”;

18 (2) in subsection (a)—

19 (A) in the matter preceding paragraph (1),
20 by striking “its impacts” and inserting “their
21 respective impacts”;

22 (B) in paragraph (3), by striking “and its
23 impacts” and inserting “and their respective im-
24 pacts”;

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

3 (D) by adding at the end the following new
4 paragraph:

5 “(5) adaptation and mitigation strategies to ad-
6 dress socioeconomic effects of ocean acidification and
7 coastal acidification.”; and

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

9 “(d) **REQUIREMENT.**—Recipients of grants from the
10 National Science Foundation under this subtitle that collect
11 data described under section 12406(d) shall—

12 “(1) collect data in accordance with the stand-
13 ards, protocols, or procedures established pursuant to
14 section 12406(d); and

15 “(2) submit such data to the Director and the
16 Secretary after publication, in accordance with any
17 rules promulgated by the Director or the Secretary.”.

18 **SEC. 10648. NASA OCEAN ACIDIFICATION ACTIVITIES.**

19 Section 12408 of the Federal Ocean Acidification Re-
20 search and Monitoring Act of 2009 (33 U.S.C. 3707) is
21 amended—

22 (1) by striking “ocean acidification” each place
23 it appears and inserting “ocean acidification and
24 coastal acidification”;

1 (2) *in subsection (a), by striking “its impacts”*
 2 *and inserting “their respective impacts”;* and

3 (3) *by adding at the end the following new sub-*
 4 *section:*

5 “(d) *REQUIREMENT.—Researchers from the National*
 6 *Aeronautics and Space Administration under this subtitle*
 7 *that collect data described under section 12406(d) shall—*

8 “(1) *collect such data in accordance with the*
 9 *standards, protocols, or procedures established pursu-*
 10 *ant to section 12406(d); and*

11 “(2) *submit such data to the Administrator and*
 12 *the Secretary, in accordance with any rules promul-*
 13 *gated by the Administrator or the Secretary.”.*

14 **SEC. 10649. AUTHORIZATION OF APPROPRIATIONS.**

15 *Section 12409 of the Federal Ocean Acidification Re-*
 16 *search and Monitoring Act of 2009 (33 U.S.C. 3708) is*
 17 *amended—*

18 (1) *in subsection (a), by striking “subtitle—”*
 19 *and all that follows through paragraph (4) and in-*
 20 *serting the following: “subtitle—*

21 “(1) *\$20,500,000 for fiscal year 2023;*

22 “(2) *\$22,000,000 for fiscal year 2024;*

23 “(3) *\$24,000,000 for fiscal year 2025;*

24 “(4) *\$26,000,000 for fiscal year 2026; and*

25 “(5) *\$28,000,000 for fiscal year 2027.”; and*

1 (2) *in subsection (b), by striking “subtitle—”*
2 *and all that follows through paragraph (4) and in-*
3 *serting the following: “subtitle, \$20,000,000 for each*
4 *of the fiscal years 2023 through 2027.”.*

5 ***Subtitle F—Interagency Working***
6 ***Group***

7 ***SEC. 10651. INTERAGENCY WORKING GROUP.***

8 (a) *ESTABLISHMENT.—The Director of the Office of*
9 *Science and Technology Policy, acting through the National*
10 *Science and Technology Council, shall establish or designate*
11 *an interagency working group to coordinate the activities*
12 *specified in subsection (c).*

13 (b) *COMPOSITION.—The interagency working group*
14 *shall be composed of the following members (or their des-*
15 *ignees), who may be organized into subcommittees, as ap-*
16 *propriate:*

17 (1) *The Secretary of Commerce.*

18 (2) *The Director of the National Science Foun-*
19 *dation.*

20 (3) *The Secretary of Energy.*

21 (4) *The Secretary of Defense.*

22 (5) *The Director of the National Economic*
23 *Council.*

24 (6) *The Director of the Office of Management*
25 *and Budget.*

1 (7) *The Secretary of Health and Human Serv-*
2 *ices.*

3 (8) *The Administrator of the National Aero-*
4 *nautics and Space Administration.*

5 (9) *The Secretary of Agriculture.*

6 (10) *The Director of National Intelligence.*

7 (11) *The Director of the Federal Bureau of In-*
8 *vestigation.*

9 (12) *Such other Federal officials as the Director*
10 *of the Office of Science and Technology Policy con-*
11 *siders appropriate, including members of the National*
12 *Science and Technology Council Committee on Tech-*
13 *nology.*

14 (c) *COORDINATION.—The interagency working group*
15 *shall seek to ensure that the activities of different Federal*
16 *agencies enhance and complement, but, as appropriate, do*
17 *not duplicate, efforts being carried out by another Federal*
18 *agency, with a focus on the following:*

19 (1) *The activities of the National Science Foun-*
20 *ation Technology, Innovation, and Partnerships Di-*
21 *rectorate in the key technology focus areas, such as*
22 *within the Regional Innovation Engines under sec-*
23 *tion 10388 and test beds under section 10390.*

24 (2) *The activities of the Department of Com-*
25 *merce under this division, including regional tech-*

1 *nology hubs under section 28 of the Stevenson-Wydler*
2 *Act of 1980 (15 U.S.C. 13701 et seq.), as added by*
3 *section 10621, the Manufacturing USA Program es-*
4 *tablished under section 34(b)(1) of the National Insti-*
5 *tute of Standards and Technology Act (15 U.S.C.*
6 *278s(b)(1)), and the Hollings Manufacturing Exten-*
7 *sion Partnership (15 U.S.C. 278k).*

8 *(3) The activities of the Department of Energy*
9 *in the key technology focus areas, including at the na-*
10 *tional laboratories, and at Federal laboratories, as de-*
11 *finied in section 4 of the Stevenson-Wydler Technology*
12 *Innovation Act of 1980 (15 U.S.C. 3703), and facili-*
13 *ties and user facilities operated in partnership with*
14 *such national laboratories or the Department of En-*
15 *ergy.*

16 *(4) Any other program that the Director of the*
17 *Office of Science and Technology Policy determines*
18 *involves research and development with respect to the*
19 *key technology focus areas.*

20 *(d) REPORT.—The interagency working group shall—*

21 *(1) by not later than 180 days after the date of*
22 *enactment of this division—*

23 *(A) conduct an initial review of Federal*
24 *programs and resources with respect to the key*

1 *technology focus areas identified pursuant to sec-*
2 *tion 10387(a)(2), in order to—*

3 *(i) assess current level of efforts and*
4 *characterize existing research infrastructure,*
5 *as of the date of the review;*

6 *(ii) identify potential areas of overlap*
7 *or duplication with respect to the key tech-*
8 *nology focus areas; and*

9 *(iii) identify potential cross-agency*
10 *collaborations and joint funding opportuni-*
11 *ties; and*

12 *(B) submit a report regarding the review*
13 *described in subparagraph (A) to Congress; and*

14 *(C) seek stakeholder input and recommenda-*
15 *tions in the course of such review; and*

16 *(2) shall carry out the annual reviews and up-*
17 *dates required under section 10387(e).*

18 *(e) CONFLICTS.—If any conflicts between Federal*
19 *agencies arise while carrying out the activities under this*
20 *section, the President shall make the final decision regard-*
21 *ing resolution of the conflict.*

1 **Subtitle G—Quantum Networking**
2 **and Communications**

3 **SEC. 10661. QUANTUM NETWORKING AND COMMUNICA-**
4 **TIONS.**

5 (a) *DEFINITIONS.—In this section:*

6 (1) *DIRECTOR.—The term “Director” means the*
7 *Director of the National Science Foundation.*

8 (2) *APPROPRIATE COMMITTEES OF CONGRESS.—*
9 *The term “appropriate committees of Congress” has*
10 *the meaning given such term in section 2 of the Na-*
11 *tional Quantum Initiative Act (15 U.S.C. 8801).*

12 (3) *Q2WORK PROGRAM.—The term “Q2Work*
13 *Program” means the Q2Work Program supported by*
14 *the Foundation.*

15 (b) *QUANTUM NETWORKING WORKING GROUP REPORT*
16 *ON QUANTUM NETWORKING AND COMMUNICATIONS.—*

17 (1) *REPORT.—Section 103 of the National*
18 *Quantum Initiative Act (15 U.S.C. 8813) is amended*
19 *by adding the following at the end the following new*
20 *subsection:*

21 *“(h) REPORT ON QUANTUM NETWORKING AND COMMU-*
22 *NICATIONS.—*

23 *“(1) IN GENERAL.—Not later than January 1,*
24 *2026, the Quantum Networking Working Group with-*
25 *in the Subcommittee on Quantum Information*

1 *Science of the National Science and Technology Council,*
2 *in coordination with the Subcommittee on the*
3 *Economic and Security Implications of Quantum In-*
4 *formation Science, shall submit to the appropriate*
5 *committees of Congress a report detailing a plan for*
6 *the advancement of quantum networking and commu-*
7 *nications technology in the United States, building on*
8 *the report entitled A Strategic Vision for America's*
9 *Quantum Networks and A Coordinated Approach for*
10 *Quantum Networking Research.*

11 “(2) *REQUIREMENTS.*—*The report under para-*
12 *graph (1) shall include the following:*

13 “(A) *An update to the report entitled Co-*
14 *ordinated Approach to Quantum Networking Re-*
15 *search Report focusing on a framework for inter-*
16 *agency collaboration regarding the advancement*
17 *of quantum networking and communications re-*
18 *search.*

19 “(B) *A plan for Federal Government part-*
20 *nership with the private sector and interagency*
21 *collaboration regarding engagement in inter-*
22 *national standards for quantum networking and*
23 *communications technology, including a list of*
24 *Federal priorities for standards relating to such*
25 *networking and technology.*

1 “(C) A proposal for the protection of na-
2 tional security interests relating to the advance-
3 ment of quantum networking and communica-
4 tions technology.

5 “(D) An assessment of the relative position
6 of the United States with respect to other coun-
7 tries in the global race to develop, demonstrate,
8 and utilize quantum networking and commu-
9 nications technology.

10 “(E) Recommendations to Congress for leg-
11 islative action relating to the matters considered
12 under subparagraphs (A), (B), (C), and (D).

13 “(F) Such other matters as the Quantum
14 Network Working Group considers necessary to
15 advance the security of communications and net-
16 work infrastructure, remain at the forefront of
17 scientific discovery in the quantum information
18 science domain, and transition quantum infor-
19 mation science research into the emerging quan-
20 tum technology economy.”.

21 (c) QUANTUM NETWORKING AND COMMUNICATIONS
22 RESEARCH AND STANDARDIZATION.—

23 (1) RESEARCH.—Subsection (a) of section 201 of
24 the National Quantum Initiative Act (15 U.S.C.
25 8831) is amended by—

1 (A) redesignating paragraphs (3) and (4)
2 as paragraphs (6) and (7), respectively; and

3 (B) inserting after paragraph (2) the fol-
4 lowing new paragraphs:

5 “(3) shall carry out research to facilitate the de-
6 velopment and standardization of quantum cryptog-
7 raphy and post-quantum classical cryptography;

8 “(4) shall carry out research to facilitate the de-
9 velopment and standardization of quantum net-
10 working, communications, and sensing technologies
11 and applications;

12 “(5) for quantum technologies determined by the
13 Director of the National Institute of Standards and
14 Technology to be at a readiness level sufficient for
15 standardization, shall provide technical review and
16 assistance to such other Federal agencies as the Direc-
17 tor considers appropriate for the development of
18 quantum networking infrastructure standards;”.

19 (2) *AUTHORIZATION OF APPROPRIATIONS.*—
20 There is authorized to be appropriated to the Sci-
21 entific and Technical Research and Services account
22 of the National Institute of Standards and Technology
23 to carry out paragraphs (3) through (5) of subsection
24 (a) of section 201 of the National Quantum Initiative
25 Act (as inserted pursuant to the amendments made by

1 *paragraph (1) of this subsection) \$15,000,000 for each*
2 *of fiscal years 2023 through 2027.*

3 *(d) QUANTUM INFORMATION SCIENCE WORKFORCE*
4 *EVALUATION AND ACCELERATION.—*

5 *(1) IN GENERAL.—Not later than 180 days after*
6 *the date of the enactment of this Act, the Director*
7 *shall enter into an agreement with the National Acad-*
8 *emies of Sciences, Engineering, and Medicine to con-*
9 *duct a study to evaluate and make recommendations*
10 *for the quantum information science workforce. The*
11 *study shall—*

12 *(A) characterize the quantum information*
13 *science workforce, including by—*

14 *(i) describing what constitutes a quan-*
15 *tum information science qualified worker*
16 *across sectors, including academia, the Fed-*
17 *eral Government, and industry; and*

18 *(ii) describing the size and makeup of*
19 *the quantum information science workforce,*
20 *including an assessment of current and fu-*
21 *ture trends;*

22 *(B) identify near- and long-term quantum*
23 *information science workforce needs across gov-*
24 *ernment, academia, and industry sectors, includ-*

1 *ing identifying the cross-disciplinary academic*
2 *degrees or academic courses necessary to—*

3 *(i) prepare students for multiple career*
4 *pathways in quantum information sciences*
5 *and related fields;*

6 *(ii) ensure the United States is com-*
7 *petitive in the field of quantum information*
8 *science while preserving national security;*
9 *and*

10 *(iii) support the development of quan-*
11 *tum applications;*

12 *(C) assess the state of quantum information*
13 *science education and skills training at all edu-*
14 *cation levels and identify gaps in meeting cur-*
15 *rent and future workforce needs, including with*
16 *respect to—*

17 *(i) elementary, middle, and high-school*
18 *student access to foundational courses, age-*
19 *appropriate quantum concepts, and hands-*
20 *on learning opportunities;*

21 *(ii) elementary, middle, and high-*
22 *school teacher professional development and*
23 *access to resources, materials, lesson plans,*
24 *modules, and curricula;*

1 (iii) *career pivot and skills training*
2 *opportunities, including professional certifi-*
3 *cates and internships; and*

4 (iv) *higher education curricula, labora-*
5 *tory experiences in academia, the Federal*
6 *Government, and industry settings, and*
7 *cross-discipline degree programs aligned*
8 *with workforce needs; and*

9 (D) *make recommendations for developing a*
10 *diverse, flexible, and sustainable quantum infor-*
11 *mation science workforce that meets the evolving*
12 *needs of academia, the Federal Government, and*
13 *industry.*

14 (2) *REPORT.*—*Not later than two years after the*
15 *date of the enactment of this Act, the National Acad-*
16 *emies of Science, Engineering, and Medicine shall*
17 *submit to Congress and the Director a report con-*
18 *taining the results of the study conducted pursuant to*
19 *paragraph (1).*

20 (e) *INCORPORATING QISE INTO STEM CUR-*
21 *RICULUM.*—

22 (1) *IN GENERAL.*—*Section 301 of the National*
23 *Quantum Initiative Act (15 U.S.C. 8841) is amended*
24 *by adding the following at the end:*

1 “(d) *INCORPORATING QISE INTO STEM CUR-*
2 *RICULUM.*—

3 “(1) *IN GENERAL.*—*The Director of the National*
4 *Science Foundation shall, through programs carried*
5 *out or supported by the National Science Foundation,*
6 *seek to increase the integration of quantum informa-*
7 *tion science and engineering (referred to in this sub-*
8 *section as ‘QISE’) into the STEM curriculum at all*
9 *education levels, including community colleges, as*
10 *considered appropriate by the Director.*

11 “(2) *CURRICULUM INTEGRATION.*—*The cur-*
12 *riculum integration under paragraph (1) may in-*
13 *clude the following:*

14 “(A) *Methods to conceptualize QISE for ele-*
15 *mentary, middle, and high school curricula.*

16 “(B) *Methods for strengthening*
17 *foundational mathematics and science curricula.*

18 “(C) *Methods for integrating students who*
19 *are underserved or historically underrepresented*
20 *groups in STEM.*

21 “(D) *Age-appropriate materials that apply*
22 *the principles of quantum information science in*
23 *STEM fields.*

24 “(E) *Recommendations for the standardiza-*
25 *tion of key concepts, definitions, and curriculum*

1 *criteria across government, academia, and in-*
2 *dustry.*

3 “(F) *Materials that specifically address the*
4 *findings and outcomes of the study to evaluate*
5 *and make recommendations for the quantum in-*
6 *formation science workforce pursuant to sub-*
7 *section (d) of section 10661 of the Research and*
8 *Development, Competition, and Innovation Act*
9 *and strategies to account for the skills and work-*
10 *force needs identified through such study.*

11 “(3) *COORDINATION.—In carrying out this sub-*
12 *section, the Director shall coordinate with relevant*
13 *Federal agencies, and consult with nongovernmental*
14 *entities with expertise in QISE, as appropriate,*
15 *which may include institutions eligible to participate*
16 *in the Established Program to Stimulate Competitive*
17 *Research (EPSCoR).*

18 “(4) *DEFINITION.—In this subsection, the term*
19 *‘STEM’ means the academic and professional dis-*
20 *ciplines of science, technology, engineering, and math-*
21 *ematics, including computer science.”.*

22 (f) *QUANTUM EDUCATION PILOT PROGRAM.—*

23 (1) *IN GENERAL.—Not later than one year after*
24 *the date of the enactment of this Act, the Director,*
25 *building on the National Science Foundation’s role in*

1 *the National Q–12 Education Partnership and pro-*
2 *grams such as Q2Work Program, shall make awards*
3 *to institutions of higher education, non-profit organi-*
4 *zations, or consortia thereof to carry out a pilot pro-*
5 *gram, to be known as the “Next Generation Quantum*
6 *Leaders Pilot Program” (in this subsection referred to*
7 *as the “Program”), for the education and training of*
8 *the next generation of students and teachers in the*
9 *fundamental principles of quantum mechanics.*

10 (2) *REQUIREMENTS.—*

11 (A) *IN GENERAL.—In carrying out the Pro-*
12 *gram, the Director shall—*

13 (i) *encourage awardees to coordinate*
14 *with educational service agencies (as such*
15 *term “educational service agency” is defined*
16 *in section 602(5) of the Individuals with*
17 *Disabilities Education Improvement Act of*
18 *2004 (20 U.S.C. 1401(5))), associations that*
19 *support STEM educators or local edu-*
20 *cational agencies, and partnerships through*
21 *the Q–12 Education Partnership, to encour-*
22 *age elementary schools, middle schools, and*
23 *secondary schools, and State educational*
24 *agencies to participate in the Program;*

1 (ii) require that awardees partner with
2 elementary schools, middle schools, or sec-
3 ondary schools, or consortia thereof, and
4 State educational agencies, to carry out ac-
5 tivities under the Program;

6 (B) USE OF FUNDS.—In carrying out the
7 Program, the Director shall make competitive,
8 merit-reviewed awards to—

9 (i) support testing, evaluation, dis-
10 semination, and implementation of age-ap-
11 propriate quantum information sciences
12 curricula and resources, including the inte-
13 gration of quantum information science and
14 engineering into the STEM curriculum pur-
15 suant to subsection (d) of section 301 of the
16 National Quantum Initiative Act (15
17 U.S.C. 8841), as added by subsection (e);

18 (ii) support opportunities for informal
19 education on quantum concepts, including
20 informal hands-on learning opportunities;

21 (iii) support opportunities for students
22 to further explore quantum information
23 science education and related careers;

24 (iv) develop and implement training,
25 research, and professional development pro-

1 *grams for teachers, including innovative*
2 *pre-service and in-service programs, in*
3 *quantum information science and related*
4 *fields; and*

5 *(v) carry out such other activities as*
6 *the Director determines appropriate.*

7 *(C) DISTRIBUTION.—In carrying out the*
8 *Program and to the extent practicable, the Direc-*
9 *tor shall ensure there is a wide, equitable dis-*
10 *tribution of Program participants across diverse*
11 *geographic areas and that the Program includes*
12 *a diverse representation of students, including*
13 *students from groups historically underrep-*
14 *resented in STEM.*

15 *(3) CONSULTATION.—The Director shall carry*
16 *out the Program in consultation with the QIS Work-*
17 *force Working Group of the Subcommittee on Quan-*
18 *tum Information Science of the National Science and*
19 *Technology Council and the Advancing Informal*
20 *STEM Learning Program.*

21 *(4) REPORTING.—Not later than four years after*
22 *the date of the enactment of this section, the Director*
23 *shall submit to Congress a report that includes the*
24 *following:*

1 (A) *An assessment, that includes feedback*
2 *from a wide range of stakeholders in academia,*
3 *K-12 education, and the private sector, of the ef-*
4 *fectiveness of the Program in scaling up imple-*
5 *mentation of effective quantum education and*
6 *training innovations.*

7 (B) *If determined to be effective, a plan for*
8 *integrating the Program into existing programs,*
9 *including the feasibility and advisability of ex-*
10 *anding the scope of the Program to include ad-*
11 *ditional technology areas, grade levels, and edu-*
12 *cational institutions beyond those originally se-*
13 *lected to participate in the Program.*

14 (5) *AUTHORIZATION OF APPROPRIATIONS.—*
15 *There are authorized to be appropriated to the Direc-*
16 *tor \$8,000,000 for each of fiscal years 2023 through*
17 *2026 to carry out this section.*

18 (6) *TERMINATION.—This subsection shall termi-*
19 *nate on the date that is four years after the date of*
20 *the enactment of this Act.*

1 ***Subtitle H—Blockchain Specialist***

2 ***SEC. 10671. ESTABLISHMENT OF BLOCKCHAIN AND***
 3 ***CRYPTOCURRENCY SPECIALIST POSITION***
 4 ***WITHIN OSTP.***

5 *The Director of the Office of Science and Technology*
 6 *Policy shall establish or designate a blockchain and*
 7 *cryptocurrencies advisory specialist position within the Of-*
 8 *fice to coordinate Federal activities and advise the Presi-*
 9 *dent on matters of research and development relating to*
 10 *blockchain, cryptocurrencies, and distributed ledger tech-*
 11 *nologies.*

12 ***Subtitle I—Partnerships for Energy***
 13 ***Security and Innovation***

14 ***SEC. 10691. FOUNDATION FOR ENERGY SECURITY AND IN-***
 15 ***NOVATION.***

16 *(a) DEFINITIONS.—In this section:*

17 *(1) BOARD.—The term “Board” means the*
 18 *Board of Directors described in subsection (b)(2)(A).*

19 *(2) DEPARTMENT.—The term “Department”*
 20 *means the Department of Energy.*

21 *(3) EXECUTIVE DIRECTOR.—The term “Execu-*
 22 *tive Director” means the Executive Director described*
 23 *in subsection (b)(5)(A).*

1 (4) *FOUNDATION.*—*The term “Foundation”*
2 *means the Foundation for Energy Security and Inno-*
3 *vation established under subsection (b)(1).*

4 (5) *HISTORICALLY BLACK COLLEGE OR UNIVER-*
5 *SITY.*—*The term “historically Black college or univer-*
6 *sity” has the meaning given the term “part B institu-*
7 *tion” in section 322 of the Higher Education Act of*
8 *1965 (20 U.S.C. 1061).*

9 (6) *INDIVIDUAL LABORATORY-ASSOCIATED FOUN-*
10 *DATION.*—*The term “Individual Laboratory-Associ-*
11 *ated Foundation” means a Laboratory Foundation*
12 *established by an operating contractor of a National*
13 *Laboratory.*

14 (7) *MINORITY-SERVING INSTITUTION.*—*The term*
15 *“minority serving institution” means a Hispanic-*
16 *serving institution as defined in section 502 of the*
17 *Higher Education Act of 1965 (20 U.S.C. 1101a), an*
18 *Alaska Native-serving institution and a Native Ha-*
19 *waiian-serving institution as defined in section in*
20 *317 of the Higher Education Act of 1965 (20 U.S.C.*
21 *1059d), or a Predominantly Black Institution, Asian*
22 *American and Native American Pacific Islander-serv-*
23 *ing institution, or a Native American-serving non-*
24 *tribal institution as defined in section 371 of the*
25 *Higher Education Act of 1965 (20 U.S.C. 1067q).*

1 (8) *NATIONAL LABORATORY.*—*The term “Na-*
2 *tional Laboratory” has the meaning given the term in*
3 *section 2 of the Energy Policy Act of 2005 (42 U.S.C.*
4 *15801).*

5 (9) *SECRETARY.*—*The term “Secretary” means*
6 *the Secretary of Energy.*

7 (10) *TRIBAL COLLEGE OR UNIVERSITY.*—*The*
8 *term “Tribal College or University” has the meaning*
9 *given in section 316 of the Higher Education Act of*
10 *1965 (20 U.S.C. 1059c).*

11 (b) *FOUNDATION FOR ENERGY SECURITY AND INNOVA-*
12 *TION.*—

13 (1) *ESTABLISHMENT.*—

14 (A) *IN GENERAL.*—*Not later than 180 days*
15 *after the date of enactment of this Act, the Sec-*
16 *retary shall establish a nonprofit corporation to*
17 *be known as the “Foundation for Energy Secu-*
18 *rity and Innovation”.*

19 (B) *MISSION.*—*The mission of the Founda-*
20 *tion shall be—*

21 (i) *to support the mission of the De-*
22 *partment; and*

23 (ii) *to advance collaboration with en-*
24 *ergy researchers, institutions of higher edu-*
25 *cation, industry, and nonprofit and philan-*

1 *thropic organizations to accelerate the com-*
2 *mmercialization of energy technologies.*

3 (C) *LIMITATION.*—*The Foundation shall not*
4 *be an agency or instrumentality of the Federal*
5 *Government.*

6 (D) *TAX-EXEMPT STATUS.*—*The Board shall*
7 *take all necessary and appropriate steps to en-*
8 *sure that the Foundation is an organization that*
9 *is described in section 501(c) of the Internal*
10 *Revenue Code of 1986 and exempt from taxation*
11 *under section 501(a) of that Code.*

12 (E) *COLLABORATION WITH EXISTING ORGA-*
13 *NIZATIONS.*—*The Secretary may collaborate with*
14 *1 or more organizations to establish the Founda-*
15 *tion and carry out the activities of the Founda-*
16 *tion.*

17 (2) *BOARD OF DIRECTORS.*—

18 (A) *ESTABLISHMENT.*—*The Foundation*
19 *shall be governed by a Board of Directors.*

20 (B) *COMPOSITION.*—

21 (i) *IN GENERAL.*—*The Board shall be*
22 *composed of the ex officio nonvoting mem-*
23 *bers described in clause (ii) and the ap-*
24 *pointed voting members described in clause*
25 *(iii).*

1 (ii) *EX OFFICIO MEMBERS.*—*The ex*
2 *officio members of the Board shall be the fol-*
3 *lowing individuals or designees of those in-*
4 *dividuals:*

5 (I) *The Secretary.*

6 (II) *The Under Secretary for*
7 *Science.*

8 (III) *The Under Secretary for Nu-*
9 *clear Security.*

10 (IV) *The Chief Commercialization*
11 *Officer.*

12 (iii) *APPOINTED MEMBERS.*—

13 (I) *INITIAL MEMBERS.*—*The Sec-*
14 *retary and the other ex officio members*
15 *of the Board shall—*

16 (aa) *seek to enter into an*
17 *agreement with the National*
18 *Academies of Sciences, Engineer-*
19 *ing, and Medicine to develop a*
20 *list of individuals to serve as*
21 *members of the Board who are*
22 *well-qualified and will meet the*
23 *requirements of subclauses (II)*
24 *and (III); and*

1 (bb) appoint the initial
2 members of the Board from that
3 list, if applicable, in consultation
4 with the National Academies of
5 Sciences, Engineering, and Medi-
6 cine.

7 (II) REPRESENTATION.—The ap-
8 pointed members of the Board shall re-
9 flect a broad cross-section of stake-
10 holders from academia, National Lab-
11 oratories, industry, nonprofit organiza-
12 tions, State or local governments, the
13 investment community, and the phil-
14 anthropic community.

15 (III) EXPERIENCE.—The Sec-
16 retary shall ensure that a majority of
17 the appointed members of the Board—

18 (aa)(AA) has experience in
19 the energy sector;

20 (BB) has research experience
21 in the energy field; or

22 (CC) has experience in tech-
23 nology commercialization or foun-
24 dation operations; and

1 *(bb) to the extent practicable,*
2 *represents diverse regions, sectors,*
3 *and communities.*

4 (C) *CHAIR AND VICE CHAIR.—*

5 *(i) IN GENERAL.—The Board shall des-*
6 *ignate from among the members of the*
7 *Board—*

8 *(I) an individual to serve as*
9 *Chair of the Board; and*

10 *(II) an individual to serve as Vice*
11 *Chair of the Board.*

12 *(ii) TERMS.—The term of service of the*
13 *Chair and Vice Chair of the Board shall*
14 *end on the earlier of—*

15 *(I) the date that is 3 years after*
16 *the date on which the Chair or Vice*
17 *Chair of the Board, as applicable, is*
18 *designated for the position; and*

19 *(II) the last day of the term of*
20 *service of the member, as determined*
21 *under subparagraph (D)(i), who is des-*
22 *ignated to be Chair or Vice Chair of*
23 *the Board, as applicable.*

24 *(iii) REPRESENTATION.—The Chair*
25 *and Vice Chair of the Board—*

1 (I) shall not be representatives of
2 the same area of subject matter exper-
3 tise, or entity, as applicable, under
4 subparagraph (B)(iii)(II); and

5 (II) shall not be representatives of
6 any area of subject matter expertise, or
7 entity, as applicable, represented by
8 the immediately preceding Chair and
9 Vice Chair of the Board.

10 (D) TERMS AND VACANCIES.—

11 (i) TERMS.—

12 (I) IN GENERAL.—The term of
13 service of each appointed member of
14 the Board shall be not more than 5
15 years.

16 (II) INITIAL APPOINTED MEM-
17 BERS.—Of the initial members of the
18 Board appointed under subparagraph
19 (B)(iii)(I), half of the members shall
20 serve for 4 years and half of the mem-
21 bers shall serve for 5 years, as deter-
22 mined by the Chair of the Board.

23 (ii) VACANCIES.—Any vacancy in the
24 membership of the appointed members of the
25 Board—

1 (I) shall be filled in accordance
2 with the bylaws of the Foundation by
3 an individual capable of representing
4 the same area or entity, as applicable,
5 as represented by the vacating board
6 member under subparagraph
7 (B)(iii)(II);

8 (II) shall not affect the power of
9 the remaining appointed members to
10 execute the duties of the Board; and

11 (III) shall be filled by an indi-
12 vidual selected by the Board.

13 (E) MEETINGS; QUORUM.—

14 (i) INITIAL MEETING.—Not later than
15 60 days after the Board is established, the
16 Secretary shall convene a meeting of the ex
17 officio and appointed members of the Board
18 to incorporate the Foundation.

19 (ii) QUORUM.—A majority of the ap-
20 pointed members of the Board shall con-
21 stitute a quorum for purposes of conducting
22 the business of the Board.

23 (F) DUTIES.—The Board shall—

24 (i) establish bylaws for the Foundation
25 in accordance with subparagraph (G);

1 (ii) provide overall direction for the ac-
2 tivities of the Foundation and establish pri-
3 ority activities;

4 (iii) carry out any other necessary ac-
5 tivities of the Foundation;

6 (iv) evaluate the performance of the
7 Executive Director; and

8 (v) actively solicit and accept funds,
9 gifts, grants, devises, or bequests of real or
10 personal property to the Foundation, in-
11 cluding from private entities.

12 (G) BYLAWS.—

13 (i) *IN GENERAL.*—The bylaws estab-
14 lished under subparagraph (F)(i) may in-
15 clude—

16 (I) policies for the selection of
17 Board members, officers, employees,
18 agents, and contractors of the Founda-
19 tion;

20 (II) policies, including ethical
21 standards, for—

22 (aa) the acceptance, sollicita-
23 tion, and disposition of donations
24 and grants to the Foundation, in-
25 cluding appropriate limits on the

1 *ability of donors to designate, by*
2 *stipulation or restriction, the use*
3 *or recipient of donated funds; and*

4 *(bb) the disposition of assets*
5 *of the Foundation;*

6 *(III) policies that subject all em-*
7 *ployees, fellows, trainees, and other*
8 *agents of the Foundation (including ex*
9 *officio and appointed members of the*
10 *Board) to conflict of interest standards;*
11 *and*

12 *(IV) the specific duties of the Ex-*
13 *ecutive Director.*

14 *(ii) REQUIREMENTS.—The Board shall*
15 *ensure that the bylaws of the Foundation*
16 *and the activities carried out under those*
17 *bylaws shall not—*

18 *(I) reflect unfavorably on the abil-*
19 *ity of the Foundation to carry out ac-*
20 *tivities in a fair and objective manner;*
21 *or*

22 *(II) compromise, or appear to*
23 *compromise, the integrity of any gov-*
24 *ernmental agency or program, or any*
25 *officer or employee employed by, or in-*

1 *involved in, a governmental agency or*
2 *program.*

3 *(H) COMPENSATION.—*

4 *(i) IN GENERAL.—No member of the*
5 *Board shall receive compensation for serv-*
6 *ing on the Board.*

7 *(ii) CERTAIN EXPENSES.—In accord-*
8 *ance with the bylaws of the Foundation,*
9 *members of the Board may be reimbursed*
10 *for travel expenses, including per diem in*
11 *lieu of subsistence, and other necessary ex-*
12 *penses incurred in carrying out the duties*
13 *of the Board.*

14 *(I) RESTRICTION ON MEMBERSHIP.—No*
15 *employee of the Department shall be appointed*
16 *as a member of the Board of Directors.*

17 *(3) PURPOSES.—The purposes of the Foundation*
18 *are—*

19 *(A) to support the Department in carrying*
20 *out the mission of the Department to ensure the*
21 *security and prosperity of the United States by*
22 *addressing energy and environmental challenges*
23 *through transformative science and technology*
24 *solutions; and*

1 *(B) to increase private and philanthropic*
2 *sector investments that support efforts to create,*
3 *characterize, develop, test, validate, and deploy*
4 *or commercialize innovative technologies that ad-*
5 *dress crosscutting national energy challenges, in-*
6 *cluding those affecting minority, rural, and other*
7 *underserved communities, by methods that in-*
8 *clude—*

9 *(i) fostering collaboration and partner-*
10 *ships with researchers from the Federal*
11 *Government, State governments, institu-*
12 *tions of higher education, including histori-*
13 *cally Black colleges or universities, Tribal*
14 *Colleges or Universities, and minority-serv-*
15 *ing institutions, federally funded research*
16 *and development centers, industry, and*
17 *nonprofit organizations for the research, de-*
18 *velopment, or commercialization of trans-*
19 *formative energy and associated tech-*
20 *nologies;*

21 *(ii) strengthening and sharing best*
22 *practices relating to regional economic de-*
23 *velopment through scientific and energy in-*
24 *novation, including in partnership with an*

1 *Individual Laboratory-Associated Founda-*
2 *tion;*

3 (iii) *promoting new product develop-*
4 *ment that supports job creation;*

5 (iv) *administering prize competi-*
6 *tions—*

7 (I) *to accelerate private sector*
8 *competition and investment; and*

9 (II) *that complement the use of*
10 *prize authority by the Department;*

11 (v) *supporting programs that advance*
12 *technology maturation, especially where*
13 *there may be gaps in Federal or private*
14 *funding in advancing a technology to de-*
15 *ployment or commercialization from the*
16 *prototype stage to a commercial stage;*

17 (vi) *supporting efforts to broaden par-*
18 *ticipation in energy technology development*
19 *among individuals from historically under-*
20 *represented groups or regions; and*

21 (vii) *facilitating access to Department*
22 *facilities, equipment, and expertise to assist*
23 *in tackling national challenges.*

24 (4) *ACTIVITIES.—*

1 (A) *STUDIES, COMPETITIONS, AND*
2 *PROJECTS.—The Foundation may conduct and*
3 *support studies, competitions, projects, and other*
4 *activities that further the purposes of the Foun-*
5 *ation described in paragraph (3).*

6 (B) *FELLOWSHIPS AND GRANTS.—*

7 (i) *IN GENERAL.—The Foundation*
8 *may award fellowships and grants for ac-*
9 *tivities relating to research, development,*
10 *demonstration, maturation, or commer-*
11 *cialization of energy and other Department-*
12 *supported technologies.*

13 (ii) *FORM OF AWARD.—A fellowship or*
14 *grant under clause (i) may consist of a sti-*
15 *pend, health insurance benefits, funds for*
16 *travel, and funds for other appropriate ex-*
17 *penses.*

18 (iii) *SELECTION.—In selecting a re-*
19 *ipient for a fellowship or grant under*
20 *clause (i), the Foundation—*

21 *(I) shall make the selection based*
22 *on the technical and commercialization*
23 *merits of the proposed project of the*
24 *potential recipient; and*

1 (ii) may consult with a potential
2 recipient regarding the ability of the
3 potential recipient to carry out various
4 projects that would further the pur-
5 poses of the Foundation described in
6 paragraph (3).

7 (iv) NATIONAL LABORATORIES.—A Na-
8 tional Laboratory that applies for or ac-
9 cepts an award under clause (i) shall not be
10 considered to be engaging in a competitive
11 process.

12 (C) ACCESSING FACILITIES AND EXPER-
13 TISE.—The Foundation may work with the De-
14 partment—

15 (i) to leverage the capabilities and fa-
16 cilities of National Laboratories to commer-
17 cialize technology; and

18 (ii) to assist with resources, including
19 by providing information on the assets of
20 each National Laboratory that may enable
21 the deployment and commercialization of
22 technology.

23 (D) TRAINING AND EDUCATION.—The Foun-
24 dation may support programs that provide
25 training to researchers, scientists, other relevant

1 *personnel at National Laboratories and institu-*
2 *tions of higher education, and previous or cur-*
3 *rent recipients of or applicants for Department*
4 *funding to help research, develop, demonstrate,*
5 *deploy, and commercialize federally funded tech-*
6 *nology.*

7 (E) *MATURATION FUNDING.—The Founda-*
8 *tion shall support programs that provide matu-*
9 *ration funding to researchers to advance the*
10 *technology of those researchers for the purpose of*
11 *moving products from a prototype stage to a*
12 *commercial stage.*

13 (F) *STAKEHOLDER ENGAGEMENT.—The*
14 *Foundation shall convene, and may consult with,*
15 *representatives from the Department, institutions*
16 *of higher education, National Laboratories, the*
17 *private sector, and commercialization organiza-*
18 *tions to develop programs for the purposes of the*
19 *Foundation described in paragraph (3) and to*
20 *advance the activities of the Foundation.*

21 (G) *INDIVIDUAL AND FEDERAL LABORA-*
22 *TORY-ASSOCIATED FOUNDATIONS.—*

23 (i) *DEFINITION OF COVERED FOUNDA-*
24 *TION.—In this subparagraph, the term*

1 “covered foundation” means each of the fol-
2 lowing:

3 (I) *An Individual Laboratory- As-*
4 *sociated Foundation.*

5 (II) *A Federal Laboratory- Asso-*
6 *ciated Foundation established pursu-*
7 *ant to subsection (c)(1).*

8 (ii) *SUPPORT.*—*The Foundation shall*
9 *provide support to and collaborate with cov-*
10 *ered foundations.*

11 (iii) *GUIDELINES AND TEMPLATES.*—
12 *For the purpose of providing support under*
13 *clause (ii), the Secretary shall establish sug-*
14 *gested guidelines and templates for covered*
15 *foundations, including—*

16 (I) *a standard adaptable organi-*
17 *zational design for responsible manage-*
18 *ment;*

19 (II) *standard and legally tenable*
20 *bylaws and money-handling proce-*
21 *dures; and*

22 (III) *a standard training cur-*
23 *riculum to orient and expand the oper-*
24 *ating expertise of personnel employed*
25 *by covered foundations.*

1 (iv) *AFFILIATIONS.*—*Nothing in this*
2 *subparagraph requires—*

3 (I) *an existing Individual Lab-*
4 *oratory-Associated Foundation to mod-*
5 *ify current practices or affiliate with*
6 *the Foundation; or*

7 (II) *a covered foundation to be*
8 *bound by charter or corporate bylaws*
9 *as permanently affiliated with the*
10 *Foundation.*

11 (H) *SUPPLEMENTAL PROGRAMS.*—*The*
12 *Foundation may carry out supplemental pro-*
13 *grams—*

14 (i) *to conduct and support forums,*
15 *meetings, conferences, courses, and training*
16 *workshops consistent with the purposes of*
17 *the Foundation described in paragraph (3);*

18 (ii) *to support and encourage the un-*
19 *derstanding and development of data that*
20 *promotes the translation of technologies*
21 *from the research stage, through the develop-*
22 *ment and maturation stage, and ending in*
23 *the market stage;*

24 (iii) *for writing, editing, printing,*
25 *publishing, and vending books and other*

1 *materials relating to research carried out*
2 *under the Foundation and the Department;*
3 *and*

4 *(iv) to conduct other activities to carry*
5 *out and support the purposes of the Foun-*
6 *ation described in paragraph (3).*

7 *(I) EVALUATIONS.—The Foundation shall*
8 *support the development of an evaluation meth-*
9 *odology, to be used as part of any program sup-*
10 *ported by the Foundation, that shall—*

11 *(i) consist of qualitative and quan-*
12 *titative metrics; and*

13 *(ii) include periodic third party eval-*
14 *uation of those programs and other activi-*
15 *ties of the Foundation.*

16 *(J) COMMUNICATIONS.—The Foundation*
17 *shall develop an expertise in communications to*
18 *promote the work of grant and fellowship recipi-*
19 *ents under subparagraph (B), the commercializa-*
20 *tion successes of the Foundation, opportunities*
21 *for partnership with the Foundation, and other*
22 *activities.*

23 *(K) SOLICITATION AND USE OF FUNDS.—*
24 *The Foundation may solicit and accept gifts,*
25 *grants, and other donations, establish accounts,*

1 *and invest and expend funds in support of the*
2 *activities and programs of the Foundation.*

3 (L) *AUTHORITY OF THE FOUNDATION.*—*The*
4 *Foundation shall be the sole entity responsible*
5 *for carrying out the activities described in this*
6 *paragraph.*

7 (5) *ADMINISTRATION.*—

8 (A) *EXECUTIVE DIRECTOR.*—*The Board*
9 *shall hire an Executive Director of the Founda-*
10 *tion, who shall serve at the pleasure of the*
11 *Board. Subject to the compliance with the poli-*
12 *cies and bylaws established pursuant to para-*
13 *graph (2)(G), the Executive Director shall be re-*
14 *sponsible for the daily operations of the Founda-*
15 *tion in carrying the activities described in para-*
16 *graph (4).*

17 (B) *COMPENSATION.*—*The rate of com-*
18 *penetration of the Executive Director shall be fixed*
19 *by the Board.*

20 (C) *ADMINISTRATIVE CONTROL.*—*No mem-*
21 *ber of the Board, officer or employee of the Foun-*
22 *dition or of any program established by the*
23 *Foundation, or participant in a program estab-*
24 *lished by the Foundation, shall exercise adminis-*
25 *trative control over any Federal employee.*

1 (D) *STRATEGIC PLAN*.—Not later than 1
2 year after the date of enactment of this Act, the
3 Foundation shall submit to the Committee on
4 Energy and Natural Resources of the Senate and
5 the Committee on Science, Space, and Tech-
6 nology of the House of Representatives a stra-
7 tegic plan that contains—

8 (i) a plan for the Foundation to be-
9 come financially self-sustaining in fiscal
10 year 2023 and thereafter (except for the
11 amounts provided each fiscal year under
12 paragraph (11)(A)(iii));

13 (ii) a forecast of major crosscutting en-
14 ergy challenge opportunities, including
15 short- and long-term objectives, identified by
16 the Board, with input from communities
17 representing the entities and areas of subject
18 matter expertise, as applicable, described in
19 paragraph (2)(B)(iii)(II);

20 (iii) a description of the efforts that the
21 Foundation will take to be transparent in
22 the processes of the Foundation, including
23 processes relating to—

24 (I) grant awards, including selec-
25 tion, review, and notification;

1 (II) communication of past, cur-
2 rent, and future research priorities;
3 and

4 (III) solicitation of and response
5 to public input on the opportunities
6 identified under clause (ii);

7 (iv) a description of the financial goals
8 and benchmarks of the Foundation for the
9 following 10 years;

10 (v) a description of the efforts under-
11 taken by the Foundation to engage histori-
12 cally underrepresented groups or regions,
13 including through collaborations with his-
14 torically Black colleges and universities,
15 Tribal Colleges or Universities, minority-
16 serving institutions, and minority-owned
17 and women-owned business, and;

18 (vi) a description of the efforts under-
19 taken by the Foundation to ensure max-
20 imum complementarity and minimum re-
21 dundancy with investments made by the
22 Department.

23 (E) ANNUAL REPORT.—Not later than 1
24 year after the date on which the Foundation is
25 established, and every years thereafter, the Foun-

1 *dation shall submit to the Committee on Energy*
2 *and Natural Resources of the Senate, the Com-*
3 *mittee on Science, Space, and Technology of the*
4 *House of Representatives, and the Secretary a*
5 *report that, for the year covered by the report—*

6 *(i) describes the activities of the Foun-*
7 *dation and the progress of the Foundation*
8 *in furthering the purposes of the Founda-*
9 *tion described in paragraph (3);*

10 *(ii) provides a specific accounting of*
11 *the source and use of all funds made avail-*
12 *able to the Foundation to carry out those*
13 *activities to ensure transparency in the*
14 *alignment of Department missions and*
15 *policies with national security;*

16 *(iii) describes how the results of the ac-*
17 *tivities of the Foundation could be incor-*
18 *porated into the procurement processes of*
19 *the General Services Administration; and*

20 *(iv) includes a summary of each eval-*
21 *uation conducted using the evaluation meth-*
22 *odology described in paragraph (4)(I).*

23 *(F) EVALUATION BY COMPTROLLER GEN-*
24 *ERAL.—Not later than 5 years after the date on*
25 *which the Foundation is established, the Comp-*

1 *troller General of the United States shall submit*
2 *to the Committee on Energy and Natural Re-*
3 *sources of the Senate and the Committee on*
4 *Science, Space, and Technology of the House of*
5 *Representatives—*

6 *(i) an evaluation of—*

7 *(I) the extent to which the Foun-*
8 *dation is achieving the mission of the*
9 *Foundation; and*

10 *(II) the operation of the Founda-*
11 *tion; and*

12 *(ii) any recommendations on how the*
13 *Foundation may be improved.*

14 *(G) AUDITS.—The Foundation shall—*

15 *(i) provide for annual audits of the fi-*
16 *nancial condition of the Foundation; and*

17 *(ii) make the audits, and all other*
18 *records, documents, and papers of the Foun-*
19 *dation, available to the Secretary and the*
20 *Comptroller General of the United States*
21 *for examination or audit.*

22 *(H) SEPARATE FUND ACCOUNTS.—The*
23 *Board shall ensure that any funds received under*
24 *paragraph (11)(A) are held in a separate ac-*

1 *count from any other funds received by the*
2 *Foundation.*

3 (I) *INTEGRITY.—*

4 (i) *IN GENERAL.—To ensure integrity*
5 *in the operations of the Foundation, the*
6 *Board shall develop and enforce procedures*
7 *relating to standards of conduct, financial*
8 *disclosure statements, conflicts of interest*
9 *(including recusal and waiver rules), au-*
10 *ditions, and any other matters determined ap-*
11 *propriate by the Board.*

12 (ii) *FINANCIAL CONFLICTS OF INTER-*
13 *EST.—To mitigate conflicts of interest and*
14 *risks from malign foreign influence, any in-*
15 *dividual who is an officer, employee, or*
16 *member of the Board is prohibited from any*
17 *participation in deliberations by the Foun-*
18 *dition of a matter that would directly or*
19 *predictably affect any financial interest*
20 *of—*

21 (I) *the individual;*

22 (II) *a relative (as defined in sec-*
23 *tion 109 of the Ethics in Government*
24 *Act of 1978 (5 U.S.C. App.)) of that*
25 *individual; or*

1 (III) a business organization or
2 other entity in which the individual
3 has an interest, including an organiza-
4 tion or other entity with which the in-
5 dividual is negotiating employment.

6 (J) *INTELLECTUAL PROPERTY.*—The Board
7 shall adopt written standards to govern the own-
8 ership and licensing of any intellectual property
9 rights developed by the Foundation or derived
10 from the collaborative efforts of the Foundation.

11 (K) *LIABILITY.*—

12 (i) *IN GENERAL.*—The United States
13 shall not be liable for any debts, defaults,
14 acts, or omissions of—

15 (I) the Foundation;

16 (II) a Federal entity with respect
17 to an agreement of that Federal entity
18 with the Foundation; or

19 (III) an Individual Laboratory-
20 Associated Foundation with respect to
21 an agreement of that Federal entity
22 with the Foundation.

23 (ii) *FULL FAITH AND CREDIT.*—The
24 full faith and credit of the United States

1 *shall not extend to any obligations of the*
2 *Foundation.*

3 (L) *NONAPPLICABILITY OF FACA.*—*The Fed-*
4 *eral Advisory Committee Act (5 U.S.C. App.)*
5 *shall not apply to the Foundation or an Indi-*
6 *vidual Laboratory-Associated Foundation.*

7 (6) *DEPARTMENT COLLABORATION.*—

8 (A) *NATIONAL LABORATORIES.*—*The Sec-*
9 *retary shall collaborate with the Foundation to*
10 *develop a process to ensure collaboration and co-*
11 *ordination between the Department, the Founda-*
12 *tion, and National Laboratories—*

13 (i) *to streamline contracting processes*
14 *between National Laboratories and the*
15 *Foundation, including by—*

16 (I) *streamlining the ability of the*
17 *Foundation to transfer equipment and*
18 *funds to National Laboratories;*

19 (II) *standardizing contract mech-*
20 *anisms to be used by the Foundation*
21 *in engaging with National Labora-*
22 *tories; and*

23 (III) *streamlining the ability of*
24 *the Foundation to fund endowed posi-*
25 *tions at National Laboratories;*

1 (ii) to allow a National Laboratory or
2 site of a National Laboratory—

3 (I) to accept and perform work for
4 the Foundation, consistent with pro-
5 vided resources, notwithstanding any
6 other provision of law governing the
7 administration, mission, use, or oper-
8 ations of the National Laboratory or
9 site, as applicable; and

10 (II) to perform that work on a
11 basis equal to other missions at the Na-
12 tional Laboratory; and

13 (iii) to permit the director of any Na-
14 tional Laboratory or site of a National Lab-
15 oratory to enter into a cooperative research
16 and development agreement or negotiate a
17 licensing agreement with the Foundation
18 pursuant to section 12 of the Stevenson-
19 Wydler Technology Innovation Act of 1980
20 (15 U.S.C. 3710a).

21 (B) DEPARTMENT LIAISONS.—The Sec-
22 retary shall appoint liaisons from across the De-
23 partment to collaborate and coordinate with the
24 Foundation, including not less than 1 liaison
25 from the Office of Technology Transitions, who

1 *shall ensure that the Foundation works in con-*
2 *junction with and does not duplicate existing ac-*
3 *tivities and programs carried out by the Depart-*
4 *ment, including the Technology Commercializa-*
5 *tion Fund of the Department.*

6 (C) *ADMINISTRATION.*—*The Secretary shall*
7 *leverage appropriate arrangements, contracts,*
8 *and directives to carry out the process developed*
9 *under subparagraph (A).*

10 (7) *NATIONAL SECURITY.*—*Nothing in this sub-*
11 *section exempts the Foundation from any national se-*
12 *curity policy of the Department.*

13 (8) *SUPPORT SERVICES.*—*The Secretary may*
14 *provide facilities, utilities, and support services to the*
15 *Foundation if it is determined by the Secretary to be*
16 *advantageous to the research programs of the Depart-*
17 *ment.*

18 (9) *PREEMPTION OF AUTHORITY.*—*This sub-*
19 *section shall not preempt any authority or responsi-*
20 *bility of the Secretary under any other provision of*
21 *law.*

22 (10) *TRANSFER FUNDS.*—*The Foundation may*
23 *transfer funds to the Department, which shall be sub-*
24 *ject to all applicable Federal limitations relating to*
25 *federally funded research.*

1 (11) *AUTHORIZATION OF APPROPRIATIONS.—*

2 (A) *IN GENERAL.—There is authorized to be*
3 *appropriated—*

4 (i) *not less than \$1,500,000 shall be for*
5 *the Secretary for fiscal year 2023 to estab-*
6 *lish the Foundation;*

7 (ii) *not less than \$30,000,000 shall be*
8 *for the Foundation for fiscal year 2024 to*
9 *carry out the activities of the Foundation;*
10 *and*

11 (iii) *not less than \$3,000,000 shall be*
12 *for the Foundation for each of the fiscal*
13 *years 2025 through 2027 for administrative*
14 *and operational costs.*

15 (B) *LIMITATION.—None of the funds au-*
16 *thorized to be appropriated to the Secretary by*
17 *subparagraph (A)(i) of this paragraph shall be*
18 *used for construction.*

19 (C) *COST SHARE.—Funds made available*
20 *under subparagraph (A)(ii) shall be required to*
21 *be cost- shared by a partner of the Foundation*
22 *other than the Department or a National Lab-*
23 *oratory.*

24 (c) *NATIONAL ENERGY TECHNOLOGY LABORATORY-AS-*
25 *SOCIATED FOUNDATION.—*

1 (1) *ESTABLISHMENT.*—

2 (A) *IN GENERAL.*—*The National Energy*
3 *Technology Laboratory may establish, or enter*
4 *into an agreement with a nonprofit organization*
5 *to establish, a Federal Laboratory-Associated*
6 *Foundation (referred to in this subsection as a*
7 *“Laboratory Foundation”)* to support the mis-
8 *sion of the National Energy Technology Labora-*
9 *tory.*

10 (B) *NOT AGENCY OR INSTRUMENTALITY.*—*A*
11 *Laboratory Foundation shall not be an agency*
12 *or instrumentality of the Federal Government.*

13 (C) *GOVERNANCE STRUCTURE.*—*A Labora-*
14 *tory Foundation established under subparagraph*
15 *(A) shall have a separate governance structure*
16 *from, and shall be managed independently of, the*
17 *National Energy Technology Laboratory.*

18 (2) *ACTIVITIES.*—*Activities of a Laboratory*
19 *Foundation may include—*

20 (A) *conducting support studies, competi-*
21 *tions, projects, research, and other activities that*
22 *further the purpose of the Laboratory Founda-*
23 *tion;*

24 (B) *carrying out programs to foster collabo-*
25 *ration and partnership among researchers from*

1 *the Federal Government, State governments, in-*
2 *stitutions of higher education, federally funded*
3 *research and development centers, and industry*
4 *and nonprofit organizations relating to the re-*
5 *search, development, and commercialization of*
6 *federally supported technologies;*

7 *(C) carrying out programs to leverage tech-*
8 *nologies to support new product development*
9 *that supports regional economic development;*

10 *(D) administering prize competitions—*

11 *(i) to accelerate private sector competi-*
12 *tion and investment; and*

13 *(ii) that complement the use of prize*
14 *authority by the Department;*

15 *(E) providing fellowships and grants to re-*
16 *search and development personnel at, or affili-*
17 *ated with, federally funded centers, in accordance*
18 *with paragraph (3);*

19 *(F) carrying out programs—*

20 *(i) that allow scientists from foreign*
21 *countries to serve in research capacities in*
22 *the United States or other countries in asso-*
23 *ciation with the National Energy Tech-*
24 *nology Laboratory;*

1 (ii) that provide opportunities for em-
2 ployees of the National Energy Technology
3 Laboratory to serve in research capacities
4 in foreign countries;

5 (iii) to conduct studies, projects, or re-
6 search in collaboration with national and
7 international nonprofit and for-profit orga-
8 nizations, which may include the provision
9 of stipends, travel, and other support for
10 personnel;

11 (iv)(I) to hold forums, meetings, con-
12 ferences, courses, and training workshops
13 that may include undergraduate, graduate,
14 post- graduate, and post-doctoral accredited
15 courses; and

16 (II) for the accreditation of those
17 courses by the Laboratory Foundation at
18 the State and national level for college de-
19 grees or continuing education credits;

20 (v) to support and encourage teachers
21 and students of science at all levels of edu-
22 cation;

23 (vi) to promote an understanding of
24 science amongst the general public;

1 (vii) for writing, editing, printing,
2 publishing, and vending of relevant books
3 and other materials; and

4 (viii) for the conduct of other activities
5 to carry out and support the purpose of the
6 Laboratory Foundation; and

7 (G) receiving, administering, soliciting, ac-
8 cepting, and using funds, gifts, devises, or be-
9 quests, either absolutely or in trust of real or
10 personal property or any income therefrom, or
11 other interest or equity therein for the benefit of,
12 or in connection with, the mission of the appli-
13 cable Federal laboratory, in accordance with
14 paragraph (4).

15 (3) *FELLOWSHIPS AND GRANTS.*—

16 (A) *SELECTION.*—*Recipients of fellowships*
17 *and grants described in paragraph (2)(E) shall*
18 *be selected—*

19 (i) *by a Laboratory Foundation and*
20 *the donors to a Laboratory Foundation;*

21 (ii) *subject to the agreement of the head*
22 *of the agency the mission of which is sup-*
23 *ported by a Laboratory Foundation; and*

24 (iii) *in the case of a fellowship, based*
25 *on the recommendation of the employees of*

1 *the National Energy Technology Laboratory*
2 *at which the fellow would serve.*

3 (B) *EXPENSES.—Fellowships and grants*
4 *described in paragraph (2)(E) may include sti-*
5 *pends, travel, health insurance, benefits, and*
6 *other appropriate expenses.*

7 (4) *GIFTS.—An amount of funds, a gift, a de-*
8 *vised, or a bequest described in paragraph (2)(G) may*
9 *be accepted by a Laboratory Foundation regardless of*
10 *whether it is encumbered, restricted, or subject to a*
11 *beneficial interest of a private person if any current*
12 *or future interest of the funds, gift, devise, or bequest*
13 *is for the benefit of the research and development ac-*
14 *tivities of the National Energy Technology Labora-*
15 *tory.*

16 (5) *OWNERSHIP BY FEDERAL GOVERNMENT.—A*
17 *contribution, gift, or any other transfer made to or*
18 *for the use of a Laboratory Foundation shall be re-*
19 *garded as a contribution, gift, or transfer to or for the*
20 *use of the Federal Government.*

21 (6) *LIABILITY.—The United States shall not be*
22 *liable for any debts, defaults, acts, or omissions of a*
23 *Laboratory Foundation.*

24 (7) *TRANSFER OF FUNDS.—Notwithstanding any*
25 *other provision of law, a Laboratory Foundation may*

1 (4) *ECONOMICALLY DISTRESSED AREA.*—*The*
 2 *term “economically distressed area” has the meaning*
 3 *described in section 301(a) of the Public Works and*
 4 *Economic Development Act of 1965 (42 U.S.C.*
 5 *3161(a)).*

6 (5) *GRANT.*—*The term “grant” means a grant*
 7 *award, cooperative agreement award, or any other fi-*
 8 *nancial assistance arrangement that the Secretary of*
 9 *Energy determines to be appropriate.*

10 (6) *INSTITUTION OF HIGHER EDUCATION.*—*The*
 11 *term “institution of higher education” has the mean-*
 12 *ing given such term in section 101 of the Higher Edu-*
 13 *cation Act of 1965, as amended (20 U.S.C. 1001).*

14 (7) *NATIONAL LABORATORY.*—*The term “Na-*
 15 *tional Laboratory” has the meaning given that term*
 16 *in section 2 of the Energy Policy Act of 2005 (42*
 17 *U.S.C. 15801).*

18 (8) *SECRETARY.*—*The term “Secretary” means*
 19 *the Secretary of Energy.*

20 **PART 1—NATIONAL CLEAN ENERGY**

21 **TECHNOLOGY TRANSFER PROGRAMS**

22 **SEC. 10713. NATIONAL CLEAN ENERGY INCUBATOR PRO-**
 23 **GRAM.**

24 (a) *CLEAN ENERGY INCUBATOR DEFINED.*—*In this*
 25 *section, the term “clean energy incubator”—*

1 (1) means any entity that is designed to accel-
2 erate the commercial application of clean energy tech-
3 nologies by providing—

4 (A) physical workspace, labs, and proto-
5 typing facilities to support clean energy startups
6 or established clean energy companies; or

7 (B) companies developing such technologies
8 with support, resources, and services, includ-
9 ing—

10 (i) access to business education and
11 counseling;

12 (ii) mentorship opportunities; and

13 (iii) other services rendered for the
14 purpose of aiding the development and com-
15 mercial application of a clean energy tech-
16 nology; and

17 (2) may include a program within or established
18 by a National Laboratory, an institution of higher
19 education or a State, territorial, local, or tribal gov-
20 ernment.

21 (b) *PROGRAM ESTABLISHMENT.*—Not later than 180
22 days after the enactment of this Act, the Secretary, acting
23 through the Chief Commercialization Officer established in
24 section 1001(a) of the Energy Policy Act of 2005 (42 U.S.C.
25 16391(a)), shall establish a Clean Energy Incubator Pro-

1 *gram (herein referred to as the “program”) to competitively*
2 *award grants to clean energy incubators.*

3 *(c) CLEAN ENERGY INCUBATOR SELECTION.—In*
4 *awarding grants to clean energy incubators under sub-*
5 *section (b), the Secretary shall, to the maximum extent*
6 *practicable, prioritize funding clean energy incubators*
7 *that—*

8 *(1) partner with entities that carry out activities*
9 *relevant to the activities of such incubator and that*
10 *operate at the local, State, and regional levels;*

11 *(2) support the commercial application activities*
12 *of startup companies focused on physical hardware,*
13 *computational, or integrated hardware and software*
14 *technologies;*

15 *(3) are located in geographically diverse regions*
16 *of the United States, such as the Great Lakes region;*

17 *(4) are located in, or partner with entities lo-*
18 *cated in, economically-distressed areas;*

19 *(5) support the development of entities focused on*
20 *expanding clean energy tools and technologies to*
21 *rural, Tribal, and low-income communities;*

22 *(6) support the commercial application of tech-*
23 *nologies being developed by clean energy entre-*
24 *preneurs from underrepresented backgrounds; and*

1 (7) *have a plan for sustaining activities of the*
2 *incubator after grant funds received under this pro-*
3 *gram have been expended.*

4 (d) *AWARD LIMITS.—The Secretary shall not award*
5 *more than \$4,000,000 to one or more incubators in one*
6 *given State, per fiscal year.*

7 (e) *DURATION.—Each grant under subsection (b) shall*
8 *be for a period of no longer than 5 years, subject to the*
9 *availability of appropriations.*

10 (f) *USE OF FUNDS.—An entity receiving a grant*
11 *under this section may use grant amounts for operating ex-*
12 *penses.*

13 (g) *RENEWAL.—An award made to a clean energy in-*
14 *cubator under this section may be renewed for a period of*
15 *not more than 3 years, subject to merit review.*

16 (h) *EVALUATION.—In accordance with section 9007 of*
17 *division Z of the Consolidated Appropriations Act, 2021*
18 *(Public Law 116–260), the Secretary shall submit to the*
19 *Committee on Science, Space, and Technology of the House*
20 *of Representatives and the Committee on Energy and Nat-*
21 *ural Resources of the Senate an evaluation of the program*
22 *established under this section that includes analyses of the*
23 *performance of the clean energy incubators.*

24 (i) *AUTHORIZATION OF APPROPRIATIONS.—There are*
25 *authorized to be appropriated to the Secretary to carry out*

1 *this section \$15,000,000 for each of fiscal years 2023*
2 *through 2027.*

3 **SEC. 10714. CLEAN ENERGY TECHNOLOGY UNIVERSITY**
4 **PRIZE COMPETITION.**

5 (a) *DEFINITIONS.—In this section:*

6 (1) *ELIGIBLE ENTITY.—The term “eligible enti-*
7 *ty” means a nonprofit entity, an institution of higher*
8 *education, or an entity working with one or more in-*
9 *stitutions of higher education.*

10 (2) *MINORITY-SERVING INSTITUTION.—The term*
11 *“minority-serving institution” means an institution*
12 *described in section 371(a) of the Higher Education*
13 *Act of 1965 (20 U.S.C. 1067q(a)).*

14 (b) *IN GENERAL.—The Secretary shall establish a pro-*
15 *gram, known as the “Clean Energy Technology University*
16 *Prize”, to award funding for eligible entities to carry out*
17 *regional and one national clean energy technology prize*
18 *competitions, under section 24 of the Stevenson-Wydler*
19 *Technology Innovation Act of 1980 (15 U.S.C. 3719). In*
20 *carrying out such prize competitions, students shall compete*
21 *to develop a business model for furthering the commercial*
22 *application of an innovative clean energy technology.*

23 (c) *TRAINING FUNDING.—In carrying out this pro-*
24 *gram, the Secretary may provide funding to train partici-*
25 *pating students in skills needed for the successful commer-*

1 cial application of clean energy technologies, including
2 through virtual training sessions.

3 (d) *PRIORITIZATION*.—In awarding grants under this
4 section, the Secretary shall prioritize awarding grants to
5 eligible entities that work with students at minority-serving
6 institutions.

7 (e) *COORDINATION*.—In carrying out this program, the
8 Secretary shall coordinate and partner with other clean en-
9 ergy technology prize competitions. In doing so, the Sec-
10 retary may develop and disseminate best practices for ad-
11 ministering prize competitions under this section.

12 (f) *REPORT*.—In accordance with section 9007 of divi-
13 sion Z of the Consolidated Appropriations Act, 2021 (Pub-
14 lic Law 116–260), the Secretary shall report annually on
15 the progress and implementation of the program established
16 under section (b).

17 (g) *EVALUATION*.—In accordance with section 9007 of
18 division Z of the Consolidated Appropriations Act, 2021
19 (Public Law 116–260), the Secretary shall submit to the
20 Committee on Science, Space, and Technology of the House
21 of Representatives and the Committee on Energy and Nat-
22 ural Resources of the Senate an evaluation on the long-term
23 outcomes of the program established under this section and
24 the progress towards achieving the purposes of the program
25 in subsection (b).

1 (h) *AUTHORIZATION OF APPROPRIATIONS.*—*There are*
2 *authorized to be appropriated to the Secretary to carry out*
3 *the activities authorized in this section \$1,000,000 for each*
4 *of fiscal years 2023 through 2027.*

5 **SEC. 10715. CLEAN ENERGY TECHNOLOGY TRANSFER CO-**
6 **ORDINATION.**

7 (a) *IN GENERAL.*—*The Secretary, acting through the*
8 *Chief Commercialization Officer established in section 1001*
9 *(a) of the Energy Policy Act of 2005 (42 U.S.C. 16391 (a)),*
10 *shall support the coordination of relevant technology trans-*
11 *fer programs that advance the commercial application of*
12 *clean energy technologies nationally and across all energy*
13 *sectors. In particular, the Secretary may support activities*
14 *to—*

15 (1) *facilitate the sharing of information on best*
16 *practices for successful operation of clean energy tech-*
17 *nology transfer programs;*

18 (2) *coordinate resources and improve cooperation*
19 *among clean energy technology transfer programs;*

20 (3) *facilitate connections between entrepreneurs*
21 *and start-up companies and the variety of programs*
22 *related to clean energy technology transfer under the*
23 *Department; and*

1 (4) facilitate the development of metrics to meas-
2 ure the impact of clean energy technology transfer
3 programs on—

4 (A) advancing the development, demonstra-
5 tion, and commercial application of clean energy
6 technologies;

7 (B) increasing the competitiveness of United
8 States in the clean energy sector, including in
9 manufacturing; and

10 (C) commercial application of clean energy
11 technologies being developed by entrepreneurs
12 from under-represented backgrounds.

13 (b) *AUTHORIZATION OF APPROPRIATIONS.*—There are
14 authorized to be appropriated to the Secretary to carry out
15 the activities in this section \$3,000,000 for each of fiscal
16 years 2023 through 2027.

17 **PART 2—SUPPORTING TECHNOLOGY DEVELOP-**
18 **MENT AT THE NATIONAL LABORATORIES**

19 **SEC. 10716. LAB PARTNERING SERVICE PILOT PROGRAM.**

20 Section 9002 of division Z of the Consolidated Appro-
21 priations Act, 2021 (Public Law 116–260) is amended by
22 adding at the end the following:

23 “(h) *AUTHORIZATION OF APPROPRIATIONS.*—There
24 are authorized to be appropriated to the Secretary
25 \$2,000,000 for each of fiscal years 2023 through 2025 to

1 carry out subsections (a), (b), and (c), and \$1,700,000 for
2 each of fiscal years 2023 through 2025 for National Labora-
3 tory employees to provide services under subsection (d).”.

4 **SEC. 10717. LAB-EMBEDDED ENTREPRENEURSHIP PRO-**
5 **GRAM.**

6 (a) *IN GENERAL.*—The Secretary shall competitively
7 award grants to National Laboratories for the purpose of
8 establishing or supporting Lab-Embedded Entrepreneur-
9 ship Programs.

10 (b) *PURPOSES.*—The purposes of such programs are
11 to provide entrepreneurial fellows with access to National
12 Laboratory research facilities, National Laboratory exper-
13 tise, and mentorship to perform research and development
14 and gain expertise that may be required or beneficial for
15 the commercial application of research ideas.

16 (c) *ENTREPRENEURIAL FELLOWS.*—An entrepre-
17 neurial fellow participating in a program described in sub-
18 section (a) shall be provided with—

19 (1) opportunities for entrepreneurial training,
20 professional development, and exposure to leaders
21 from academia, industry, government, and finance
22 who may serve as advisors to or partners of the fel-
23 low;

24 (2) financial and technical support for research,
25 development, and commercial application activities;

1 (3) *fellowship awards to cover costs of living,*
2 *health insurance, and travel stipends for the duration*
3 *of the fellowship; and*

4 (4) *any other resources determined appropriate*
5 *by the Secretary.*

6 (d) *PROGRAM ACTIVITIES.—Each National Labora-*
7 *tory that receives funding under this section shall support*
8 *entrepreneurial fellows by providing—*

9 (1) *access to facilities and expertise within the*
10 *National Laboratory;*

11 (2) *engagement with external stakeholders; and*

12 (3) *market and customer development opportuni-*
13 *ties.*

14 (e) *ADMINISTRATION.—National Laboratories that re-*
15 *ceive grants under this section shall prioritize the support*
16 *and success of the entrepreneurial fellow with regards to*
17 *professional development and development of a relevant*
18 *technology.*

19 (f) *PARTNERSHIPS.—In carrying out a Lab-Embedded*
20 *Entrepreneurship Program, a National Laboratory may*
21 *partner with an external entity, including—*

22 (1) *a nonprofit organization;*

23 (2) *an institution of higher education;*

24 (3) *a federally-owned corporation; or*

1 (4) *a consortium of 2 or more entities described*
2 *in paragraphs (1) through (3).*

3 (g) *METRICS.*—*The Secretary shall support the devel-*
4 *opment of short-term and long-term metrics to assess the*
5 *effectiveness of programs receiving a grant under subsection*
6 *(a) in achieving the purposes of the program in subsection*
7 *(a).*

8 (h) *EVALUATION.*—*In accordance with section 9007 of*
9 *division Z of the Consolidated Appropriations Act, 2021*
10 *(Public Law 116–260), the Secretary shall submit to the*
11 *Committee on Science, Space, and Technology of the House*
12 *of Representatives and the Committee on Energy and Nat-*
13 *ural Resources of the Senate an evaluation of the effective-*
14 *ness of the programs under subsection (a) based on the*
15 *metrics developed pursuant to subsection (g).*

16 (i) *COORDINATION.*—*The Secretary shall oversee the*
17 *planning and coordination of grants under subsection (a)*
18 *and shall identify and disseminate best practices for achiev-*
19 *ing the purposes of subsection (a) to National Laboratories*
20 *that receive grants under this section.*

21 (j) *INTERAGENCY COLLABORATION.*—*The Secretary*
22 *shall collaborate with other executive branch agencies, in-*
23 *cluding the Department of Defense and other agencies with*
24 *Federal laboratories, regarding opportunities to partner*

1 *with National Laboratories receiving a grant under sub-*
2 *section (a).*

3 (k) *AUTHORIZATION OF APPROPRIATIONS.—There are*
4 *authorized to be appropriated to the Secretary to carry out*
5 *the activities authorized in this section \$25,000,000 for each*
6 *of fiscal years 2023 through 2027.*

7 **SEC. 10718. SMALL BUSINESS VOUCHER PROGRAM.**

8 *Section 1003 of the Energy Policy Act of 2005 (42*
9 *U.S.C. 16393) is amended—*

10 (1) *in subsection (a)—*

11 (A) *in the matter preceding paragraph (1),*
12 *by striking “, and may require the Director of*
13 *a single-purpose research facility,” and inserting*
14 *“(as defined in section 2) and the Director of*
15 *each single-purpose research facility”;*

16 (B) *in paragraph (1)—*

17 (i) *by striking “increase” and insert-*
18 *ing “encourage”;* and

19 (ii) *by striking “collaborative re-*
20 *search,” and inserting “research, develop-*
21 *ment, demonstration, and commercial ap-*
22 *plication activities, including product devel-*
23 *opment,”;*

1 (C) in paragraph (2), by striking “procure-
2 ment and collaborative research” and inserting
3 “the activities described in paragraph (1)”;

4 (D) in paragraph (3)—

5 (i) by inserting “facilities,” before
6 “training”; and

7 (ii) by striking “procurement and col-
8 laborative research activities” and inserting
9 “the activities described in paragraph (1)”;

10 and

11 (E) in paragraph (5), by striking “for the
12 program under subsection (b)” and inserting
13 “and metrics for the programs under subsections
14 (b) and (c)”;

15 (2) by redesignating subsections (c) and (d) as
16 subsections (d) and (e), respectively;

17 (3) by inserting after subsection (b) the fol-
18 lowing:

19 “(c) *SMALL BUSINESS VOUCHER PROGRAM.*—

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

21 “(A) *DIRECTOR.*—The term ‘Director’
22 means—

23 “(i) the Director of each National Lab-
24 oratory; and

1 “(ii) the Director of each single-pur-
2 pose research facility.

3 “(B) NATIONAL LABORATORY.—The term
4 ‘National Laboratory’ has the meaning given the
5 term in section 2.

6 “(C) PROGRAM.—The term ‘program’
7 means the program established under paragraph
8 (2).

9 “(D) SMALL BUSINESS CONCERN.—The
10 term ‘small business concern’ has the meaning
11 given such term in section 3 of the Small Busi-
12 ness Act (15 U.S.C. 632).

13 “(2) ESTABLISHMENT.—The Secretary, acting
14 through the Chief Commercialization Officer ap-
15 pointed under section 1001(a), and in consultation
16 with the Directors, shall establish a program to pro-
17 vide small business concerns with vouchers under
18 paragraph (3)—

19 “(A) to achieve the goal described in sub-
20 section (a)(1); and

21 “(B) to improve the products, services, and
22 capabilities of small business concerns in the
23 mission space of the Department.

24 “(3) VOUCHERS.—Under the program, the Direc-
25 tors are authorized to provide to small business con-

1 cerns vouchers to be used at National Laboratories
2 and single-purpose research facilities for—

3 “(A) research, development, demonstration,
4 technology transfer, skills training and workforce
5 development, or commercial application activi-
6 ties; or

7 “(B) any other activities that the applicable
8 Director determines appropriate.

9 “(4) *EXPEDITED APPROVAL.*—The Secretary,
10 working with the Directors, shall establish a stream-
11 lined approval process for financial assistance agree-
12 ments signed between—

13 “(A) small business concerns selected to re-
14 ceive a voucher under the program; and

15 “(B) the National Laboratories and single-
16 purpose research facilities.

17 “(5) *COST-SHARING REQUIREMENT.*—In car-
18 rying out the program, the Secretary shall require
19 cost-sharing in accordance with section 988.

20 “(6) *REPORT.*—In accordance with section 9007
21 of division Z of the Consolidated Appropriations Act,
22 2021 (Public Law 116–260), the Secretary shall re-
23 port annually on the progress and implementation of
24 the small business voucher program established under
25 this section, including the number and locations of

1 *small businesses that received grants under this pro-*
2 *gram.”; and*

3 *(4) in subsection (e) (as so redesignated), by*
4 *striking “for activities under this section” and insert-*
5 *ing “for activities under subsection (b)” and inserting*
6 *before the period at the end “and for activities under*
7 *subsection (c) \$25,000,000 for each of fiscal years*
8 *2023 through 2027”.*

9 **SEC. 10719. ENTREPRENEURIAL LEAVE PROGRAM.**

10 *(a) IN GENERAL.—The Secretary shall delegate to Di-*
11 *rectors the authority to carry out an entrepreneurial leave*
12 *program (referred to in this section as the “program”) to*
13 *allow National Laboratory employees to take a full leave*
14 *of absence from their position, with the option to return*
15 *to that or a comparable position up to 3 years later, or*
16 *a partial leave of absence, to advance the commercial appli-*
17 *cation of energy and related technologies relevant to the*
18 *mission of the Department.*

19 *(b) TERMINATION AUTHORITY.—Directors shall retain*
20 *the authority to terminate National Laboratory employees*
21 *that participate in the program if such employees are found*
22 *to violate terms prescribed by the National Laboratory at*
23 *which such employee is employed.*

24 *(c) LICENSING.—To reduce barriers to participation*
25 *in the program, the Secretary shall delegate to the Directors*

1 *the requirement to establish streamlined mechanisms for fa-*
2 *ilitating the licensing of technology that is the focus of Na-*
3 *tional Laboratory employees who participate in the pro-*
4 *gram.*

5 (d) *REPORT.*—*In accordance with section 9007 of divi-*
6 *sion Z of the Consolidated Appropriations Act, 2021 (Pub-*
7 *lic Law 116–260), the Secretary shall report annually on*
8 *the utilization of this authority at National Laboratories,*
9 *including the number of employees who participate in this*
10 *program at each National Laboratory and the number of*
11 *employees who take a permanent leave from their positions*
12 *at National Laboratories as a result of participating in this*
13 *program.*

14 (e) *FEDERAL ETHICS.*—*Nothing in this section shall*
15 *affect existing Federal ethics rules applicable to Federal*
16 *personnel.*

17 **SEC. 10720. NATIONAL LABORATORY NON-FEDERAL EM-**
18 **PLOYEE OUTSIDE EMPLOYMENT AUTHORITY.**

19 (a) *IN GENERAL.*—*The Secretary shall delegate to Di-*
20 *rectors of National Laboratories the authority to allow their*
21 *non-Federal employees—*

22 (1) *to engage in outside employment, including*
23 *start-up companies based on licensing technologies de-*
24 *veloped at National Laboratories and consulting in*

1 *their areas of expertise, and receive compensation*
2 *from such entities; and*

3 (2) *to engage in outside activities related to their*
4 *areas of expertise at the National Laboratory and*
5 *may allow employees, in their employment capacity*
6 *at such outside employment, to access the National*
7 *Laboratories under the same contracting mechanisms*
8 *as non-Laboratory employees and entities, in accord-*
9 *ance with appropriate conflict of interest protocols.*

10 (b) *REQUIREMENTS.—If a Director elects to use the*
11 *authority granted by subsection (a) of this section, the Di-*
12 *rector, or their designee, shall—*

13 (1) *require employees to disclose to and obtain*
14 *approval from the Director or their designee prior to*
15 *engaging in any outside employment;*

16 (2) *develop and require appropriate conflict of*
17 *interest protocols for employees that engage in outside*
18 *employment;*

19 (3) *maintain the authority to terminate employ-*
20 *ees engaging in outside employment if they are found*
21 *to violate terms, including conflict of interest proto-*
22 *cols, mandated by the Director; and*

23 (4) *ensure that any such programs or activities*
24 *are in conformance with the Department's research*
25 *security policies, including DOE Order 486.1.*

1 (c) *ADDITIONAL RESTRICTIONS.*—*Employees engaging*
2 *in outside employment may not—*

3 (1) *allow such activities to interfere with or im-*
4 *pede their duties at the National Laboratory;*

5 (2) *engage in activities related to outside em-*
6 *ployment using National Laboratory government*
7 *equipment, property, or resources, unless such activi-*
8 *ties are performed under National Laboratory con-*
9 *tracting mechanisms, such as Cooperative Research*
10 *and Development Agreements or Strategic Partner-*
11 *ship Projects, whereby all conflicts of interest require-*
12 *ments apply; or*

13 (3) *use their position at a National Laboratory*
14 *to provide an unfair competitive advantage to an out-*
15 *side employer or start-up activity.*

16 (d) *FEDERAL ETHICS.*—*Nothing in this section shall*
17 *affect existing Federal ethics rules applicable to Federal*
18 *personnel.*

19 **PART 3—DEPARTMENT OF ENERGY**

20 **MODERNIZATION**

21 **SEC. 10722. OFFICE OF TECHNOLOGY TRANSITIONS.**

22 *Section 1001(a) of the Energy Policy Act of 2005 (42*
23 *U.S.C. 16391) is amended by adding at the end the fol-*
24 *lowing:*

1 “(e) *ADDITIONAL AUTHORITY.*—*The Secretary may so-*
2 *licit, select, and manage covered projects directly through*
3 *the program.*”

4 “(f) *PROJECT TERMINATION.*—*Should an ongoing cov-*
5 *ered project receive an unfavorable review under subsection*
6 *(c)(5), the Secretary or their designee may cease funding*
7 *the covered project and reallocate the remaining funds to*
8 *new or existing covered projects carried out by that pro-*
9 *gram office.”; and*

10 (5) *in subsection (h)(1) (as so redesignated), by*
11 *striking “The Secretary” and inserting “In accord-*
12 *ance with section 9007 of division Z of the Consoli-*
13 *dated Appropriations Act, 2021 (Public Law 116-*
14 *260), the Secretary”.*

15 **SEC. 10724. STREAMLINING PRIZE COMPETITIONS.**

16 (a) *REPORTING.*—*Section 1008 of the Energy Policy*
17 *Act of 2005 (42 U.S.C. 16396) is amended by adding at*
18 *the end the following:*

19 “(h) *REPORT.*—*In accordance with section 9007 of di-*
20 *vision Z of the Consolidated Appropriations Act, 2021*
21 *(Public Law 116–260), the Secretary shall report annually*
22 *on a description of any prize competitions carried out using*
23 *the authority under this section, the total amount of prizes*
24 *awarded along with any private sector contributions, the*
25 *methods used for solicitation and evaluation, and a descrip-*

1 *tion of how each prize competition advanced the mission*
2 *of the Department.”.*

3 (b) *TECHNICAL AMENDMENT.*—Section 1008 of the
4 *Energy Policy Act of 2005 (42 U.S.C. 16396) is amended*
5 *by redesignating the second subsection (e) (relating to au-*
6 *thorization of appropriations) as subsection (f).*

7 **SEC. 10725. COST-SHARE WAIVER EXTENSION.**

8 (a) *IN GENERAL.*—Section 988 of the *Energy Policy*
9 *Act of 2005 (42 U.S.C. 16352) is amended in subsection*
10 *(b)(4)(B) by striking “this paragraph” and inserting “the*
11 *Research and Development, Competition, and Innovation*
12 *Act”.*

13 (b) *REPORT.*—Section 108(b) of the *Department of*
14 *Energy Research and Innovation Act is amended in sub-*
15 *section (b) by striking “this Act” each place it appears and*
16 *inserting “the Research and Development, Competition, and*
17 *Innovation Act”.*

18 **SEC. 10726. SPECIAL HIRING AUTHORITY FOR SCIENTIFIC,**
19 **ENGINEERING, AND PROJECT MANAGEMENT**
20 **PERSONNEL.**

21 (a) *IN GENERAL.*—The Under Secretary for Science
22 *shall have the authority to—*

23 (1) *make appointments of not more than 60 sci-*
24 *entific, engineering, and professional personnel, with-*

1 *out regard to civil service laws, to assist the Depart-*
2 *ment in meeting specific project or research needs;*

3 *(2) fix the basic pay of any employee appointed*
4 *under this section at a rate to be determined by the*
5 *Under Secretary at rates not in excess of Level II of*
6 *the Executive Schedule (EX-II) under section 5311 of*
7 *title 5, United States Code without regard to the civil*
8 *service laws; and*

9 *(3) pay any employee appointed under this sec-*
10 *tion payments in addition to basic pay, except that*
11 *the total amount of additional payments paid to an*
12 *employee under this subsection for any 12-month pe-*
13 *riod shall not exceed the lesser of the following*
14 *amounts:*

15 *(A) \$25,000.*

16 *(B) The amount equal to 25 percent of the*
17 *annual rate of basic pay of that employee.*

18 *(C) The amount of the limitation that is*
19 *applicable for a calendar year under section*
20 *5307(a)(1) of title 5, United States Code.*

21 *(b) TERM.—*

22 *(1) IN GENERAL.—The term of any employee ap-*
23 *pointed under this section shall not exceed 3 years*
24 *unless otherwise authorized in law.*

1 *Technology of the House of Representatives and the Com-*
 2 *mittee on Energy and Natural Resources of the Senate an*
 3 *evaluation on the extent to which programs established*
 4 *under sections 9001, 9002, 9003, 9004, and 9005 of this*
 5 *Act and sections 10713, 10714, 10715, and 10717 of the*
 6 *Research and Development, Competition, and Innovation*
 7 *Act are achieving success based on relevant short-term and*
 8 *long-term metrics.”.*

9 ***Subtitle K—Micro Act***

10 ***SEC. 10731. MICROELECTRONICS RESEARCH FOR ENERGY*** 11 ***INNOVATION.***

12 *(a) DEFINITIONS.—In this section:*

13 *(1) CENTER.—The term “Center” means a*
 14 *Microelectronics Science Research Center established*
 15 *pursuant to subsection (d).*

16 *(2) DEPARTMENT.—The term “Department”*
 17 *means the Department of Energy.*

18 *(3) DIRECTOR.—The term “Director” means the*
 19 *Director of the Office of Science.*

20 *(4) HISTORICALLY BLACK COLLEGE OR UNIVER-*
 21 *SITY.—The term “historically Black college or univer-*
 22 *sity” has the meaning given the term “part B institu-*
 23 *tion” in section 322 of the Higher Education Act of*
 24 *1965 (20 U.S.C. 1061).*

1 (5) *INSTITUTION OF HIGHER EDUCATION.*—*The*
2 *term “institution of higher education” has the mean-*
3 *ing given the term in section 101(a) of the Higher*
4 *Education Act of 1965 (20 U.S.C. 1001(a)).*

5 (6) *MICROELECTRONICS.*—*The term “microelec-*
6 *tronics” means—*

7 (A) *a semiconductor and related materials;*

8 (B) *processing chemistries;*

9 (C) *design technologies;*

10 (D) *fabrication technologies;*

11 (E) *lithography technologies;*

12 (F) *packaging technologies;*

13 (G) *a sensor;*

14 (H) *a device;*

15 (I) *an integrated circuit;*

16 (J) *a processor;*

17 (K) *computing architecture;*

18 (L) *modeling and simulation;*

19 (M) *a software tool; and*

20 (N) *any other related technology.*

21 (7) *MINORITY-SERVING INSTITUTION.*—*The term*
22 *“minority-serving institution” means—*

23 (A) *a Hispanic-serving institution (as de-*
24 *efined in section 502(a) of the Higher Education*
25 *Act of 1965 (20 U.S.C. 1101a(a)));*

1 (B) an Alaska Native-serving institution
2 (as defined in section 317(b) of the Higher Edu-
3 cation Act of 1965 (20 U.S.C. 1059d(b)));

4 (C) a Native Hawaiian-serving institution
5 (as defined in that section);

6 (D) a Predominantly Black Institution (as
7 defined in section 371(c) of the Higher Edu-
8 cation Act of 1965 (20 U.S.C. 1067q(c)));

9 (E) an Asian American and Native Amer-
10 ican Pacific Islander-serving institution (as de-
11 fined in that section); and

12 (F) a Native American-serving nontribal
13 institution (as defined in that section).

14 (8) NATIONAL LABORATORY.—The term “Na-
15 tional Laboratory” has the meaning given the term in
16 section 2 of the Energy Policy Act of 2005 (42 U.S.C.
17 15801).

18 (9) PROGRAM.—The term “program” means the
19 program established under subsection (c)(1).

20 (10) SECRETARY.—The term “Secretary” means
21 the Secretary of Energy.

22 (11) SKILLED TECHNICAL WORKFORCE.—The
23 term “skilled technical workforce” has the meaning
24 given the term in section 4(b)(3) of the Innovations

1 *in Mentoring, Training, and Apprenticeships Act (42*
2 *U.S.C. 1862p note; Public Law 115–402).*

3 (12) *TRIBAL COLLEGE OR UNIVERSITY.*—*The*
4 *term “Tribal College or University” has the meaning*
5 *given the term in section 316 of the Higher Education*
6 *Act of 1965 (20 U.S.C. 1059c).*

7 (13) *WORK-BASED LEARNING.*—*The term “work-*
8 *based learning” has the meaning given the term in*
9 *section 3 of the Carl D. Perkins Career and Technical*
10 *Education Act of 2006 (20 U.S.C. 2302).*

11 (b) *FINDINGS.*—*Congress finds that—*

12 (1) *the coming end of Moore’s Law presents*
13 *major technological challenges and opportunities for*
14 *the United States and has important implications for*
15 *national security, economic competitiveness, and sci-*
16 *entific discovery;*

17 (2) *future progress and innovation in microelec-*
18 *tronics, and the maintenance of a robust domestic*
19 *microelectronics supply chain, will require an ap-*
20 *proach that advances relevant materials science, elec-*
21 *tronic and photonic device technologies, processing*
22 *and packaging technologies, manufacturing tech-*
23 *nologies, circuit, chip, and system architecture, and*
24 *software system and algorithm development in a co-*
25 *design fashion;*

1 (3) *the National Laboratories possess unique*
2 *technical expertise and user facilities that are essen-*
3 *tial to—*

4 (A) *overcoming foundational research chal-*
5 *lenges relevant to the topics described in para-*
6 *graph (2); and*

7 (B) *translating and transferring research*
8 *outcomes to industry; and*

9 (4) *the expertise and user facilities of the Na-*
10 *tional Laboratories described in paragraph (3) will*
11 *enable the Department to drive advances in microelec-*
12 *tronics that are essential to meeting future needs in*
13 *areas critical to the missions of the Department and*
14 *the future competitiveness of the domestic microelec-*
15 *tronics industry, including high-performance com-*
16 *puting, emerging data-centric computing approaches*
17 *and energy-efficient computing, optical sensors,*
18 *sources, and wireless networks, and power electronics*
19 *and electricity delivery systems.*

20 (c) *MICROELECTRONICS RESEARCH PROGRAM.—*

21 (1) *IN GENERAL.—The Secretary shall carry out*
22 *a crosscutting program of research, development, and*
23 *demonstration of microelectronics relevant to the mis-*
24 *sions of the Department to enable advances and*
25 *breakthroughs that will—*

1 (A) *accelerate underlying research and de-*
2 *velopment for design, development, and*
3 *manufacturability of next-generation microelec-*
4 *tronics; and*

5 (B) *ensure the global competitiveness of the*
6 *United States in the field of microelectronics.*

7 (2) *RESEARCH PROJECTS.—*

8 (A) *IN GENERAL.—In carrying out the pro-*
9 *gram, the Secretary shall provide financial as-*
10 *istance to eligible entities described in subpara-*
11 *graph (B) to carry out research projects in—*

12 (i) *foundational science areas, includ-*
13 *ing—*

14 (I) *materials sciences, chemical*
15 *sciences, and plasma science synthesis*
16 *and fabrication;*

17 (II) *novel microelectronics devices,*
18 *including emerging memory and stor-*
19 *age technologies;*

20 (III) *diverse computing architec-*
21 *tures and paradigms, including analog*
22 *computing and edge computing;*

23 (IV) *data-driven modeling and*
24 *simulation;*

- 1 (V) *integrated sensing, power har-*
2 *vesting, and communications;*
- 3 (VI) *component integration and*
4 *subsystems;*
- 5 (VII) *photonic integration and*
6 *packaging; and*
- 7 (VIII) *development of codesign*
8 *frameworks for all stages of microelec-*
9 *tronics design, development, fabrica-*
10 *tion, and application;*
- 11 (ii) *cybersecurity by design to result in*
12 *trusted and resilient microelectronics;*
- 13 (iii) *methods for leveraging advanced*
14 *simulation and artificial intelligence to en-*
15 *hance codesign and discovery in microelec-*
16 *tronics;*
- 17 (iv) *in consultation with the National*
18 *Institute of Standards and Technology, fab-*
19 *rication and processing science and metrol-*
20 *ogy associated with microelectronics manu-*
21 *facturing, including lithography, pat-*
22 *terning, surface deposition, etching, and*
23 *cleaning;*
- 24 (v) *approaches for optimizing system-*
25 *level energy efficiency of advanced com-*

1 *puting systems, the electrical grid, power*
2 *electronics, and other energy infrastructure;*

3 *(vi) approaches for enhancing the du-*
4 *rability and lifetime of radiation-hardened*
5 *electronics;*

6 *(vii) enhancement of microelectronics*
7 *security, including the development of inte-*
8 *grated devices, packages, and thermal man-*
9 *agement for severe environments and na-*
10 *tional security;*

11 *(viii) in coordination with other rel-*
12 *evant initiatives of the Department, meth-*
13 *ods to improve the lifetime, maintenance,*
14 *recycling, reuse, and sustainability of*
15 *microelectronics components and systems,*
16 *including technologies and strategies that*
17 *reduce the use of energy, water, critical ma-*
18 *terials, and other commodities that the Sec-*
19 *retary determines are vulnerable to disrup-*
20 *tion; and*

21 *(ix) methods and techniques for domes-*
22 *tic processing of materials for microelec-*
23 *tronics and components of microelectronics.*

24 *(B) ELIGIBLE ENTITIES.—An eligible entity*
25 *referred to in subparagraph (A) is—*

1 (i) *an institution of higher education,*
2 *including a historically Black college or*
3 *university, a Tribal College or University,*
4 *and a minority-serving institution;*

5 (ii) *a nonprofit research organization;*

6 (iii) *a State research agency;*

7 (iv) *a National Laboratory;*

8 (v) *a private commercial entity;*

9 (vi) *a partnership or consortium of 2*
10 *or more entities described in clauses (i)*
11 *through (v); and*

12 (vii) *any other entity that the Sec-*
13 *retary determines appropriate.*

14 (C) *NOTIFICATION.*—*Not later than 30 days*
15 *after the Secretary provides financial assistance*
16 *to an eligible entity under subparagraph (A), the*
17 *Secretary shall submit to the Committee on En-*
18 *ergy and Natural Resources of the Senate and*
19 *the Committee on Science, Space, and Tech-*
20 *nology of the House of Representatives a notifi-*
21 *cation of the financial assistance provided, in-*
22 *cluding—*

23 (i) *the criteria used by the Secretary to*
24 *select the eligible entity receiving the finan-*
25 *cial assistance;*

1 (ii) the manner in which the criteria
2 described in clause (i) comport with the
3 purposes of the program described in para-
4 graph (1); and

5 (iii) a description of the research
6 project that the eligible entity will carry out
7 using the financial assistance.

8 (3) *TECHNOLOGY TRANSFER.*—In carrying out
9 the program, the Secretary, in coordination with the
10 Director of the Office of Technology Transitions and
11 in consultation with the private sector, shall—

12 (A) support translational research and
13 transfer of microelectronics technologies; and

14 (B) identify emerging research and develop-
15 ment needs of industry and government for the
16 benefit of United States economic competitive-
17 ness.

18 (4) *WORKFORCE DEVELOPMENT.*—In carrying
19 out the program, the Secretary shall support—

20 (A) workforce development through existing
21 authorities and mechanisms available to the De-
22 partment, including internships, fellowships, in-
23 dividual investigator grants, and other activities
24 the Secretary determines appropriate; and

1 (B) *in consultation with the National*
2 *Science Foundation, as appropriate, education*
3 *and outreach activities—*

4 (i) *to disseminate information and*
5 *promote understanding of microelectronics*
6 *and related fields among students at ele-*
7 *mentary school, secondary school, high*
8 *school, undergraduate, and graduate levels;*
9 *and*

10 (ii) *that may include educational pro-*
11 *gramming with an emphasis on experien-*
12 *tial and project-based learning.*

13 (5) *OUTREACH.—The Secretary shall conduct*
14 *outreach to recruit applicants to the program and en-*
15 *gage participants from all regions of the United*
16 *States, especially individuals from underserved com-*
17 *munities and groups historically underrepresented in*
18 *science, technology, engineering, and mathematics.*

19 (6) *COORDINATION.—In carrying out the pro-*
20 *gram, the Secretary shall—*

21 (A) *coordinate across all relevant programs*
22 *and offices of the Department; and*

23 (B) *coordinate the research carried out*
24 *under the program relating to microelectronics*
25 *with activities carried out by other Federal agen-*

1 *cies and programs relating to microelectronics*
2 *research, development, manufacturing, and sup-*
3 *ply chain security, including the programs au-*
4 *thorized under subsections (c) through (f) of sec-*
5 *tion 9906 of the William M. (Mac) Thornberry*
6 *National Defense Authorization Act for Fiscal*
7 *Year 2021 (15 U.S.C. 4656).*

8 *(7) REPORT.—Not later than 180 days after the*
9 *date of enactment of this Act, the Secretary shall sub-*
10 *mit to the Committee on Energy and Natural Re-*
11 *sources of the Senate and the Committee on Science,*
12 *Space, and Technology of the House of Representa-*
13 *tives a report describing the goals, priorities, and an-*
14 *ticipated outcomes of the program.*

15 *(8) FUNDING.—There are authorized to be ap-*
16 *propriated to the Secretary to carry out this sub-*
17 *section—*

18 *(A) \$75,000,000 for fiscal year 2023;*

19 *(B) \$100,000,000 for fiscal year 2024;*

20 *(C) \$100,000,000 for fiscal year 2025;*

21 *(D) \$100,000,000 for fiscal year 2026; and*

22 *(E) \$100,000,000 for fiscal year 2027.*

23 *(d) MICROELECTRONICS SCIENCE RESEARCH CEN-*
24 *TERS.—*

1 (1) *IN GENERAL.*—*In carrying out the program,*
2 *subject to the availability of appropriations, the Di-*
3 *rector shall establish not more than 4 Microelectronics*
4 *Science Research Centers, each comprising 1 or more*
5 *eligible entities—*

6 (A) *to conduct mission-driven research to*
7 *address foundational challenges in the design, de-*
8 *velopment, characterization, prototyping, dem-*
9 *onstration, and fabrication of microelectronics;*
10 *and*

11 (B) *to facilitate the translation of research*
12 *results to industry.*

13 (2) *ELIGIBLE ENTITIES.*—*An eligible entity re-*
14 *ferred to in paragraph (1) is—*

15 (A) *a National Laboratory;*

16 (B) *an institution of higher education, in-*
17 *cluding a historically Black college or university,*
18 *a Tribal College or University, and a minority-*
19 *serving institution;*

20 (C) *a private commercial entity;*

21 (D) *a research center;*

22 (E) *a partnership or consortium of 2 or*
23 *more entities described in subparagraphs (A)*
24 *through (D); and*

1 (F) any other entity that the Secretary de-
2 termines appropriate.

3 (3) *ACTIVITIES.*—*The activities of a Center shall*
4 *include research, development, and demonstration ac-*
5 *tivities for—*

6 (A) *accelerating the development of new*
7 *microelectronics science and technology, includ-*
8 *ing materials, devices, circuits, systems, architec-*
9 *tures, fabrication tools, processes, diagnostics,*
10 *modeling, synthesis, and, in consultation with*
11 *the National Institute of Standards and Tech-*
12 *nology, metrology;*

13 (B) *advancing the sustainability and en-*
14 *ergy efficiency of new microelectronics devices,*
15 *packages, and systems;*

16 (C) *application-driven codesign and proto-*
17 *typing of novel devices to facilitate laboratory-to-*
18 *fabrication transition;*

19 (D) *advancing knowledge and experimental*
20 *capabilities in surface and materials science,*
21 *plasma science, and computational and theo-*
22 *retical methods, including artificial intelligence,*
23 *multiscale codesign, and advanced supercom-*
24 *puting capabilities to invent and manufacture*
25 *revolutionary microelectronic devices;*

1 (E) creating technology testbeds for proto-
2 typing platforms for validation and verification
3 of new capabilities and sharing of ideas, intellec-
4 tual property, and the unique facilities of the
5 Department;

6 (F) supporting development of cybersecurity
7 capabilities for computing architectures that
8 measurably improve safety and security and are
9 adaptable for existing and future applications;
10 and

11 (G) supporting long-term and short-term
12 workforce development in microelectronics.

13 (4) REQUEST FOR PROPOSALS; MERIT REVIEW.—

14 (A) IN GENERAL.—The Director shall, at
15 such time, in such manner, and containing such
16 information as the Director determines to be ap-
17 propriate, issue a request for proposals from eli-
18 gible entities described in paragraph (2) seeking
19 to be designated as a Center.

20 (B) COMPETITIVE MERIT REVIEW.—The Di-
21 rector shall select eligible entities under subpara-
22 graph (A) through a competitive, merit-based
23 process.

24 (5) OPERATION.—

25 (A) DURATION.—

1 (i) *IN GENERAL.*—Each Center shall
2 operate for a period of not more than 5
3 years, unless renewed for an additional 5-
4 year period in accordance with clause (ii).

5 (ii) *RENEWAL.*—

6 (I) *INITIAL RENEWAL.*—In the
7 case of a Center that has operated for
8 not more than 5 years, the Director
9 may renew support for the Center on a
10 merit-reviewed basis for a period of not
11 more than 5 years.

12 (II) *10-YEAR OPERATION.*—In the
13 case of a Center that has operated for
14 not less than 5 years but not more
15 than 10 years, the Director may renew
16 support for the Center on a competi-
17 tive, merit-reviewed basis for a period
18 of not more than 5 years.

19 (III) *15-YEAR OPERATION.*—In
20 the case of a Center that has operated
21 for not less than 10 years but not more
22 than 15 years, the Director may renew
23 support for the Center on a merit-re-
24 viewed basis for a period of not more
25 than 5 years.

1 (B) *TERMINATION.*—*Consistent with the ex-*
2 *isting authorities of the Department, the Direc-*
3 *tor may terminate an underperforming Center*
4 *during the performance period.*

5 (6) *TECHNOLOGY TRANSFER.*—*The Director, in*
6 *coordination with the Director of the Office of Tech-*
7 *nology Transitions, shall seek to enter into partner-*
8 *ships with industry groups to facilitate the trans-*
9 *lation and transfer of research results produced by the*
10 *Centers.*

11 (7) *COORDINATION.*—*The Secretary shall—*

12 (A) *establish a coordinating network to co-*
13 *ordinate cross-cutting research and foster com-*
14 *munication and collaboration among the Cen-*
15 *ters; and*

16 (B) *ensure coordination, and avoid unneces-*
17 *sary duplication, of the activities of each Center*
18 *with the activities of—*

19 (i) *other research entities of the De-*
20 *partment, including—*

21 (I) *the Nanoscale Science Re-*
22 *search Centers;*

23 (II) *the National Quantum Infor-*
24 *mation Science Research Centers;*

1 (III) *the Energy Frontier Re-*
2 *search Centers;*

3 (IV) *the Energy Innovation Hubs;*

4 (V) *the National Laboratories;*

5 *and*

6 (VI) *other offices of the Depart-*
7 *ment;*

8 (ii) *the National Semiconductor Tech-*
9 *nology Center established under section*
10 *9906(c)(1) of the William M. (Mac) Thorn-*
11 *berry National Defense Authorization Act*
12 *for Fiscal Year 2021 (15 U.S.C. 4656(c)(1));*

13 (iii) *institutions of higher education;*

14 (iv) *industry; and*

15 (v) *relevant research activities carried*
16 *out by other Federal agencies.*

17 (8) *WORKFORCE DEVELOPMENT.—Each Center*
18 *shall support workforce development through—*

19 (A) *incorporation of undergraduate stu-*
20 *dents, postdoctoral fellows, graduate students,*
21 *and early career researchers, as well as elemen-*
22 *tary school, secondary school, and high school*
23 *students, through opportunities such as dual-en-*
24 *rollment programs and work-based learning pro-*
25 *grams, as applicable;*

1 (B) hands-on research and equipment train-
2 ing programs;

3 (C) technical training and certificate pro-
4 grams for the skilled technical workforce;

5 (D) facilitation of engagement among aca-
6 demic, industry, and laboratory researchers; and

7 (E) public outreach activities, including to
8 students at elementary school, secondary school,
9 high school, undergraduate, and graduate levels,
10 which may include educational programming
11 with an emphasis on experiential and project-
12 based learning.

13 (9) *OUTREACH.*—*The Director shall support the*
14 *workforce development of Centers under paragraph*
15 *(8) by conducting outreach to recruit applicants and*
16 *engage participants from all regions of the United*
17 *States, especially individuals from underserved com-*
18 *munities and groups historically underrepresented in*
19 *science, technology, engineering, and mathematics.*

20 (10) *INTELLECTUAL PROPERTY.*—*The Secretary*
21 *shall ensure that the intellectual property and value*
22 *proposition created by the Centers are retained within*
23 *the United States.*

24 (11) *NOTIFICATION.*—

1 (A) *DEFINITION OF COVERED DETERMINA-*
2 *TION.—In this paragraph, the term “covered de-*
3 *termination” means a determination of the Sec-*
4 *retary—*

5 (i) *to establish a Center under para-*
6 *graph (1);*

7 (ii) *to renew support for a Center*
8 *under paragraph (5)(A)(ii); or*

9 (iii) *to terminate a Center under para-*
10 *graph (5)(B).*

11 (B) *NOTIFICATION.—Not later than 30 days*
12 *after the Secretary makes a covered determina-*
13 *tion, the Secretary shall submit to the Committee*
14 *on Energy and Natural Resources of the Senate*
15 *and the Committee on Science, Space, and Tech-*
16 *nology of the House of Representatives a notifi-*
17 *cation of the covered determination, including—*

18 (i) *the criteria used by the Secretary to*
19 *make the covered determination; and*

20 (ii) *the manner in which the criteria*
21 *described in clause (i) comport with the*
22 *purposes of the program described in para-*
23 *graph (1).*

24 (12) *FUNDING.—Subject to the availability of*
25 *appropriations, the Secretary shall use not more than*

1 \$25,000,000 to fund each Center for each of fiscal
2 years 2023 through 2027.

3 ***Subtitle L—National Nuclear Uni-***
4 ***versity Research Infrastructure***
5 ***Reinvestment***

6 **SEC. 10741. SHORT TITLE.**

7 *This subtitle may be cited as the “National Nuclear*
8 *University Research Infrastructure Reinvestment Act of*
9 *2021”.*

10 **SEC. 10742. PURPOSES.**

11 *The purposes of this subtitle are—*

12 (1) *to upgrade the nuclear research capabilities*
13 *of universities in the United States to meet the re-*
14 *search requirements of advanced nuclear energy sys-*
15 *tems;*

16 (2) *to ensure the continued operation of univer-*
17 *sity research reactors;*

18 (3) *to coordinate available resources to enable the*
19 *establishment, including the start and efficient com-*
20 *pletion of construction, of new nuclear science and en-*
21 *gineering facilities; and*

22 (4) *to support—*

23 (A) *workforce development critical to main-*
24 *taining United States leadership in nuclear*

1 *science and engineering and related disciplines;*
 2 *and*

3 *(B) the establishment or enhancement of nu-*
 4 *clear science and engineering capabilities and*
 5 *other, related capabilities at historically Black*
 6 *colleges and universities, Tribal colleges or uni-*
 7 *versities, minority-serving institutions, EPSCoR*
 8 *universities, junior or community colleges, and*
 9 *associate-degree-granting colleges.*

10 **SEC. 10743. UNIVERSITY INFRASTRUCTURE COLLABORA-**
 11 **TION.**

12 *Section 954(a) of the Energy Policy Act of 2005 (42*
 13 *U.S.C. 16274(a)) is amended—*

14 *(1) in paragraph (2) by amending subparagraph*
 15 *(D) to read as follows:*

16 *“(D) promote collaborations, partnerships,*
 17 *and knowledge sharing between institutions of*
 18 *higher education, National Laboratories, other*
 19 *Federal agencies, industry, and associated labor*
 20 *unions; and”.*

21 *(2) by amending paragraph (4) to read as fol-*
 22 *low:*

23 *“(4) STRENGTHENING UNIVERSITY RESEARCH*
 24 *AND TRAINING REACTORS AND ASSOCIATED INFRA-*
 25 *STRUCTURE.—*

1 “(A) *IN GENERAL.*—*In carrying out the*
2 *program under this subsection, the Secretary*
3 *may support—*

4 “(i) *converting research reactors from*
5 *high-enrichment fuels to low-enrichment*
6 *fuels and upgrading operational instrumen-*
7 *tation;*

8 “(ii) *revitalizing and upgrading exist-*
9 *ing nuclear science and engineering infra-*
10 *structure that support the development of*
11 *advanced nuclear technologies and applica-*
12 *tions;*

13 “(iii) *regional or subregional univer-*
14 *sity-led consortia to—*

15 “(I) *broaden access to university*
16 *research reactors;*

17 “(II) *enhance existing university-*
18 *based nuclear science and engineering*
19 *infrastructure; and*

20 “(III) *provide project manage-*
21 *ment, technical support, quality engi-*
22 *neering and inspections, manufac-*
23 *turing, and nuclear material support;*

24 “(iv) *student training programs, in*
25 *collaboration with the United States nuclear*

1 *industry, in relicensing and upgrading re-*
 2 *actors, including through the provision of*
 3 *technical assistance; and*

4 “(v) reactor improvements that empha-
 5 size research, training, and education, in-
 6 cluding through the *Innovations in Nuclear*
 7 *Infrastructure and Education Program* or
 8 any similar program.

9 “(B) Of any amounts appropriated to carry
 10 out the program under this subsection, there is
 11 authorized to be appropriated to the Secretary to
 12 carry out clauses (ii) and (iii) of subparagraph
 13 (A) \$55,000,000 for each of fiscal years 2023
 14 through 2027.”.

15 **SEC. 10744. ADVANCED NUCLEAR RESEARCH INFRASTRUC-**
 16 **TURE ENHANCEMENT SUBPROGRAM.**

17 Section 954(a) of the Energy Policy Act of 2005 (42
 18 U.S.C. 16274(a)), as amended by section 3, is further
 19 amended—

20 (1) by redesignating paragraphs (5) through (8)
 21 as paragraphs (6) through (9), respectively;

22 (2) by inserting after paragraph (4) the fol-
 23 lowing:

24 “(5) **ADVANCED NUCLEAR RESEARCH INFRA-**
 25 **STRUCTURE ENHANCEMENT.**—

1 “(A) *IN GENERAL.*—*The Secretary shall*
2 *carry out a subprogram to be known as the Ad-*
3 *vanced Nuclear Research Infrastructure En-*
4 *hancement Subprogram in order to—*

5 “(i) *demonstrate various advanced nu-*
6 *clear reactor and nuclear microreactor con-*
7 *cepts;*

8 “(ii) *establish medical isotope produc-*
9 *tion reactors or other specialized applica-*
10 *tions; and*

11 “(iii) *advance other research infra-*
12 *structure that, in the determination of the*
13 *Secretary, is consistent with the mission of*
14 *the Department.*

15 “(B) *NEW NUCLEAR SCIENCE AND ENGI-*
16 *NEERING FACILITIES.*—*In carrying out the sub-*
17 *program, the Secretary shall establish—*

18 “(i) *not more than 4 new research re-*
19 *actors; and*

20 “(ii) *new nuclear science and engineer-*
21 *ing facilities, as required to address re-*
22 *search demand and identified infrastructure*
23 *gaps.*

1 “(C) *LOCATIONS.*—*New research reactors*
2 *and facilities established under subparagraph*
3 *(B) shall be established in a manner that—*

4 “(i) *supports the regional or sub-*
5 *regional consortia described in paragraph*
6 *(4)(C); and*

7 “(ii) *encourages the participation of—*

8 “(I) *historically Black colleges*
9 *and universities;*

10 “(II) *Tribal colleges or univer-*
11 *sities;*

12 “(III) *minority-serving institu-*
13 *tions;*

14 “(IV) *EPSCoR universities; and*

15 “(V) *junior or community col-*
16 *leges.*

17 “(D) *FUEL REQUIREMENTS.*—*New research*
18 *reactors established under subparagraph (B)*
19 *shall not use high-enriched uranium, as defined*
20 *in section 2001 of division Z of the Consolidated*
21 *Appropriations Act of 2021.*

22 “(E) *AUTHORIZATION OF APPROPRIA-*
23 *TIONS.*—*Of any amounts appropriated to carry*
24 *out the program under this section, there are au-*
25 *thorized to be appropriated to the Secretary to*

1 *carry out the subprogram under this para-*
2 *graph—*

3 “(i) \$45,000,000 for fiscal year 2023;

4 “(ii) \$60,000,000 for fiscal year 2024;

5 “(iii) \$65,000,000 for fiscal year 2025;

6 “(iv) \$80,000,000 for fiscal year 2026;

7 *and*

8 “(v) \$140,000,000 for fiscal year
9 2027.”; *and*

10 (3) *by amending paragraph (9), as redesignated*
11 *by paragraph (1) of this section, to read as follows:*

12 “(9) *DEFINITIONS.—In this subsection:*

13 “(A) *JUNIOR FACULTY.—The term ‘junior*
14 *faculty’ means a faculty member who was*
15 *awarded a doctorate less than 10 years before re-*
16 *ceipt of an award from the grant program de-*
17 *scribed in paragraph (2)(B).*

18 “(B) *JUNIOR OR COMMUNITY COLLEGE.—*
19 *The term ‘junior or community college’ means—*

20 “(i) *a public institution of high edu-*
21 *cation, including additional locations, at*
22 *which the highest awarded degree, or the*
23 *predominantly awarded degree, is an asso-*
24 *ciate degree; or*

1 “(ii) any Tribal college or university
2 (as defined in section 316 of the Higher
3 Education Act of 1965 (20 U.S.C. 1059c)).

4 “(C) EPSCOR UNIVERSITY.—The term
5 ‘EPSCoR university’ means an institution of
6 higher education located in a State eligible to
7 participate in the program defined in section
8 502 of the America COMPETES Reauthoriza-
9 tion Act of 2010 (42 U.S.C. 1862p note).

10 “(D) HISTORICALLY BLACK COLLEGE OR
11 UNIVERSITY.—The term ‘historically Black col-
12 lege or university’ has the meaning given the
13 term ‘part B institution’ in section 322 of the
14 Higher Education Act of 1965 (20 U.S.C. 1061).

15 “(E) MINORITY-SERVING INSTITUTION.—
16 The term ‘minority-serving institution’ means a
17 Hispanic-serving institution, an Alaska Native-
18 serving institution, a Native Hawaiian-serving
19 institution, a Predominantly Black Institution,
20 an Asian American and Native American Pa-
21 cific Islander-serving institution, or a Native
22 American-serving nontribal institution as de-
23 scribed in section 371 of the Higher Education
24 Act of 1965 (20 U.S.C. 1067q(a)).

1 “(F) *TRIBAL COLLEGE OR UNIVERSITY*.—
 2 *The term ‘Tribal College or University’ has the*
 3 *meaning given such term in section 316 of the*
 4 *Higher Education Act of 1965 (20 U.S.C.*
 5 *1059c).’.*”

6 **SEC. 10745. SCIENCE EDUCATION AND HUMAN RESOURCES**
 7 ***SCHOLARSHIPS, FELLOWSHIPS, AND RE-***
 8 ***SEARCH AND DEVELOPMENT PROJECTS.***

9 (a) *IN GENERAL*.—*The purpose of this section is to*
 10 *support a diverse workforce for the complex landscape asso-*
 11 *ciated with effective and equitable development of advanced*
 12 *nuclear energy technologies, including interdisciplinary re-*
 13 *search to enable positive impacts and avoid potential nega-*
 14 *tive impacts across the lifespan of nuclear energy tech-*
 15 *nologies.*

16 (b) *NONTECHNICAL NUCLEAR RESEARCH*.—*Section*
 17 *313 of the Omnibus Appropriations Act, 2009 (Public Law*
 18 *111–8; 42 U.S.C. 16274a) is amended—*

19 (1) *in subsection (b)(2), after “engineering”, by*
 20 *inserting “, which may include nontechnical nuclear*
 21 *research.”;*

22 (2) *in subsection (c), by inserting after para-*
 23 *graph (2) the following:*

24 “(3) *NONTECHNICAL NUCLEAR RESEARCH*.—*The*
 25 *term ‘nontechnical nuclear research’ means research*

1 *with specializations such as social sciences or law*
 2 *that can support an increase in community engage-*
 3 *ment, participation, and confidence in nuclear energy*
 4 *systems, including the navigation of the licensing re-*
 5 *quired for advanced reactor deployment, aligned with*
 6 *the objectives in section 951(a)(2) of the Energy Pol-*
 7 *icy Act of 2005 (42 U.S.C. 16271(a)(2)).”; and*
 8 (3) *in subsection (d)(1), by striking*
 9 “\$30,000,000” and inserting “\$45,000,000”.

10 ***Subtitle M—Steel Upgrading Part-***
 11 ***nerships and Emissions Reduc-***
 12 ***tion***

13 ***SEC. 10751. LOW-EMISSIONS STEEL MANUFACTURING RE-***
 14 ***SEARCH PROGRAM.***

15 (a) *PROGRAM.*—*Subtitle D of title IV of the Energy*
 16 *Independence and Security Act of 2007 (42 U.S.C. 17111*
 17 *et seq.) is amended by inserting after section 454 the fol-*
 18 *lowing:*

19 ***“SEC. 454A. LOW-EMISSIONS STEEL MANUFACTURING RE-***
 20 ***SEARCH PROGRAM.***

21 “(a) *PURPOSE.*—*The purpose of this section is to en-*
 22 *courage the research and development of innovative tech-*
 23 *nologies aimed at—*

1 “(1) *increasing the technological and economic*
2 *competitiveness of industry and manufacturing in the*
3 *United States; and*

4 “(2) *achieving significant net nonwater green-*
5 *house emissions reductions in the production processes*
6 *for iron, steel, and steel mill products.*

7 “(b) *DEFINITIONS.—In this section:*

8 “(1) *COMMERCIALLY AVAILABLE*
9 *STEELMAKING.—The term ‘commercially available*
10 *steelmaking’ means the current production method of*
11 *iron, steel, and steel mill products.*

12 “(2) *CRITICAL MATERIAL.—The term ‘critical*
13 *material’ has the meaning given such term in section*
14 *7002 of division Z of the Consolidated Appropriations*
15 *Act, 2021 (Public Law 116–260).*

16 “(3) *CRITICAL MINERAL.—The term ‘critical*
17 *mineral’ has the meaning given such term in section*
18 *7002 of division Z of the Consolidated Appropriations*
19 *Act, 2021 (Public Law 116–260).*

20 “(4) *ELIGIBLE ENTITY.—The term ‘eligible enti-*
21 *ty’ means—*

22 “(A) *an institution of higher education;*

23 “(B) *an appropriate State or Federal enti-*
24 *ty, including a federally funded research and de-*
25 *velopment center of the Department;*

1 “(C) a nonprofit research institution;

2 “(D) a private entity;

3 “(E) any other relevant entity the Secretary
4 determines appropriate; and

5 “(F) a partnership or consortium of two or
6 more entities described in subparagraphs (A)
7 through (E).

8 “(5) INSTITUTION OF HIGHER EDUCATION.—The
9 term ‘institution of higher education’ has the meaning
10 given the term in section 101 of the Higher Education
11 Act of 1965 (20 U.S.C. 1001).

12 “(6) LOW-EMISSIONS STEEL MANUFACTURING.—
13 The term ‘low-emissions steel manufacturing’ means
14 advanced or commercially available steelmaking with
15 the reduction, to the maximum extent practicable, of
16 net nonwater greenhouse gas emissions to the atmos-
17 phere from the production of iron, steel, and steel mill
18 products.

19 “(c) IN GENERAL.—Not later than 180 days after the
20 date of enactment of the Research and Development, Com-
21 petition, and Innovation Act, the Secretary shall establish
22 a program of research, development, demonstration, and
23 commercial application of advanced tools, technologies, and
24 methods for low-emissions steel manufacturing.

1 “(d) *REQUIREMENTS.*—*In carrying out the program*
2 *under subsection (c), the Secretary shall—*

3 “(1) *coordinate this program with the programs*
4 *and activities authorized in title VI of division Z of*
5 *the Consolidated Appropriations Act, 2021;*

6 “(2) *coordinate across all relevant program of-*
7 *fices of the Department, including the Office of*
8 *Science, Office of Energy Efficiency and Renewable*
9 *Energy, the Office of Fossil Energy, and the Office of*
10 *Nuclear Energy;*

11 “(3) *leverage, to the extent practicable, the re-*
12 *search infrastructure of the Department, including*
13 *scientific computing user facilities, x-ray light*
14 *sources, neutron scattering facilities, and nanoscale*
15 *science research centers; and*

16 “(4) *conduct research, development, and dem-*
17 *onstration of low-emissions steel manufacturing tech-*
18 *nologies that have the potential to increase domestic*
19 *production and employment in advanced and com-*
20 *mercially available steelmaking.*

21 “(e) *STRATEGIC PLAN.*—

22 “(1) *IN GENERAL.*—*Not later than 180 days*
23 *after the date of enactment of the Research and Devel-*
24 *opment, Competition, and Innovation Act, the Sec-*
25 *retary shall develop a 5-year strategic plan identi-*

1 *ifying research, development, demonstration, and com-*
2 *mercial application goals for the program established*
3 *in subsection (c). The Secretary shall submit this*
4 *plan to the Committee on Science, Space, and Tech-*
5 *nology of the House of Representatives and the Com-*
6 *mittee on Energy and Natural Resources of the Sen-*
7 *ate.*

8 “(2) *CONTENTS.—The strategic plan submitted*
9 *under paragraph (1) shall—*

10 “(A) *identify programs at the Department*
11 *related to low-emissions steel manufacturing that*
12 *support the research, development, demonstra-*
13 *tion, and commercial application activities de-*
14 *scribed in this section, and the demonstration*
15 *projects under subsection (h);*

16 “(B) *establish technological and pro-*
17 *grammatic goals to achieve the requirements of*
18 *subsection (d); and*

19 “(C) *include timelines for the accomplish-*
20 *ment of goals developed under the plan.*

21 “(3) *UPDATES TO PLAN.—Not less than once*
22 *every two years, the Secretary shall submit to the*
23 *Committee on Science, Space, and Technology of the*
24 *House of Representatives and the Committee on En-*

1 *ergy and Natural Resources of the Senate an updated*
2 *version of the plan under paragraph (1).*

3 “(f) *FOCUS AREAS.*—*In carrying out the program es-*
4 *tablished in subsection (c), the Secretary shall focus on—*

5 “(1) *medium- and high-temperature heat genera-*
6 *tion technologies used for low-emissions steel manu-*
7 *facturing, which may include—*

8 “(A) *alternative fuels, including hydrogen*
9 *and biomass;*

10 “(B) *alternative reducing agents, including*
11 *hydrogen;*

12 “(C) *renewable heat generation technology,*
13 *including solar and geothermal;*

14 “(D) *electrification of heating processes, in-*
15 *cluding through electrolysis; and*

16 “(E) *other heat generation sources;*

17 “(2) *carbon capture technologies for advanced*
18 *and commercially available steelmaking processes,*
19 *which may include—*

20 “(A) *combustion and chemical looping tech-*
21 *nologies;*

22 “(B) *use of slag to reduce carbon dioxide*
23 *emissions;*

24 “(C) *pre-combustion technologies; and*

25 “(D) *post-combustion technologies;*

1 “(3) *smart manufacturing technologies and prin-*
2 *ciples, digital manufacturing technologies, and ad-*
3 *vanced data analytics to develop advanced tech-*
4 *nologies and practices in information, automation,*
5 *monitoring, computation, sensing, modeling, and net-*
6 *working to—*

7 “(A) *model and simulate manufacturing*
8 *production lines;*

9 “(B) *monitor and communicate production*
10 *line status; and*

11 “(C) *model, simulate, and optimize the en-*
12 *ergy efficiency of manufacturing processes;*

13 “(4) *technologies and practices that minimize*
14 *energy and natural resource consumption, which may*
15 *include—*

16 “(A) *designing products that enable reuse,*
17 *refurbishment, remanufacturing, and recycling;*

18 “(B) *minimizing waste from advanced and*
19 *commercially available steelmaking processes, in-*
20 *cluding through the reuse of waste as resources*
21 *in other industrial processes for mutual benefit;*

22 “(C) *increasing resource efficiency; and*

23 “(D) *increasing the energy efficiency of ad-*
24 *vanced and commercially available steelmaking*
25 *processes;*

1 “(5) *alternative materials and technologies that*
2 *produce fewer emissions during production and result*
3 *in fewer emissions during use, which may include—*

4 “(A) *innovative raw materials;*

5 “(B) *high-performance lightweight mate-*
6 *rials;*

7 “(C) *substitutions for critical materials and*
8 *critical minerals; and*

9 “(D) *other technologies that achieve signifi-*
10 *cant carbon emission reductions in low-emissions*
11 *steel manufacturing, as determined by the Sec-*
12 *retary; and*

13 “(6) *high-performance computing to develop ad-*
14 *vanced materials and manufacturing processes con-*
15 *tributing to the focus areas described in paragraphs*
16 *(1) through (5), including—*

17 “(A) *modeling, simulation, and optimiza-*
18 *tion of the design of energy efficient and sustain-*
19 *able products; and*

20 “(B) *the use of digital prototyping and ad-*
21 *ditive manufacturing to enhance product design.*

22 “(g) *TESTING AND VALIDATION.—The Secretary, in*
23 *consultation with the Director of the National Institute of*
24 *Standards and Technology, shall support the development*
25 *of standardized testing and technical validation of ad-*

1 *vanced and commercially available steelmaking and low-*
2 *emissions steel manufacturing through collaboration with*
3 *one or more National Laboratories, and one or more eligible*
4 *entities.*

5 “(h) *DEMONSTRATION.*—

6 “(1) *ESTABLISHMENT.*—*Not later than 180 days*
7 *after the date of enactment of the Research and Devel-*
8 *opment, Competition, and Innovation Act, the Sec-*
9 *retary, in carrying out the program established in*
10 *subsection (c), and in collaboration with industry*
11 *partners, institutions of higher education, and the*
12 *National Laboratories, shall support an initiative for*
13 *the demonstration of low-emissions steel manufac-*
14 *turing, as identified by the Secretary, that uses ei-*
15 *ther—*

16 “(A) *a single technology; or*

17 “(B) *a combination of multiple technologies.*

18 “(2) *SELECTION REQUIREMENTS.*—*Under the*
19 *initiative established under paragraph (1), the Sec-*
20 *retary shall select eligible entities to carry out dem-*
21 *onstration projects and to the maximum extent prac-*
22 *ticable—*

23 “(A) *encourage regional diversity among el-*
24 *igible entities, including participation by rural*
25 *States;*

1 “(B) encourage technological diversity
2 among eligible entities; and

3 “(C) ensure that specific projects selected—
4 “(i) expand on the existing technology
5 demonstration programs of the Department;
6 and

7 “(ii) prioritize projects that leverage
8 matching funds from non-Federal sources.

9 “(3) *REPORTS.*—The Secretary shall submit to
10 the Committee on Science, Space, and Technology of
11 the House of Representatives and the Committee on
12 Energy and Natural Resources of the Senate—

13 “(A) not less frequently than once every two
14 years for the duration of the demonstration ini-
15 tiative under this subsection, a report describing
16 the performance of the initiative; and

17 “(B) if the initiative established under this
18 subsection is terminated, an assessment of the
19 success of, and education provided by, the meas-
20 ures carried out by recipients of financial assist-
21 ance under the initiative.

22 “(i) *ADDITIONAL COORDINATION.*—

23 “(1) *MANUFACTURING U.S.A.*—In carrying out
24 this section the Secretary shall consider—

1 “(A) leveraging the resources of relevant ex-
2 isting Manufacturing USA Institutes described
3 in section 34(d) of the National Institute of
4 Standards and Technology Act (15 U.S.C.
5 278s(d));

6 “(B) integrating program activities into a
7 relevant existing Manufacturing USA Institute;
8 or

9 “(C) establishing a new institute focused on
10 low-emissions steel manufacturing.

11 “(2) *OTHER FEDERAL AGENCIES.*—In carrying
12 out this section, the Secretary shall coordinate with
13 other Federal agencies that are carrying out research
14 and development initiatives to increase industrial
15 competitiveness and achieve significant net nonwater
16 greenhouse emissions reductions through low-emis-
17 sions steel manufacturing, including the Department
18 of Defense, Department of Transportation, and the
19 National Institute of Standards and Technology.”.

20 (b) *CLERICAL AMENDMENT.*—Section 1(b) of the En-
21 ergy Independence and Security Act of 2007 (42 U.S.C.
22 17001 note) is amended in the table of contents by inserting
23 after the item relating to section 454 the following:

 “Sec. 454A. *Low-Emissions Steel Manufacturing Research Program.*”.

1 ***Subtitle N—Applied Laboratories***
2 ***Infrastructure Restoration and***
3 ***Modernization***

4 **SEC. 10761. APPLIED LABORATORIES INFRASTRUCTURE**
5 **RESTORATION AND MODERNIZATION.**

6 (a) *DEFINITION OF NATIONAL LABORATORY.*—*In this*
7 *section, the term “National Laboratory” means—*

- 8 (1) *the National Renewable Energy Laboratory;*
9 (2) *the National Energy Technology Laboratory;*
10 (3) *the Idaho National Laboratory;*
11 (4) *the Savannah River National Laboratory;*
12 (5) *the Sandia National Laboratories;*
13 (6) *the Los Alamos National Laboratory; and*
14 (7) *the Lawrence Livermore National Labora-*
15 *tory.*

16 (b) *RESTORATION AND MODERNIZATION PROJECTS.*—

17 (1) *IN GENERAL.*—*The Secretary shall fund*
18 *projects described in paragraph (2) as needed to ad-*
19 *dress the deferred maintenance, critical infrastructure*
20 *needs, and modernization of National Laboratories.*

21 (2) *PROJECTS DESCRIBED.*—*The projects re-*
22 *ferred to in paragraph (1) are, as determined by the*
23 *Secretary—*

24 (A) *priority deferred maintenance projects*
25 *at National Laboratories, including facilities*

1 sustainment for, upgrade of, and construction of
2 research laboratories, administrative and sup-
3 port buildings, utilities, roads, power plants, and
4 any other critical infrastructure; and

5 (B) lab modernization projects at National
6 Laboratories, including projects relating to core
7 infrastructure needed—

8 (i) to support existing and emerging
9 science missions with new and specialized
10 requirements for world-leading scientific
11 user facilities and computing capabilities;
12 and

13 (ii) to maintain safe, efficient, reliable,
14 and environmentally responsible operations,
15 including pilot projects to demonstrate net-
16 zero emissions with resilient operations.

17 (3) *APPROACH.*—In carrying out paragraph (1),
18 the Secretary shall use all available approaches and
19 mechanisms, as the Secretary determines to be appro-
20 priate, including—

21 (A) capital line items;

22 (B) minor construction projects;

23 (C) energy savings performance contracts;

24 (D) utility energy service contracts;

25 (E) alternative financing; and

1 (F) *expense funding.*

2 (c) *SUBMISSION TO CONGRESS.—For each fiscal year*
3 *through fiscal year 2027, at the same time as the annual*
4 *budget submission of the President, the Secretary shall sub-*
5 *mit to the Committee on Appropriations and the Committee*
6 *on Energy and Natural Resources of the Senate and the*
7 *Committee on Appropriations and the Committee on*
8 *Science, Space, and Technology of the House of Representa-*
9 *tives a list of projects for which the Secretary will provide*
10 *funding under this section, including a description of each*
11 *project and the funding profile for the project.*

12 (d) *AUTHORIZATION OF APPROPRIATIONS.—There is*
13 *authorized to be appropriated to the Secretary to carry out*
14 *the activities described in this section \$800,000,000 for each*
15 *of fiscal years 2023 through 2027, of which, in each fiscal*
16 *year—*

17 (1) *\$640,000,000 is authorized to be appro-*
18 *priated for projects at National Laboratories de-*
19 *scribed in paragraphs (1) through (4) of subsection*
20 *(a); and*

21 (2) *\$160,000,000 is authorized to be appro-*
22 *priated for projects at National Laboratories de-*
23 *scribed in paragraphs (5) through (7) of that sub-*
24 *section.*

1 ***Subtitle O—Department of Energy***
2 ***Research, Development, and***
3 ***Demonstration Activities***

4 ***SEC. 10771. DEPARTMENT OF ENERGY RESEARCH, DEVELOPMENT,***
5 ***AND DEMONSTRATION ACTIVITIES.***

6 *For the purpose of carrying out research, development,*
7 *and demonstration activities and addressing energy-related*
8 *supply chain activities in the key technology focus areas*
9 *(as described in section 10387), there are authorized to be*
10 *appropriated the following amounts:*

11 (1) *OFFICE OF ENERGY EFFICIENCY AND RENEW-*
12 *ABLE ENERGY.—In addition to amounts otherwise*
13 *authorized to be appropriated or made available,*
14 *there are authorized to be appropriated to the Sec-*
15 *retary of Energy (referred to in this section as the*
16 *“Secretary”), acting through the Office of Energy Ef-*
17 *iciency and Renewable Energy, for the period of fis-*
18 *cal years 2023 through 2026—*

19 (A) *\$1,200,000,000 to carry out building*
20 *technologies research, development, and dem-*
21 *onstration activities;*

22 (B) *\$1,200,000,000 to carry out sustainable*
23 *transportation research, development, and dem-*
24 *onstration activities;*

1 (C) \$1,000,000,000 to carry out advanced
2 manufacturing research, development, and dem-
3 onstration activities, excluding activities carried
4 out pursuant to subparagraph (D);

5 (D) \$1,000,000,000 to carry out section 454
6 of the Energy Independence and Security Act of
7 2007 (42 U.S.C. 17113);

8 (E) \$600,000,000 to carry out advanced
9 materials research, development, and demonstra-
10 tion activities, including relating to upcycling,
11 recycling, and biobased materials; and

12 (F) \$800,000,000 to carry out renewable
13 power research, development, and demonstration
14 activities.

15 (2) OFFICE OF ELECTRICITY.—In addition to
16 amounts otherwise authorized to be appropriated or
17 made available, there is authorized to be appropriated
18 to the Secretary, acting through the Office of Elec-
19 tricity, for the period of fiscal years 2023 through
20 2026, \$1,000,000,000 to carry out electric grid mod-
21 ernization and security research, development, and
22 demonstration activities.

23 (3) OFFICE OF CYBERSECURITY, ENERGY SECU-
24 RITY, AND EMERGENCY RESPONSE.—In addition to
25 amounts otherwise authorized to be appropriated or

1 *made available, there is authorized to be appropriated*
2 *to the Secretary, acting through the Office of Cyberse-*
3 *curity, Energy Security, and Emergency Response,*
4 *for the period of fiscal years 2023 through 2026,*
5 *\$800,000,000 to carry out cybersecurity and energy*
6 *system physical security research, development, and*
7 *demonstration activities.*

8 (4) *OFFICE OF NUCLEAR ENERGY.—In addition*
9 *to amounts otherwise authorized to be appropriated*
10 *or made available, there is authorized to be appro-*
11 *priated to the Secretary, acting through the Office of*
12 *Nuclear Energy, for the period of fiscal years 2023*
13 *through 2026, \$400,000,000 to carry out advanced*
14 *materials research, development, and demonstration*
15 *activities.*

16 (5) *OFFICE OF ENVIRONMENTAL MANAGEMENT.—*
17 *In addition to amounts otherwise authorized to be ap-*
18 *propriated or made available, there is authorized to*
19 *be appropriated to the Secretary, acting through the*
20 *Office of Environmental Management, for the period*
21 *of fiscal years 2023 through 2026, \$200,000,000 to*
22 *carry out research, development, and demonstration*
23 *activities, including relating to artificial intelligence*
24 *and information technology.*

1 (6) *OFFICE OF FOSSIL ENERGY AND CARBON*
2 *MANAGEMENT.*—*In addition to amounts otherwise au-*
3 *thorized to be appropriated or made available, there*
4 *are authorized to be appropriated to the Secretary,*
5 *acting through the Office of Fossil Energy and Car-*
6 *bon Management, for the period of fiscal years 2023*
7 *through 2026—*

8 (A) *\$600,000,000 to carry out clean indus-*
9 *trial technologies research, development, and*
10 *demonstration activities pursuant to section 454*
11 *of the Energy Independence and Security Act of*
12 *2007 (42 U.S.C. 17113);*

13 (B) *\$200,000,000 to carry out alternative*
14 *fuels research, development, and demonstration*
15 *activities; and*

16 (C) *\$1,000,000,000 to carry out carbon re-*
17 *moval research, development, and demonstration*
18 *activities.*

19 (7) *ADVANCED RESEARCH PROJECTS AGENCY—*
20 *ENERGY.*—*In addition to amounts otherwise author-*
21 *ized to be appropriated or made available, there is*
22 *authorized to be appropriated to the Secretary, acting*
23 *through the Director of the Advanced Research*
24 *Projects Agency—Energy established under section*
25 *5012 of the America COMPETES Act (42 U.S.C.*

1 16538), for the period of fiscal years 2023 through
2 2026, \$1,200,852,898 to carry out activities of the Ad-
3 vanced Research Projects Agency—Energy.

4 ***Subtitle P—Fission for the Future***

5 **SEC. 10781. ADVANCED NUCLEAR TECHNOLOGIES FEDERAL** 6 **RESEARCH, DEVELOPMENT, AND DEM-** 7 **ONSTRATION PROGRAM.**

8 (a) *DEFINITIONS.—In this section:*

9 (1) *ADVANCED NUCLEAR REACTOR.—The term*
10 *“advanced nuclear reactor” has the meaning given the*
11 *term in section 951(b) of the Energy Policy Act of*
12 *2005 (42 U.S.C. 16271(b)).*

13 (2) *ELIGIBLE ENTITY.—The term “eligible enti-*
14 *ty” means each of—*

15 (A) *a State;*

16 (B) *an Indian Tribe (as defined in section*
17 *4 of the Indian Self-Determination and Edu-*
18 *cation Assistance Act (25 U.S.C. 5304));*

19 (C) *a Tribal organization (as defined in*
20 *section 4 of the Indian Self-Determination and*
21 *Education Assistance Act (25 U.S.C. 5304));*

22 (D) *a unit of local government;*

23 (E) *an electric utility (as defined in section*
24 *3 of the Federal Power Act (16 U.S.C. 796));*

1 (F) a National Laboratory (as defined in
2 section 2 of the Energy Policy Act of 2005 (42
3 U.S.C. 15801));

4 (G) an institution of higher education (as
5 defined in section 101(a) of the Higher Edu-
6 cation Act of 1965 (20 U.S.C. 1001(a))); and

7 (H) a private entity specializing in—

8 (i) advanced nuclear technology devel-
9 opment;

10 (ii) nuclear supply chains; or

11 (iii) with respect to nuclear tech-
12 nologies and nonelectric applications of nu-
13 clear technologies, construction, project fi-
14 nancing, contract structuring and risk allo-
15 cation, or regulatory and licensing proc-
16 esses.

17 (3) PROGRAM.—The term “program” means the
18 program established under subsection (b)(1).

19 (4) SECRETARY.—The term “Secretary” means
20 the Secretary of Energy.

21 (b) ESTABLISHMENT OF PROGRAM.—

22 (1) IN GENERAL.—The Secretary shall establish
23 a program to provide Federal financial assistance to
24 eligible entities to support the research, development,
25 and demonstration of advanced nuclear reactors.

1 (2) *COMPETITIVE PROCEDURES.*—*To the maximum extent practicable, the Secretary shall carry out*
2 *the program using a competitive, merit-based review*
3 *process that is consistent with section 989 of the Energy Policy Act of 2005 (42 U.S.C. 16353).*

4 (3) *APPLICATIONS.*—*An eligible entity desiring Federal financial assistance under the program shall submit*
5 *to the Secretary an application at such time, in such manner, and containing such information as the Secretary may*
6 *require.*

7 (4) *PRIORITY.*—*In selecting eligible entities to receive Federal financial assistance under the program, the Secretary shall give priority to eligible entities that—*

8 (1) *plan to carry out projects at or near the site of 1 or more fossil fuel electric generation facilities that are retired or scheduled to retire, including multi-unit facilities that are partially shut down—*

9 (1) *(A) to support the productive reuse of fossil fuel electric generation facilities that are retired or scheduled to retire; and*

10 (1) *(B) to sustain and revitalize communities impacted by the closure of fossil fuel electric generation facilities;*

11 (2) *plan to support nonelectric applications, including supplying heat for—*

- 1 (A) *energy storage;*
2 (B) *hydrogen or other liquid and gaseous*
3 *fuel or chemical production;*
4 (C) *industrial processes;*
5 (D) *desalination technologies and processes;*
6 (E) *isotope production;*
7 (F) *district heating; and*
8 (G) *other applications, as the Secretary de-*
9 *termines to be appropriate; and*

10 (3) *have implemented or demonstrated the abil-*
11 *ity to successfully implement workforce training or*
12 *retraining programs to train workers to perform ac-*
13 *tivities relating to the research, development, and*
14 *demonstration of advanced nuclear reactors.*

15 (e) *COST SHARE.—Section 988 of the Energy Policy*
16 *Act of 2005 (42 U.S.C. 16352) shall apply to Federal finan-*
17 *cial assistance provided under the program.*

18 (f) *AUTHORIZATION OF APPROPRIATIONS.—In addi-*
19 *tion to amounts otherwise available, there are authorized*
20 *to be appropriated to the Secretary to carry out the pro-*
21 *gram—*

- 22 (1) *\$75,000,000 for fiscal year 2023;*
23 (2) *\$100,000,000 for fiscal year 2024;*
24 (3) *\$150,000,000 for fiscal year 2025;*
25 (4) *\$225,000,000 for fiscal year 2026; and*

1 (5) \$250,000,000 for fiscal year 2027.

2 **TITLE VII—NATIONAL AERO-**
 3 **NAUTICS AND SPACE ADMIN-**
 4 **ISTRATION AUTHORIZATION**
 5 **ACT**

6 **SEC. 10801. SHORT TITLE.**

7 *This title may be cited as the “National Aeronautics*
 8 *and Space Administration Authorization Act of 2022”.*

9 **SEC. 10802. DEFINITIONS.**

10 *In this title:*

11 (1) *ADMINISTRATION.*—*The term “Administra-*
 12 *tion” means the National Aeronautics and Space Ad-*
 13 *ministration.*

14 (2) *ADMINISTRATOR.*—*The term “Adminis-*
 15 *trator” means the Administrator of the National Aer-*
 16 *onautics and Space Administration.*

17 (3) *APPROPRIATE COMMITTEES OF CONGRESS.*—
 18 *Except as otherwise expressly provided, the term “ap-*
 19 *propriate committees of Congress” means—*

20 (A) *the Committee on Commerce, Science,*
 21 *and Transportation of the Senate; and*

22 (B) *the Committee on Science, Space, and*
 23 *Technology of the House of Representatives.*

24 (4) *CISLUNAR SPACE.*—*The term “cislunar*
 25 *space” means the region of space beyond low-Earth*

1 orbit out to and including the region around the sur-
2 face of the Moon.

3 (5) *DEEP SPACE*.—The term “deep space” means
4 the region of space beyond low-Earth orbit, including
5 cislunar space.

6 (6) *DEVELOPMENT COST*.—The term “develop-
7 ment cost” has the meaning given the term in section
8 30104 of title 51, United States Code.

9 (7) *GOVERNMENT ASTRONAUT*.—The term “gov-
10 ernment astronaut” has the meaning given the term
11 in section 50902 of title 51, United States Code.

12 (8) *ISS*.—The term “ISS” means the Inter-
13 national Space Station.

14 (9) *LOW-ENRICHED URANIUM*.—The term “low-
15 enriched uranium” means uranium having an assay
16 greater than the assay for natural uranium but less
17 than 20 percent of the uranium-235 isotope.

18 (10) *NASA*.—The term “NASA” means the Na-
19 tional Aeronautics and Space Administration.

20 (11) *ORION*.—The term “Orion” means the mul-
21 tipurpose crew vehicle described in section 303 of the
22 National Aeronautics and Space Administration Au-
23 thorization Act of 2010 (42 U.S.C. 18323).

24 (12) *OSTP*.—The term “OSTP” means the Of-
25 fice of Science and Technology Policy.

1 (13) *SPACE FLIGHT PARTICIPANT*.—*The term*
 2 “*space flight participant*” *has the meaning given the*
 3 *term in section 50902 of title 51, United States Code.*

4 (14) *SPACE LAUNCH SYSTEM*.—*The term “Space*
 5 *Launch System” means the Space Launch System*
 6 *authorized under section 302 of the National Aero-*
 7 *navitics and Space Administration Act of 2010 (42*
 8 *U.S.C. 18322).*

9 (15) *UNMANNED AIRCRAFT; UNMANNED AIR-*
 10 *CRAFT SYSTEM*.—*The terms “unmanned aircraft”*
 11 *and “unmanned aircraft system” have the meanings*
 12 *given those terms in section 44801 of title 49, United*
 13 *States Code.*

14 ***Subtitle A—Exploration***

15 ***SEC. 10811. MOON TO MARS.***

16 (a) *SENSE OF CONGRESS*.—*It is the sense of Congress*
 17 *that—*

18 (1) *advances in space technology and space ex-*
 19 *ploration capabilities—*

20 (A) *ensure the long-term technological pre-*
 21 *eminence, economic competitiveness, STEM*
 22 *workforce development, and national security of*
 23 *the United States; and*

24 (B) *offer profound inspirational value for*
 25 *future generations;*

1 (2) *the Artemis missions—*

2 (A) *will make further progress on advancing*
3 *the human exploration roadmap to achieve*
4 *human presence beyond low-Earth orbit to the*
5 *surface of Mars, as required under section 432 of*
6 *the National Aeronautics and Space Administra-*
7 *tion Transition Authorization Act of 2017 (Pub-*
8 *lic Law 115–10; 51 U.S.C. 20302 note);*

9 (B) *should fulfill the goal of landing United*
10 *States astronauts, including the first woman and*
11 *the next man, on the Moon; and*

12 (C) *should seek collaboration with commer-*
13 *cial and international partners to establish sus-*
14 *tainable lunar exploration, and should fund any*
15 *sustainable lunar activities not directly required*
16 *for the advancement of a human mission to Mars*
17 *separately;*

18 (3) *in carrying out the Artemis missions, the*
19 *Administrator should ensure that the entire Artemis*
20 *program is inclusive and representative of all people*
21 *of the United States, including women and minori-*
22 *ties;*

23 (4) *safe and successful execution of the roadmap*
24 *to achieve human presence on Mars, including the*
25 *Artemis missions, requires—*

1 (A) a clear strategic vision for achieving
2 lunar and Mars exploration that is shared by
3 NASA, international partners, nongovernmental
4 partners, Congress, and the people of the United
5 States;

6 (B) a well-developed and executable
7 timeline, budget, and mission architecture, to in-
8 form decisions, including decisions relating to
9 workforce and infrastructure needs and the devel-
10 opment of technical and nontechnical skills;

11 (C) consistent NASA oversight of all rel-
12 evant exploration activities, enabled by NASA
13 leadership with authority, responsibility, and ac-
14 countability for decisions and well-developed ca-
15 pabilities for systems engineering and integra-
16 tion;

17 (D) clearly defined roles for NASA, inter-
18 national partners, and nongovernmental part-
19 ners, including criteria for determining whether
20 NASA should make, manage, or buy key capa-
21 bilities; and

22 (E) mechanisms to ensure NASA insight
23 into the activities of its international and non-
24 governmental partners, as required to identify
25 and mitigate risks to mission safety and success.

1 **(b) MOON TO MARS OFFICE AND PROGRAM.—**

2 **(1) MOON TO MARS OFFICE.—***Not later than 120*
3 *days after the date of the enactment of this Act, the*
4 *Administrator shall establish within the Exploration*
5 *Systems Development Mission Directorate a Moon to*
6 *Mars Program Office (referred to in this section as*
7 *the “Office”) to lead and manage the Moon to Mars*
8 *program established under paragraph (2), including*
9 *Artemis missions and activities.*

10 **(2) MOON TO MARS PROGRAM.—**

11 **(A) ESTABLISHMENT.—***Not later than 120*
12 *days after the date of the enactment of this Act,*
13 *the Administrator shall establish a Moon to Mars*
14 *Program (referred to in this section as the “Pro-*
15 *gram”) in accordance with sections 20302(b)*
16 *and 70504 of title 51, United States Code, which*
17 *shall include Artemis missions and activities, to*
18 *achieve the goal of human exploration of Mars.*

19 **(B) ELEMENTS.—***The Program shall in-*
20 *clude the following elements:*

21 **(i)** *The Space Launch System under*
22 *section 20302 of title 51, United States*
23 *Code.*

24 **(ii)** *The Orion crew vehicle under such*
25 *section.*

- 1 (iii) *Exploration Ground Systems.*
- 2 (iv) *An outpost in orbit around the*
3 *Moon under section 70504 of such title.*
- 4 (v) *Human-rated landing systems.*
- 5 (vi) *Spacesuits.*
- 6 (vii) *Any other element needed to meet*
7 *the requirements for the Program.*
- 8 (C) *DIRECTION.*—*The Administrator shall*
9 *ensure that—*
- 10 (i) *each Artemis mission demonstrates*
11 *or advances a technology or operational*
12 *concept that will enable human missions to*
13 *Mars;*
- 14 (ii) *the Program incorporates each*
15 *such mission into the human exploration*
16 *roadmap under section 432 of the National*
17 *Aeronautics and Space Administration*
18 *Transition Authorization Act of 2017 (Pub-*
19 *lic Law 115–10; 51 U.S.C. 20302 note); and*
- 20 (iii) *the Program includes cislunar*
21 *space exploration activities that—*
- 22 (I) *use a combination of launches*
23 *of the Space Launch System and space*
24 *transportation services from United*

1 *States commercial providers, as appro-*
2 *priate, for each such mission;*

3 (II) *plan for not fewer than 1*
4 *Space Launch System launch annually*
5 *beginning after the first successful*
6 *crewed launch of Orion on the Space*
7 *Launch System, with a goal of 2 Space*
8 *Launch System launches annually as*
9 *soon as practicable; and*

10 (III) *establish an outpost in orbit*
11 *around the Moon that—*

12 (aa) *demonstrates tech-*
13 *nologies, systems, and operational*
14 *concepts directly applicable to the*
15 *space vehicle that will be used to*
16 *transport humans to Mars;*

17 (bb) *has the capability for*
18 *periodic human habitation; and*

19 (cc) *functions as a point of*
20 *departure, return, or staging for*
21 *missions to multiple locations on*
22 *the lunar surface or other destina-*
23 *tions.*

24 (3) *DIRECTOR.—*

1 (A) *IN GENERAL.*—*The Administrator shall*
2 *appoint a Director for the Program, who shall*
3 *lead the Office and report to the Associate Ad-*
4 *ministrators of the Exploration Systems Develop-*
5 *ment Mission Directorate.*

6 (B) *ACCOUNTABILITY.*—*The Director shall*
7 *have accountability for risk management and*
8 *shall have authority, as consistent with NASA*
9 *Space Flight Program and Project Management*
10 *requirements—*

11 (i) *to implement—*

12 (I) *Program-level requirements;*

13 *and*

14 (II) *an architecture and program*
15 *plan developed to meet such require-*
16 *ments;*

17 (ii) *to manage resources, personnel,*
18 *and contracts necessary to implement the*
19 *Program, as appropriate;*

20 (iii) *to manage cost, risk, schedule, and*
21 *performance factors;*

22 (iv) *to direct and oversee a Program-*
23 *wide systems engineering and integration*
24 *and integrated risk management function;*
25 *and*

1 (v) to carry out other authorities, in
2 accordance with Administration policies
3 and procedures.

4 (C) *RESPONSIBILITIES.*—The Director shall
5 be responsible for—

6 (i) developing and managing—

7 (I) an integrated master plan, in-
8 tegrated master schedule, and inte-
9 grated risk management procedures for
10 the Program;

11 (II) a Program-wide systems engi-
12 neering and integration function as de-
13 scribed in subsection (c);

14 (III) plans for technology and ca-
15 pabilities development;

16 (IV) logistics support, science data
17 management, communications, and
18 other plans that are relevant to the
19 functions of the Office; and

20 (V) performance measures to as-
21 sess the progress of the Program;

22 (ii) advising the Associate Adminis-
23 trator of the Exploration Systems Develop-
24 ment Mission Directorate on the develop-
25 ment of—

1 (I) *Program-level requirements,*
2 *including for a human Mars orbital*
3 *mission and a human mission to the*
4 *surface of Mars; and*

5 (II) *an architecture based on the*
6 *requirements described in subclause (I);*
7 *and*

8 (iii) *informing the Associate Adminis-*
9 *trator of the Administration on coordina-*
10 *tion among NASA centers, as required to*
11 *most efficiently achieve the goals of the Pro-*
12 *gram.*

13 (c) *SYSTEMS ENGINEERING AND INTEGRATION.—The*
14 *Director of the Office shall—*

15 (1) *establish within the Office a Program-wide*
16 *systems engineering and integration function; and*

17 (2) *appoint a manager for such function to man-*
18 *age systems engineering and integration activities*
19 *across the Program, including with respect to the Pro-*
20 *gram elements described in subsection (b)(2).*

21 (d) *IMPLEMENTATION.—In the implementation of the*
22 *Program, the Administrator shall ensure that—*

23 (1) *for the purposes of reducing risk and com-*
24 *plexity and making the maximum use of taxpayer in-*
25 *vestments to date, in conducting Artemis activities,*

1 *the Administration does not take any action in re-*
2 *gard to the design of the Exploration Upper Stage-en-*
3 *hanced Space Launch System that would preclude it*
4 *from carrying an integrated human-rated lunar land-*
5 *ing system for crewed lunar landing missions;*

6 *(2) the Program maintains a robust series of*
7 *ground-based and in-flight testing activities, includ-*
8 *ing, with respect to each crewed system design, not*
9 *less than 1 uncrewed flight test, followed by a crewed*
10 *flight test, as appropriate, prior to use of the design*
11 *on a human-rated lunar landing system or Mars mis-*
12 *sion; and*

13 *(3) human lunar landing missions under the*
14 *Program, including surface and in-space activities,*
15 *are carried out solely by government astronauts.*

16 *(e) STUDY.—Not later than 180 days after the date*
17 *of the enactment of this Act, the Administrator shall submit*
18 *to the appropriate committees of Congress a report detail-*
19 *ing—*

20 *(1) progress towards the establishment of—*

21 *(A) the Office, the Program, and the Pro-*
22 *gram architecture; and*

23 *(B) the integrated master plan, integrated*
24 *master schedule, and integrated risk manage-*
25 *ment procedures for the Program;*

1 (2) *performance measures and milestones for the*
2 *Program and any interim assessment with respect to*
3 *such performance measures, as practicable;*

4 (3) *initial criteria for determining whether*
5 *NASA should make, manage, or buy key capabilities*
6 *within the Program or engage with international*
7 *partners to access such capabilities;*

8 (4) *strategies to ensure consistent insight into the*
9 *activities of NASA partners, including nongovern-*
10 *mental partners, as required to identify and mitigate*
11 *mission risks;*

12 (5) *progress towards the establishment of a sys-*
13 *tems engineering and integration function; and*

14 (6) *an annual budget profile for resources re-*
15 *quired to implement the Program during the 5-year*
16 *period beginning on the date of the enactment of this*
17 *Act.*

18 **SEC. 10812. SPACE LAUNCH SYSTEM CONFIGURATIONS.**

19 (a) *EXPLORATION GROUND SYSTEMS INFRASTRUC-*
20 *TURE.—The Administrator shall ensure that—*

21 (1) *the necessary elements of a ground system in-*
22 *frastructure are in place to enable the preparation*
23 *and use of the Space Launch System, specifically the*
24 *Block 1 (at least 70 mt), Block 1B (at least 105 mt),*

1 *and Block 2 (at least 130 mt) variants of the Space*
2 *Launch System; and*

3 *(2) not fewer than 2 bays of the vehicle assembly*
4 *building of such ground system infrastructure are*
5 *outfitted and dedicated to support Space Launch Sys-*
6 *tem stacking and preparations.*

7 *(b) FLIGHT RATE AND SAFETY.—After the first crewed*
8 *lunar landing of the Administration’s Moon to Mars activi-*
9 *ties, the Administrator shall, to the extent practicable, seek*
10 *to carry out a flight rate of 2 integrated Space Launch Sys-*
11 *tem and Orion crew vehicle missions annually until the*
12 *lunar activities needed to enable a human mission to Mars*
13 *are completed so as to maintain the critical human*
14 *spaceflight production and operations skills necessary for*
15 *the safety of human spaceflight activities in deep space.*

16 *(c) MOBILE LAUNCH PLATFORM.—*

17 *(1) IN GENERAL.—The Administrator is author-*
18 *ized to maintain 2 operational mobile launch plat-*
19 *forms to enable the launch of multiple configurations*
20 *of the Space Launch System.*

21 *(2) SECOND MOBILE LAUNCH PLATFORM.—*

22 *(A) IN GENERAL.—In implementing para-*
23 *graph (1), the Administrator shall take all nec-*
24 *essary steps to develop and complete a second*
25 *mobile launch platform, to be in place by 2026,*

1 to support the first launch of the Block 1B vari-
2 ant of the Space Launch System.

3 (B) *REQUIREMENT.*—Such second mobile
4 launch platform shall be sized and constructed to
5 accommodate the Block 2 variant of the Space
6 Launch System.

7 (d) *REPORTS.*—The Administrator shall submit to
8 Congress—

9 (1) not later than 45 days after the date of the
10 enactment of this Act, a report on the steps the Ad-
11 ministrator and industry partners are taking—

12 (A) to address the cost, schedule, and per-
13 formance challenges in the development of the
14 Mobile Launch–2 platform; and

15 (B) to ensure that such platform is ready
16 for operational use on a schedule that aligns
17 with the current plans for an Artemis IV launch,
18 which is currently anticipated in 2027; and

19 (2) not later than 90 days after such date of en-
20 actment, a report that contains a list of the key mile-
21 stones required for completing each of the Space
22 Launch System variants, and an estimated date on
23 which such milestones will be completed.

24 (e) *EXPLORATION UPPER STAGE.*—

1 (1) *IN GENERAL.*—*To meet the capability re-*
2 *quirements under section 302(c)(2) of the National*
3 *Aeronautics and Space Administration Authorization*
4 *Act of 2010 (42 U.S.C. 18322(c)(2)), the Adminis-*
5 *trator shall continue development of the Exploration*
6 *Upper Stage for the Space Launch System on a*
7 *schedule consistent with the Artemis IV lunar mis-*
8 *sion.*

9 (2) *BRIEFING.*—*Not later than 90 days after the*
10 *date of the enactment of this Act, the Administrator*
11 *shall brief the appropriate committees of Congress on*
12 *the development and scheduled availability of the Ex-*
13 *ploration Upper Stage for the Artemis IV lunar mis-*
14 *sion.*

15 (f) *MAIN PROPULSION TEST ARTICLE.*—*To meet the*
16 *requirements under section 302(c)(3) of the National Aero-*
17 *nautics and Space Administration Authorization Act of*
18 *2010 (42 U.S.C. 18322(c)(3)), the Administrator may ini-*
19 *tiate development of a main propulsion test article for the*
20 *integrated Exploration Upper Stage element of the Space*
21 *Launch System, consistent with cost and schedule con-*
22 *straints, particularly for long-lead propulsion hardware*
23 *needed for flight.*

1 **SEC. 10813. ROCKET ENGINE TEST INFRASTRUCTURE.**

2 (a) *IN GENERAL.*—*The Administrator shall, to the ex-*
3 *tent practicable, continue to carry out a program to mod-*
4 *ernize rocket propulsion test infrastructure at NASA facili-*
5 *ties—*

6 (1) *to increase capabilities;*

7 (2) *to enhance safety;*

8 (3) *to support propulsion development and test-*
9 *ing; and*

10 (4) *to foster the improvement of Government and*
11 *commercial space transportation and exploration.*

12 (b) *PROJECTS.*—*Projects funded under the program*
13 *described in subsection (a) may include—*

14 (1) *infrastructure and other facilities and sys-*
15 *tems relating to rocket propulsion test stands and*
16 *rocket propulsion testing;*

17 (2) *enhancements to test facility capacity and*
18 *flexibility; and*

19 (3) *such other projects as the Administrator con-*
20 *siders appropriate to meet the goals described in that*
21 *subsection.*

22 (c) *REQUIREMENTS.*—*In carrying out the program*
23 *under subsection (a), the Administrator shall—*

24 (1) *to the extent practicable and appropriate,*
25 *prioritize investments in projects that enhance test*
26 *and flight certification capabilities, including for*

1 *large thrust-level atmospheric and altitude engines*
2 *and engine systems, and multi-engine integrated test*
3 *capabilities;*

4 (2) *continue to make underutilized test facilities*
5 *available for commercial use on a reimbursable basis;*
6 *and*

7 (3) *ensure that no project carried out under this*
8 *program adversely impacts, delays, or defers testing*
9 *or other activities associated with facilities used for*
10 *Government programs, including—*

11 (A) *the Space Launch System and the Ex-*
12 *ploration Upper Stage of the Space Launch Sys-*
13 *tem;*

14 (B) *in-space propulsion to support explo-*
15 *ration missions; or*

16 (C) *nuclear propulsion testing.*

17 (d) *RULE OF CONSTRUCTION.—Nothing in this section*
18 *shall preclude a NASA program, including the Space*
19 *Launch System and the Exploration Upper Stage of the*
20 *Space Launch System, from using the modernized test in-*
21 *frastructure developed under this section.*

22 (e) *WORKING CAPITAL FUND STUDY.—*

23 (1) *IN GENERAL.—Not later than 1 year after*
24 *the date of the enactment of this division, the Admin-*
25 *istrator shall submit to the appropriate committees of*

1 *Congress a report on the use of the authority under*
2 *section 30102 of title 51, United States Code, to pro-*
3 *mote increased use of NASA rocket propulsion test in-*
4 *frastructure for research, development, testing, and*
5 *evaluation activities by other Federal agencies, firms,*
6 *associations, corporations, and educational institu-*
7 *tions.*

8 (2) *MATTERS TO BE INCLUDED.*—*The report re-*
9 *quired by paragraph (1) shall include the following:*

10 (A) *An assessment of prior use, if any, of*
11 *the authority under section 30102 of title 51,*
12 *United States Code, to improve testing infra-*
13 *structure.*

14 (B) *An analysis of any barrier to imple-*
15 *mentation of such authority for the purpose of*
16 *promoting increased use of NASA rocket propul-*
17 *sion test infrastructure.*

18 **SEC. 10814. PEARL RIVER MAINTENANCE.**

19 (a) *IN GENERAL.*—*The Administrator shall coordinate*
20 *with the Chief of the Army Corps of Engineers on a com-*
21 *prehensive plan to ensure the continued navigability of the*
22 *Pearl River and Little Lake channels sufficient to support*
23 *NASA barge operations surrounding Stennis Space Center*
24 *and the Michoud Assembly Facility.*

1 **(b) REPORT TO CONGRESS.**—Not later than 180 days
2 after the date of the enactment of this division, the Adminis-
3 trator shall submit to the appropriate committees of Con-
4 gress a report on efforts under subsection (a).

5 **(c) APPROPRIATE COMMITTEES OF CONGRESS DE-**
6 **FINED.**—In this section, the term “appropriate committees
7 of Congress” means—

8 (1) the Committee on Commerce, Science, and
9 Transportation, the Committee on Environment and
10 Public Works, and the Committee on Appropriations
11 of the Senate; and

12 (2) the Committee on Science, Space, and Tech-
13 nology, the Committee on Transportation and Infra-
14 structure, and the Committee on Appropriations of
15 the House of Representatives.

16 **SEC. 10815. EXTENSION AND MODIFICATION RELATING TO**
17 **INTERNATIONAL SPACE STATION.**

18 **(a) POLICY.**—Section 501(a) of the National Aero-
19 nautics and Space Administration Authorization Act of
20 2010 (42 U.S.C. 18351(a)) is amended by striking “2024”
21 and inserting “September 30, 2030”.

22 **(b) MAINTENANCE OF UNITED STATES SEGMENT AND**
23 **ASSURANCE OF CONTINUED OPERATIONS.**—Section 503(a)
24 of the National Aeronautics and Space Administration Au-
25 thorization Act of 2010 (42 U.S.C. 18353(a)) is amended

1 *by striking “September 30, 2024” and inserting “September*
2 *30, 2030”.*

3 (c) *RESEARCH CAPACITY ALLOCATION AND INTEGRA-*
4 *TION OF RESEARCH PAYLOADS.—Section 504(d) of the Na-*
5 *tional Aeronautics and Space Administration Authoriza-*
6 *tion Act of 2010 (42 U.S.C. 18354(d)) is amended—*

7 (1) *in paragraph (1), in the first sentence—*

8 (A) *by striking “As soon as practicable”*
9 *and all that follows through “2011,” and insert-*
10 *ing “The”; and*

11 (B) *by striking “September 30, 2024” and*
12 *inserting “September 30, 2030”; and*

13 (2) *in paragraph (2), in the third sentence, by*
14 *striking “September 30, 2024” and inserting “Sep-*
15 *tember 30, 2030”.*

16 (d) *MAINTENANCE OF USE.—*

17 (1) *IN GENERAL.—Section 70907 of title 51,*
18 *United States Code, is amended—*

19 (A) *in the section heading, by striking*
20 *“**2024**” and inserting “**2030**”;*

21 (B) *in subsection (a), by striking “Sep-*
22 *tember 30, 2024” and inserting “September 30,*
23 *2030”; and*

1 (C) in subsection (b)(3), by striking “Sep-
2 tember 30, 2024” and inserting “September 30,
3 2030”.

4 (2) *CONFORMING AMENDMENT.*—The table of sec-
5 tions for chapter 709 of title 51, United States Code,
6 is amended by striking the item relating to section
7 70907 and inserting the following:

“70907. *Maintaining use through at least 2030.*”.

8 (e) *TRANSITION PLAN REPORTS.*—Section 50111(c)(2)
9 of title 51, United States Code is amended—

10 (1) in the matter preceding subparagraph (A),
11 by striking “2023” and inserting “2028”; and

12 (2) in subparagraph (J), by striking “2028” and
13 inserting “2030”.

14 (f) *ASSESSMENTS AND REPORT.*—The Administrator
15 shall—

16 (1) conduct a comprehensive assessment of the vi-
17 ability of the ISS to operate safely and support full
18 and productive use through 2030, including all nec-
19 essary analyses to certify ISS operations through
20 2030;

21 (2) not later than 180 days after the date of the
22 enactment of this Act, submit to the Aerospace Safety
23 Advisory Panel an assessment of—

24 (A) the root cause of cracks and air leaks in
25 the Russian Service Module Transfer Tunnel;

1 (B) the certification of all United States
2 systems and modules to operate through 2030;

3 (C)(i) an inventory of spares or replace-
4 ments for elements, systems, and equipment, in-
5 cluding systems certified under subparagraph
6 (B), that are currently produced, in inventory,
7 or on order;

8 (ii) a description of the state of the readi-
9 ness of such spares and replacements; and

10 (iii) a schedule for delivery of such spares
11 and replacements to the ISS, including the
12 planned transportation means for such delivery
13 and the estimated cost and schedule for procure-
14 ment of such spares and replacements and their
15 delivery to the ISS; and

16 (D) any other relevant data, information,
17 or analysis relevant to the safe and productive
18 use of the ISS through 2030; and

19 (3) not later than 240 days after the date of the
20 enactment of this Act, submit to the appropriate com-
21 mittees of Congress—

22 (A) a report on the results of the assessment
23 conducted under paragraph (1); and

24 (B) a plan to address any recommendations
25 of the Aerospace Safety Advisory Panel, con-

1 *sistent with section 31101(c)(2) of title 51,*
2 *United States Code, with respect to such assess-*
3 *ment.*

4 **SEC. 10816. PRIORITIES FOR INTERNATIONAL SPACE STA-**
5 **TION.**

6 (a) *IN GENERAL.*—*The Administrator shall assess*
7 *International Space Station research activities and shall*
8 *ensure that crew time and resources allocated to the Admin-*
9 *istration for use on the International Space Station*
10 *prioritize—*

11 (1) *the research of the Human Research Pro-*
12 *gram, including research on and development of coun-*
13 *termeasures relevant to reducing human health and*
14 *performance risks, behavioral and psychological risks,*
15 *and other astronaut safety risks related to long-dura-*
16 *tion human spaceflight;*

17 (2) *risk reduction activities relevant to explo-*
18 *ration technologies, including for the Environmental*
19 *Control and Life Support System, extravehicular ac-*
20 *tivity and space suits, environmental monitoring,*
21 *safety, emergency response, and deep space commu-*
22 *nications;*

23 (3) *the advancement of United States leadership*
24 *in basic and applied space life and physical science*
25 *research, consistent with the priorities of the most re-*

1 *cent space life and physical sciences decadal survey of*
2 *the National Academies of Sciences, Engineering, and*
3 *Medicine; and*

4 (4) *other research and development activities*
5 *identified by the Administrator as essential to Moon*
6 *to Mars activities.*

7 (b) *REPORTS.—*

8 (1) *ASSESSMENT AND PRIORITIZATION.—Not*
9 *later than 180 days after the date of the enactment*
10 *of this Act, the Administrator shall submit to the ap-*
11 *propriate committees of Congress a report on—*

12 (A) *the assessment; and*

13 (B) *the steps taken to achieve the*
14 *prioritization required by subsection (a).*

15 (2) *SPACE FLIGHT PARTICIPANTS.—Not later*
16 *than 120 days after the date of the enactment of this*
17 *Act, the Administrator shall submit to the appro-*
18 *priate committees of Congress a report on measures*
19 *taken, with respect to space flight participants aboard*
20 *the ISS, to ensure government astronaut safety, to*
21 *avoid interference in ISS operations and research*
22 *priorities, and to prevent undue demands on crew*
23 *time and resources.*

24 (3) *ANNUAL PROGRESS REPORTS.—Concurrent*
25 *with the annual budget submission of the President to*

1 *Congress under section 1105(a) of title 31, United*
2 *States Code, the Administrator shall provide to the*
3 *appropriate committees of Congress an annual ac-*
4 *counting of the use of Administration crew time and*
5 *ISS resources, including the allocation of such re-*
6 *sources toward the priorities described in subsection*
7 *(a).*

8 **SEC. 10817. TECHNICAL AMENDMENTS RELATING TO**
9 **ARTEMIS MISSIONS.**

10 *(a) Section 421 of the National Aeronautics and Space*
11 *Administration Authorization Act of 2017 (Public Law*
12 *115–10; 51 U.S.C. 20301 note) is amended—*

13 *(1) in subsection (c)(3)—*

14 *(A) by striking “EM–1” and inserting*
15 *“Artemis I”;*

16 *(B) by striking “EM–2” and inserting*
17 *“Artemis II”; and*

18 *(C) by striking “EM–3” and inserting*
19 *“Artemis III”; and*

20 *(2) in subsection (f)(3), by striking “EM–3” and*
21 *inserting “Artemis III”.*

22 *(b) Section 432(b) of the National Aeronautics and*
23 *Space Administration Authorization Act of 2017 (Public*
24 *Law 115–10; 51 U.S.C. 20302 note) is amended—*

25 *(1) in paragraph (3)(D)—*

- 1 (A) by striking “EM-1” and inserting
 2 “Artemis I”; and
 3 (B) by striking “EM-2” and inserting
 4 “Artemis II”; and
 5 (2) in paragraph (4)(C), by striking “EM-3”
 6 and inserting “Artemis III”.

7 **Subtitle B—Science**

8 **SEC. 10821. SCIENCE PRIORITIES.**

9 (a) *SENSE OF CONGRESS ON SCIENCE PORTFOLIO.*—

10 *It is the sense of Congress that—*

11 (1) *a balanced and adequately funded set of ac-*
 12 *tivities, consisting of research and analysis grant pro-*
 13 *grams, technology development, suborbital research*
 14 *activities, and small, medium, and large space mis-*
 15 *sions, contributes to a robust and productive science*
 16 *program and serves as a catalyst for innovation and*
 17 *discovery; and*

18 (2) *the Research and Analysis programs funded*
 19 *by the Science Mission Directorate are critically im-*
 20 *portant for—*

21 (A) *preparing the next generation of space*
 22 *and Earth scientists;*

23 (B) *pursuing peer-reviewed cutting-edge re-*
 24 *search;*

1 (C) maximizing scientific return from the
2 Administration’s space and Earth science mis-
3 sions; and

4 (D) developing innovative techniques and
5 future mission concepts.

6 (b) *GOAL.*—The Administrator shall pursue the goal
7 of establishing annual funding for Research and Analysis
8 in the Science Mission Directorate that reaches a level of
9 not less than 10 percent of the total annual funding of rel-
10 evant divisions of the Science Mission Directorate by fiscal
11 year 2025.

12 **SEC. 10822. SEARCH FOR LIFE.**

13 (a) *SENSE OF CONGRESS.*—It is the sense of Congress
14 that—

15 (1) the report entitled “An Astrobiology Strategy
16 for the Search for Life in the Universe” published by
17 the National Academies of Sciences, Engineering, and
18 Medicine outlines key scientific questions and methods
19 on the search for the origin, evolution, distribution,
20 and future of life in the universe; and

21 (2) the interaction of lifeforms with their envi-
22 ronment, a central focus of astrobiology research, is a
23 topic of broad significance to life sciences research in
24 space and on Earth.

25 (b) *PROGRAM CONTINUATION.*—

1 (1) *IN GENERAL.*—*The Administrator shall con-*
2 *tinue to implement a collaborative, multidisciplinary*
3 *science and technology development program to search*
4 *for evidence of the existence or historical existence of*
5 *life beyond Earth in support of—*

6 (A) *the scientific priorities of the most re-*
7 *cent decadal surveys on planetary science and*
8 *astrobiology and astronomy and astrophysics of*
9 *the National Academies of Sciences, Engineering,*
10 *and Medicine; and*

11 (B) *the objective described in section*
12 *20102(d)(10) of title 51, United States Code.*

13 (2) *ELEMENT.*—*The program under paragraph*
14 *(1) shall include activities relating to astronomy, bi-*
15 *ology, geology, and planetary science.*

16 (3) *COORDINATION WITH LIFE SCIENCES PRO-*
17 *GRAM.*—*In carrying out the program under para-*
18 *graph (1), the Administrator shall coordinate efforts*
19 *with the life sciences program of the Administration.*

20 (4) *INSTRUMENTATION AND SENSOR TECH-*
21 *NOLOGY.*—*In carrying out the program under para-*
22 *graph (1), the Administrator may invest in the devel-*
23 *opment of new instrumentation and sensor tech-*
24 *nology.*

1 (5) *TECHNOSIGNATURES*.—*In carrying out the*
2 *program under paragraph (1), the Administrator*
3 *may support, as appropriate, merit-reviewed, com-*
4 *petitively selected research on technosignatures.*

5 **SEC. 10823. NEXT GENERATION OF ASTROPHYSICS GREAT**
6 **OBSERVATORIES.**

7 (a) *SENSE OF CONGRESS*.—*It is the sense of Congress*
8 *that—*

9 (1) *NASA’s Great Observatories, a suite of space-*
10 *based telescopes launched over the course of 2 decades*
11 *and comprised of the Hubble Space Telescope, Comp-*
12 *ton Gamma-Ray Observatory, Chandra X-Ray Ob-*
13 *servatory, and Spitzer Space Telescope, have enabled*
14 *major scientific advances across a broad range of as-*
15 *trophysics disciplines, including with respect to the*
16 *origins of planets, the formation and evolution of*
17 *stars and galaxies, fundamental physics, and the*
18 *structure of the universe;*

19 (2) *the decadal survey of the National Academies*
20 *of Science, Engineering, and Medicine entitled “Path-*
21 *ways to Discovery in Astronomy and Astrophysics for*
22 *the 2020s” recommends a vision to understand the re-*
23 *lationships between stars and the bodies that orbit*
24 *them by “looking” at the universe through a range of*
25 *observations, including radio, optical, gamma rays,*

1 *neutrinos, and gravitational waves, in order to un-*
2 *derstand the origin and evolution of galaxies;*

3 *(3) the United States and NASA are uniquely*
4 *poised—*

5 *(A) to lead the world in the implementation*
6 *of the next generation of Great Observatories, as*
7 *recommended in such decadal survey, including*
8 *implementation of an observatory to search for*
9 *biosignatures of exoplanets in the habitable zone;*

10 *(B) to address the most compelling scientific*
11 *questions of the next decade; and*

12 *(C) to transform not only our under-*
13 *standing of the universe and the processes and*
14 *physical paradigms that govern the universe, but*
15 *also the place of humanity in the universe;*

16 *(4) the Administrator should pursue an ambi-*
17 *tious astrophysics program that meets the scientific*
18 *vision of the astronomical community and the trans-*
19 *formative capacity of technological innovation; and*

20 *(5) in implementing astrophysics research, in*
21 *order to avoid the major growth in the cost of astro-*
22 *physics flagship-class missions that has the potential*
23 *to impact the overall portfolio balance of the Science*
24 *Mission Directorate, the Administrator should seek to*

1 *implement lessons learned from previous astrophysics*
2 *missions, including by—*

3 *(A) establishing sufficient cost and schedule*
4 *reserves;*

5 *(B) demonstrating in advance of prelimi-*
6 *nary design review, as practicable and appro-*
7 *priate, the maturity of necessary technologies*
8 *through prototype demonstrations in a relevant*
9 *environment;*

10 *(C) providing for regular updates to the*
11 *cost, schedule, and risk of a project; and*

12 *(D) considering, as feasible, the impacts of*
13 *cost and schedule changes across the Science Mis-*
14 *sion Directorate.*

15 *(b) NANCY GRACE ROMAN TELESCOPE.—*

16 *(1) IN GENERAL.—The Administrator shall con-*
17 *tinue development of the Nancy Grace Roman Space*
18 *Telescope (commonly known as the “Roman telescope”*
19 *and formerly known as the “Wide Field Infrared Sur-*
20 *vey Telescope”) in the configuration established*
21 *through critical design review, to meet the objectives*
22 *prioritized in the 2010 decadal survey of astronomy*
23 *and astrophysics of the National Academies of*
24 *Sciences, Engineering, and Medicine.*

1 (2) *COST AND SCHEDULE.*—Section 30104 of
2 *title 51, United States Code shall apply to the devel-*
3 *opment of the Roman telescope under paragraph (1).*

4 (3) *QUARTERLY REPORTS.*—Not less frequently
5 *than quarterly, the Administrator shall submit to the*
6 *appropriate committees of Congress a report on the*
7 *progress of the development of the Roman telescope*
8 *and the budget profile and schedule relative to the*
9 *baseline plan for such development.*

10 **SEC. 10824. EARTH SCIENCE MISSIONS AND PROGRAMS.**

11 (a) *SENSE OF CONGRESS.*—It is the sense of Congress
12 *that—*

13 (1) *the Earth science and applications program*
14 *of the Administration provides increasingly valuable*
15 *data for natural resource management, agriculture,*
16 *forestry, food security, air quality monitoring, and*
17 *many other application areas; and*

18 (2) *a robust and balanced Earth science and ap-*
19 *plications program contributes significantly to—*

20 (A) *the scientific discovery and economic*
21 *growth of the United States; and*

22 (B) *supporting the health and safety of the*
23 *people of the United States and the citizens of*
24 *the world.*

1 (b) *REAFFIRMATION.*—Congress reaffirms the goal for
2 *the Administration’s Earth science and applications pro-*
3 *gram set forth in section 60501 of title 51, United States*
4 *Code, which states: “The goal for the Administration’s*
5 *Earth Science program shall be to pursue a program of*
6 *Earth observations, research, and applications activities to*
7 *better understand the Earth, how it supports life, and how*
8 *human activities affect its ability to do so in the future.*
9 *In pursuit of this goal, the Administration’s Earth Science*
10 *program shall ensure that securing practical benefits for so-*
11 *ciety will be an important measure of its success in addi-*
12 *tion to securing new knowledge about the Earth system and*
13 *climate change. In further pursuit of this goal, the Adminis-*
14 *tration shall, together with the National Oceanic and At-*
15 *mospheric Administration and other relevant agencies, pro-*
16 *vide United States leadership in developing and carrying*
17 *out a cooperative international Earth observations-based re-*
18 *search program.”.*

19 (c) *EARTH SCIENCE MISSIONS AND PROGRAMS.*—With
20 *respect to the missions and programs of the Earth Science*
21 *Division, the Administrator shall, to the maximum extent*
22 *practicable, follow the recommendations and guidance pro-*
23 *vided by the scientific community through the decadal sur-*
24 *vey for Earth science and applications from space of the*

1 *National Academies of Sciences, Engineering, and Medi-*
2 *cine, including—*

3 (1) *the science priorities described in such sur-*
4 *vey;*

5 (2) *the execution of the series of existing or pre-*
6 *viously planned observations (commonly known as the*
7 *“program of record”); and*

8 (3) *the development of a range of missions of all*
9 *classes, including opportunities for principal investi-*
10 *gator-led, competitively selected missions.*

11 (d) *EARTH SYSTEM OBSERVATORY.—The Adminis-*
12 *trator shall pursue an Earth System Observatory, which*
13 *shall consist of an array of new and complementary Earth-*
14 *observing scientific satellites, instruments, and missions—*

15 (1) *to address the recommendations of the 2018*
16 *Earth science and applications decadal survey of the*
17 *National Academies of Sciences, Engineering, and*
18 *Medicine entitled “Thriving on our Changing Plan-*
19 *et”, including by conducting priority observations*
20 *in—*

21 (A) *aerosols;*

22 (B) *cloud convection and precipitation;*

23 (C) *mass change;*

24 (D) *surface biology and geology;*

25 (E) *surface deformation and change; and*

1 (F) other observation areas designated as
2 high-priority by such decadal survey; and

3 (2) to achieve the goal of the Earth Science Pro-
4 gram set forth in section 60501 of title 51, United
5 States Code.

6 (e) *SURVEY OF USE OF EARTH OBSERVATION DATA*
7 *BY STATES, TRIBES, AND TERRITORIES.*—

8 (1) *SURVEY.*—*The Administrator shall arrange*
9 *for the conduct of a survey of the use of NASA Earth*
10 *observation data by States, Tribal organizations, and*
11 *territories.*

12 (2) *SUBMISSION.*—*Not later than 18 months*
13 *after the date of the enactment of this Act, the Admin-*
14 *istrator shall submit to the appropriate committees of*
15 *Congress the results of the survey conducted under*
16 *paragraph (1).*

17 (f) *CLIMATE ARCHITECTURE PLAN.*—*The Adminis-*
18 *trator shall—*

19 (1) *maintain a comprehensive, strategic Climate*
20 *Architecture Plan for Earth Observations and Appli-*
21 *cations from Space that describes an integrated and*
22 *balanced program of Earth science and applications*
23 *observations to advance science, policy, and applica-*
24 *tions and societal benefits; and*

1 (2) *update such plan every 5 years so as to align*
2 *with the release of the decadal surveys in Earth*
3 *science and applications from space and the mid-dec-*
4 *ade assessments of the National Academies of*
5 *Sciences, Engineering, and Medicine.*

6 **SEC. 10825. PLANETARY DEFENSE COORDINATION OFFICE.**

7 (a) *FINDINGS.—Congress makes the following findings:*

8 (1) *Near-Earth objects remain a threat to the*
9 *United States.*

10 (2) *Section 321(d)(1) of the National Aero-*
11 *navitics and Space Administration Authorization Act*
12 *of 2005 (Public Law 109–155; 119 Stat. 2922; 51*
13 *U.S.C. 71101 note prec.), established a requirement*
14 *that the Administrator plan, develop, and implement*
15 *a Near-Earth Object Survey program to detect, track,*
16 *catalogue, and characterize the physical characteris-*
17 *tics of near-Earth objects equal to, or greater than,*
18 *140 meters in diameter in order to assess the threat*
19 *of such near-Earth objects to the Earth, with the goal*
20 *of 90 percent completion of the catalogue of such near-*
21 *Earth objects by December 30, 2020.*

22 (3) *The goal described in paragraph (2) has not*
23 *be met.*

24 (4) *The report of the National Academies of*
25 *Sciences, Engineering, and Medicine entitled “Find-*

1 *ing Hazardous Asteroids Using Infrared and Visible*
2 *Wavelength Telescopes*”, issued in 2019, states that—

3 (A) NASA should develop and launch a
4 dedicated space-based infrared survey telescope to
5 meet the requirements of section 321(d)(1) of the
6 National Aeronautics and Space Administration
7 Authorization Act of 2005 (Public Law 109–155;
8 119 Stat. 2922; 51 U.S.C. 71101 note prec.); and

9 (B) the early detection of potentially haz-
10 ardous near-Earth objects enabled by a space-
11 based infrared survey telescope is important to
12 enable deflection of a dangerous asteroid.

13 (b) MAINTENANCE OF PLANETARY DEFENSE COORDI-
14 NATION OFFICE.—The Administrator shall maintain an of-
15 fice within the Planetary Science Division of the Science
16 Mission Directorate, to be known as the “Planetary Defense
17 Coordination Office”—

18 (1) to plan, develop, and implement a program
19 to survey threats posed by near-Earth objects equal to
20 or greater than 140 meters in diameter, as required
21 by section 321(d)(1) of the National Aeronautics and
22 Space Administration Authorization Act of 2005
23 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C.
24 71101 note prec.);

1 (2) *identify, track, and characterize potentially*
2 *hazardous near-Earth objects, issue warnings of the*
3 *effects of potential impacts of such objects, and inves-*
4 *tigate strategies and technologies for mitigating the*
5 *potential impacts of such objects; and*

6 (3) *assist in coordinating government planning*
7 *for response to a potential impact of a near-Earth ob-*
8 *ject.*

9 (c) *DEDICATED SURVEY MISSION.—*

10 (1) *SENSE OF CONGRESS.—It is the sense of*
11 *Congress that—*

12 (A) *the Near-Earth Object Surveyor mis-*
13 *sion, as designed, is anticipated to make signifi-*
14 *cant progress toward carrying out congressional*
15 *policy and direction, as set forth in section*
16 *321(d)(1) of the National Aeronautics and Space*
17 *Administration Authorization Act of 2005 (Pub-*
18 *lic Law 109–155; 119 Stat. 2922; 51 U.S.C.*
19 *71101 note prec.), to detect 90 percent of near-*
20 *Earth objects equal to, or greater than, 140 me-*
21 *ters in diameter; and*

22 (B) *the Administrator should prioritize the*
23 *public safety role of the Near-Earth Object Sur-*
24 *veyor mission and should not delay the develop-*

1 *ment and launch of the mission due to cost*
2 *growth on other planetary science missions.*

3 (2) *CONTINUATION OF MISSION.—*

4 (A) *IN GENERAL.—The Administrator shall*
5 *continue the development of a dedicated space-*
6 *based infrared survey telescope mission, known*
7 *as the “Near-Earth Object Surveyor”, on a*
8 *schedule to achieve a launch-readiness date not*
9 *later than March 30, 2026, or the earliest prac-*
10 *ticable date, for the purpose of accomplishing the*
11 *objectives set forth in section 321(d)(1) of the Na-*
12 *tional Aeronautics and Space Administration*
13 *Authorization Act of 2005 (Public Law 109–155;*
14 *119 Stat. 2922; 51 U.S.C. 71101 note prec.).*

15 (B) *CONSIDERATION OF RECOMMENDA-*
16 *TIONS.—The design of the mission described in*
17 *subparagraph (A) shall take into account the rec-*
18 *ommendations of the 2019 report of the National*
19 *Academies of Sciences, Engineering, and Medi-*
20 *cine entitled “Finding Hazardous Asteroids*
21 *Using Infrared and Visible Wavelength Tele-*
22 *scopes”, the planetary science decadal survey,*
23 *and the 2018 United States National Near-Earth*
24 *Object Preparedness Strategy and Action Plan.*

1 (d) *ANNUAL REPORT.—Section 321(f) of the National*
2 *Aeronautics and Space Administration Authorization Act*
3 *of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C.*
4 *71101 note prec.) is amended to read as follows:*

5 “(f) *ANNUAL REPORT.—Not later than 180 days after*
6 *the date of the enactment of the National Aeronautics and*
7 *Space Administration Authorization Act of 2022 and annu-*
8 *ally thereafter through 90-percent completion of the cata-*
9 *logue required by subsection (d)(1), the Administrator shall*
10 *submit to the Committee on Commerce, Science, and Trans-*
11 *portation of the Senate and the Committee on Science,*
12 *Space, and Technology of the House of Representatives a*
13 *report that includes the following:*

14 “(1) *A summary of all activities carried out by*
15 *the Planetary Defense Coordination Office established*
16 *under section 10825 of the National Aeronautics and*
17 *Space Administration Authorization Act of 2022*
18 *since the date of enactment of that Act.*

19 “(2) *A description of the progress with respect to*
20 *the design, development, and launch of the space-*
21 *based infrared survey telescope required by section*
22 *10825(c) of the National Aeronautics and Space Ad-*
23 *ministration Authorization Act of 2022.*

24 “(3) *An assessment of the progress toward meet-*
25 *ing the requirements under subsection (d)(1).*

1 (2) *large-scale flight test experimentation and*
2 *validation are necessary for—*

3 (A) *transitioning new technologies and ma-*
4 *terials, including associated manufacturing proc-*
5 *esses, for aviation and aeronautics use; and*

6 (B) *capturing the full extent of benefits*
7 *from investments made by the Aeronautics Re-*
8 *search Mission Directorate; and*

9 (3) *a level of funding that adequately supports*
10 *large-scale flight test experimentation and validation,*
11 *including related infrastructure, should be ensured*
12 *over a sustained period of time to restore the capacity*
13 *of the Administration—*

14 (A) *to see legacy priority programs through*
15 *to completion; and*

16 (B) *to achieve national economic and secu-*
17 *rity objectives.*

18 (b) *STATEMENT OF POLICY.—It is the policy of the*
19 *United States—*

20 (1) *to maintain world leadership in—*

21 (A) *civilian aeronautical science and tech-*
22 *nology; and*

23 (B) *aerospace industrialization; and*

24 (2) *to maintain as a fundamental objective of the*
25 *aeronautics research of the Administration the steady*

1 *progression and expansion of flight research and ca-*
2 *pabilities, including the science and technology of*
3 *critical underlying disciplines and competencies, such*
4 *as—*

5 *(A) computational-based analytical and*
6 *predictive tools and methodologies;*

7 *(B) aerothermodynamics;*

8 *(C) propulsion;*

9 *(D) advanced materials and manufacturing*
10 *processes;*

11 *(E) high-temperature structures and mate-*
12 *rials; and*

13 *(F) guidance, navigation, and flight con-*
14 *trols.*

15 *(c) EXPERIMENTAL AIRCRAFT FLIGHT DEMONSTRA-*
16 *TIONS.—*

17 *(1) IN GENERAL.—In meeting the objectives de-*
18 *scribed in subsection (b), the Administrator shall*
19 *carry out experimental aircraft demonstrations, in-*
20 *cluding—*

21 *(A) a subsonic demonstrator to demonstrate*
22 *the performance and feasibility of advanced,*
23 *ultra-efficient, and low emissions subsonic flight*
24 *demonstrator configurations;*

1 (B) a low boom flight demonstrator to vali-
2 date design tools and technologies that can be ap-
3 plied to low sonic boom commercial supersonic
4 aircraft and support the development of a noise-
5 based standard for supersonic overland flight;
6 and

7 (C) a flight research demonstrator to test
8 the performance and feasibility of advanced,
9 ultra-efficient and net-zero emissions aircraft
10 concepts and configurations.

11 (2) *ELEMENTS.*—For each demonstration under
12 paragraph (1), the Administrator shall—

13 (A) include the development of experimental
14 aircraft and all necessary supporting flight test
15 assets;

16 (B) pursue a robust technology maturation
17 and flight test validation effort;

18 (C) improve necessary facilities, flight test-
19 ing capabilities, and computational tools to sup-
20 port the demonstration;

21 (D) award any primary contracts for de-
22 sign, procurement, and manufacturing to United
23 States persons, consistent with international ob-
24 ligations and commitments; and

1 (E) coordinate research and flight test dem-
2 onstration activities with other Federal agencies
3 and the United States aviation community, as
4 the Administrator considers appropriate.

5 (3) UNITED STATES PERSON DEFINED.—In this
6 subsection, the term “United States person” means—

7 (A) a United States citizen or an alien law-
8 fully admitted for permanent residence to the
9 United States; or

10 (B) an entity organized under the laws of
11 the United States or of any jurisdiction within
12 the United States, including a foreign branch of
13 such an entity.

14 (d) COLLABORATION WITH INDUSTRY AND ACA-
15 DEMLA.—The Administration shall seek means to expand
16 collaboration with industry and academia on basic research
17 and technology development related to experimental air-
18 craft, and on the experimental aircraft demonstrations re-
19 quired by subsection (c).

20 (e) ADVANCED MATERIALS AND MANUFACTURING
21 TECHNOLOGY PROGRAM.—

22 (1) IN GENERAL.—The Administrator may estab-
23 lish an advanced materials and manufacturing tech-
24 nology program—

25 (A) to develop—

1 (i) *new materials, including composite*
2 *and high-temperature materials, from base*
3 *material formulation through full-scale*
4 *structural validation and manufacture;*

5 (ii) *advanced materials and manufac-*
6 *turing processes, including additive manu-*
7 *facturing, to reduce the cost of manufac-*
8 *turing scale-up and certification for use in*
9 *aeronautics; and*

10 (iii) *noninvasive or nondestructive*
11 *techniques for testing or evaluating aviation*
12 *and aeronautics structures, including for*
13 *materials and manufacturing processes;*

14 (B) *to reduce the time it takes to design, in-*
15 *dustrialize, and certify advanced materials and*
16 *manufacturing processes;*

17 (C) *to provide education and training op-*
18 *portunities for the aerospace workforce; and*

19 (D) *to address global cost and human cap-*
20 *ital competitiveness for United States aero-*
21 *nautical industries and technological leadership*
22 *in advanced materials and manufacturing tech-*
23 *nology.*

24 (2) *ELEMENTS.—In carrying out a program*
25 *under paragraph (1), the Administrator may—*

1 (A) *build on work that was carried out by*
2 *the Advanced Composites Project of the Adminis-*
3 *tration;*

4 (B) *partner with the private and academic*
5 *sectors, such as members of the Advanced Com-*
6 *posites Consortium of the Administration, the*
7 *Joint Advanced Materials and Structures Center*
8 *of Excellence of the Federal Aviation Adminis-*
9 *tration, the Manufacturing USA institutes of the*
10 *Department of Commerce, and national labora-*
11 *tories, as the Administrator considers appro-*
12 *priate;*

13 (C) *provide a structure for managing intel-*
14 *lectual property generated by the program based*
15 *on or consistent with the structure established for*
16 *the Advanced Composites Consortium of the Ad-*
17 *ministration;*

18 (D) *ensure adequate Federal cost share for*
19 *applicable research; and*

20 (E) *coordinate with advanced manufac-*
21 *turing and composites initiatives in other mis-*
22 *sion directorates of the Administration, as the*
23 *Administrator considers appropriate.*

24 (f) *RESEARCH PARTNERSHIPS.—In carrying out the*
25 *demonstrations under subsection (c) and a program under*

1 *subsection (e), the Administrator may engage in cooperative*
2 *research programs with—*

3 *(1) academia; and*

4 *(2) commercial aviation and aerospace manufac-*
5 *turers.*

6 **SEC. 10832. UNMANNED AIRCRAFT SYSTEMS.**

7 *(a) UNMANNED AIRCRAFT SYSTEMS OPERATION PRO-*
8 *GRAM.—The Administrator shall—*

9 *(1) research and test capabilities and concepts,*
10 *including unmanned aircraft systems communica-*
11 *tions, for integrating unmanned aircraft systems into*
12 *the national airspace system;*

13 *(2) leverage the partnership NASA has with in-*
14 *dustry focused on the advancement of technologies for*
15 *future air traffic management systems for unmanned*
16 *aircraft systems; and*

17 *(3) continue to leverage the research and testing*
18 *portfolio of NASA to inform the integration of un-*
19 *manned aircraft systems into the national airspace*
20 *system, consistent with public safety and national se-*
21 *curity objectives.*

22 *(b) SENSE OF CONGRESS ON COORDINATION WITH*
23 *FEDERAL AVIATION ADMINISTRATION.—It is the sense of*
24 *Congress that—*

25 *(1) NASA should continue—*

1 (A) to coordinate with the Federal Aviation
2 Administration on research on air traffic man-
3 agement systems for unmanned aircraft systems;
4 and

5 (B) to assist the Federal Aviation Adminis-
6 tration in the integration of air traffic manage-
7 ment systems for unmanned aircraft systems
8 into the national airspace system; and

9 (2) the test ranges (as defined in section 44801
10 of title 49, United States Code) should continue to be
11 leveraged for research on—

12 (A) air traffic management systems for un-
13 manned aircraft systems; and

14 (B) the integration of such systems into the
15 national airspace system.

16 **SEC. 10833. CLEANER, QUIETER AIRPLANES.**

17 (a) *INITIATIVE REQUIRED.*—Section 40112 of title 51,
18 United States Code, is amended—

19 (1) by redesignating subsections (b) through (f)
20 as subsections (c) through (g), respectively; and

21 (2) by inserting after subsection (a) the fol-
22 lowing:

23 “(b) *RESEARCH AND DEVELOPMENT INITIATIVE ON*
24 *REDUCTION OF GREENHOUSE GAS AND NOISE EMISSIONS*
25 *FROM AIRCRAFT.*—

1 “(1) *IN GENERAL.*—*The Administrator shall es-*
2 *tablish an initiative to research, develop, and dem-*
3 *onstrate new technologies and concepts—*

4 “(A) *to reduce greenhouse gas emissions*
5 *from aviation, including carbon dioxide, nitro-*
6 *gen oxides, other greenhouse gases, water vapor,*
7 *black carbon and sulfate aerosols, and increased*
8 *cloudiness due to contrail formation;*

9 “(B) *to reduce aviation noise emissions;*
10 *and*

11 “(C) *to enable associated aircraft perform-*
12 *ance characteristics.*

13 “(2) *GOALS.*—*The goals of the initiative required*
14 *by paragraph (1) shall be—*

15 “(A) *to ensure United States leadership in*
16 *research and technology innovation leading to*
17 *substantial reductions in aviation noise and*
18 *greenhouse gas emissions;*

19 “(B) *to enhance and expand basic research,*
20 *and the translation of basic research into appli-*
21 *cations, that may lead to transformational ad-*
22 *vances in reducing aviation noise and green-*
23 *house gas emissions;*

24 “(C) *to accelerate research and development*
25 *that contributes to maturing new technologies for*

1 *reducing aircraft noise and greenhouse gas emis-*
2 *sions; and*

3 “(D) *to obtain and disseminate associated*
4 *testing and performance data that facilitates the*
5 *incorporation of new technologies into commer-*
6 *cial aircraft development as soon as practicable.*

7 “(3) *OBJECTIVES.*—*The objectives of the initia-*
8 *tive established under paragraph (1) and the goals de-*
9 *scribed in paragraph (2) shall include—*

10 “(A) *as soon as practicable, a reduction of*
11 *greenhouse gas emissions from new aircraft by at*
12 *least 50 percent, as compared to the highest-per-*
13 *forming aircraft technologies in service as of De-*
14 *cember 31, 2021;*

15 “(B) *noise levels from aircraft throughout*
16 *all phases of flight that do not exceed ambient*
17 *noise levels in the absence of flight operations in*
18 *the vicinity of the flight route;*

19 “(C) *net-zero greenhouse gas emissions from*
20 *aircraft by 2050; and*

21 “(D) *demonstration of new technologies de-*
22 *veloped pursuant to such initiative on—*

23 “(i) *regional aircraft intended to enter*
24 *into service by 2030; and*

1 “(ii) single-aisle aircraft designed to
2 accommodate more than 125 passengers in-
3 tended to enter into service by 2040.”.

4 (b) *TECHNOLOGY FOCUS AREAS.*—In carrying out the
5 research and development initiative established under sec-
6 tion 40112(b) of title 51, United States Code, the Adminis-
7 trator shall advance research, development, and demonstra-
8 tion projects on promising technologies such as—

9 (1) advanced subsonic propulsion technology, de-
10 sign, and integration;

11 (2) electric and hybrid-electric propulsion, in-
12 cluding battery electric and hydrogen fuel cell electric
13 systems;

14 (3) airframe concepts and configurations;

15 (4) analysis of technology options, including
16 cost-benefit analysis of greenhouse gas and noise emis-
17 sions reduction technologies;

18 (5) analytical tools for system-level and system-
19 of-systems-level modeling and integration;

20 (6) airspace operations improvements;

21 (7) noise emissions reduction; and

22 (8) any other effort, as determined by the Ad-
23 ministration, that contributes to a sustainable future
24 for aviation.

1 (c) *IMPLEMENTATION.*—*In implementing the initiative*
2 *established under section 40112(b) of title 51, United States*
3 *Code, the Administrator shall, to the extent practicable—*

4 (1) *ensure that testing and performance data in-*
5 *tegrates the results of community acceptance surveys*
6 *conducted by the Federal Aviation Administration*
7 *and other relevant studies, including studies on the*
8 *impacts of new noise effects from novel propulsion*
9 *systems and from airspace operations changes;*

10 (2) *provide testing and performance data on the*
11 *technologies described in subsection (b) of this section*
12 *to the Administrator of the Federal Aviation Admin-*
13 *istration to facilitate the work of the Federal Aviation*
14 *Administration in identifying new requirements for*
15 *policy, infrastructure, and administrative capacity*
16 *necessary to enable the safe integration of such tech-*
17 *nologies on aircraft;*

18 (3) *pursue partnerships with organizations, cur-*
19 *rent commercial production aircraft providers, aca-*
20 *demie institutions, small businesses, and new en-*
21 *trants, including partnerships to advance research*
22 *and development activities related to both regional*
23 *aircraft and aircraft designed to accommodate more*
24 *than 125 passengers;*

1 (4) *include universities, academic institutions,*
2 *and other research organizations in the partnerships*
3 *described in paragraph (3);*

4 (5) *expand basic research;*

5 (6) *ensure equity in research sponsorship of, and*
6 *partnership opportunities with, underrepresented stu-*
7 *dents, faculty, and minority-serving-institutions;*

8 (7) *continue to coordinate with the Secretary of*
9 *Energy on battery technology research;*

10 (8) *make available the research and development*
11 *carried out under the initiative established under sub-*
12 *section (b) of section 40112 of title 51, United States*
13 *Code, to help enable an industry-wide shift toward*
14 *aircraft concepts that reduce greenhouse gas emissions*
15 *and aircraft noise to achieve the goals and objectives*
16 *under paragraphs (2) and (3) of that subsection; and*

17 (9) *continue to support research, development,*
18 *and demonstration of aircraft concepts, including sys-*
19 *tems architecture, materials and components, integra-*
20 *tion of systems and airframe structures, human fac-*
21 *tors, airspace planning and operations, and the inte-*
22 *gration of related advanced technologies and concepts,*
23 *with the goal of carrying out test flights with inte-*
24 *grated subsystems by 2025.*

1 (d) *ANNUAL REPORT*.—Not later than 1 year after the
 2 date of the enactment of this Act, and annually thereafter,
 3 the Administrator shall submit to the appropriate commit-
 4 tees of Congress a report on the progress of the efforts car-
 5 ried out under the initiative established under subsection
 6 (b) of section 40112 of title 51, United States Code, includ-
 7 ing—

8 (1) *the status of progress on such initiative;*

9 (2) *an updated, anticipated timeframe for readi-*
 10 *ness of technologies and aircraft to be adopted by in-*
 11 *dustry with the emissions reduction levels directed*
 12 *under that subsection; and*

13 (3) *an identification of fundamental aeronautics*
 14 *research activities contributing to achieving the goals*
 15 *and objectives of such initiative, as described in para-*
 16 *graphs (2) and (3) of that subsection, and a descrip-*
 17 *tion of any obstacles to achieving such goals and ob-*
 18 *jectives.*

19 ***Subtitle D—Space Technology***

20 ***SEC. 10841. SPACE NUCLEAR CAPABILITIES.***

21 (a) *NUCLEAR PROPULSION*.—

22 (1) *USE IN ROBOTIC AND HUMAN EXPLORATION*
 23 *ACTIVITIES*.—The Administrator, in collaboration
 24 with other relevant Federal agencies and with indus-
 25 try, shall take all necessary steps to carry out re-

1 search and development, ground-based testing and in-
2 space testing, and other associated activities to enable
3 the use of space nuclear propulsion in Administration
4 robotic and human exploration activities, including
5 in cargo missions to Mars in the late 2020's and
6 crewed missions to Mars in the 2030's.

7 (2) *SPACE NUCLEAR PROPULSION PROGRAM.*—

8 (A) *IN GENERAL.*—*The Administrator shall*
9 *establish a space nuclear propulsion program to*
10 *carry out the activities described in paragraph*
11 *(1).*

12 (B) *ELEMENTS.*—*The program established*
13 *under subparagraph (A) shall include the fol-*
14 *lowing:*

15 (i) *Research and development in both*
16 *nuclear electric and nuclear thermal pro-*
17 *pulsion technology maturation efforts, to the*
18 *extent practicable, and the development of*
19 *consistent figures of merit across both nu-*
20 *clear electric and nuclear thermal systems,*
21 *as recommended by the National Academies*
22 *of Sciences, Engineering, and Medicine in*
23 *the report entitled “Space Nuclear Propul-*
24 *sion for Human Mars Exploration”, so as*
25 *to inform a down-selection of a nuclear elec-*

1 *tric or nuclear thermal propulsion system*
2 *by 2026, or as early as practicable.*

3 *(ii) Ground-based testing, to the extent*
4 *practicable, including not less than 1*
5 *ground-based test of a full-scale, integrated*
6 *nuclear propulsion system before any in-*
7 *space test or demonstration of such system.*

8 *(iii) In-space demonstration of a nu-*
9 *clear propulsion system in the late 2020's,*
10 *which may be carried out as a cargo mis-*
11 *sion to Mars.*

12 *(3) PLAN.—*

13 *(A) IN GENERAL.—Not later than 180 days*
14 *after the date of the enactment of this Act, the*
15 *Administrator shall submit to the appropriate*
16 *committees of Congress a plan to achieve an in-*
17 *space flight test of a nuclear propulsion system*
18 *that could support the first crewed mission to*
19 *Mars in the 2030's.*

20 *(B) ELEMENTS.—The plan required by sub-*
21 *paragraph (A) shall include the following:*

22 *(i) A timeline to mature enabling tech-*
23 *nologies and an outline of major milestones*
24 *for integration of such technologies into the*
25 *larger nuclear propulsion system.*

1 (ii) *A cost estimate for maturing such*
2 *technologies.*

3 (iii) *A description of facility require-*
4 *ments for the program under paragraph (2)*
5 *associated with such technologies.*

6 (iv) *A description of the manner in*
7 *which the Administrator will use the efforts*
8 *described in paragraph (2)(B) to determine*
9 *whether the in-space flight test should dem-*
10 *onstrate a nuclear electric propulsion sys-*
11 *tem or a nuclear thermal propulsion sys-*
12 *tem.*

13 (C) *An identification of any policy or regu-*
14 *latory challenges or barriers to conducting such*
15 *in-space test or any precursor ground-based test-*
16 *ing, and a description of options for addressing*
17 *such challenges or barriers.*

18 (b) *NUCLEAR SURFACE POWER PROGRAM.—*

19 (1) *ESTABLISHMENT.—The Administrator shall*
20 *establish a program for research, testing, and develop-*
21 *ment of a space nuclear surface power reactor design.*

22 (2) *PLAN.—*

23 (A) *IN GENERAL.—The Administrator*
24 *shall—*

1 (i) develop a plan and timeline for the
2 program established under paragraph (1),
3 taking into consideration mission needs;
4 and

5 (ii) include in such plan opportunities
6 for participation by United States commer-
7 cial entities.

8 (B) SUBMISSION.—Not later than 1 year
9 after the date of the enactment of this Act, the
10 Administrator shall submit to the appropriate
11 committees of Congress the plan developed under
12 subparagraph (A).

13 (c) ASSESSMENT OF IN-SPACE PROPULSION TESTING
14 FACILITIES.—

15 (1) IN GENERAL.—The Administrator shall carry
16 out a needs assessment for facilities and technical ca-
17 pabilities required to support ground-based testing of
18 a full-scale, full-power integrated nuclear propulsion
19 system.

20 (2) ELEMENT.—The assessment required by
21 paragraph (1) shall consider the potential develop-
22 ment of facilities that will support long-term research
23 and development of space nuclear propulsion systems.

24 (3) REPORT.—Not later than 270 days after the
25 date of the enactment of this Act, the Administrator

1 *shall submit to the appropriate committees of Con-*
2 *gress a report on the results of the assessment carried*
3 *out under paragraph (1).*

4 **SEC. 10842. PRIORITIZATION OF LOW-ENRICHED URANIUM**
5 **TECHNOLOGY.**

6 *(a) IN GENERAL.—The Administrator shall prioritize*
7 *the use of low-enriched uranium, including high-assay low-*
8 *enriched uranium, for space nuclear research and develop-*
9 *ment, including ground and in-space testing and other re-*
10 *lated demonstration activities carried out under this title.*

11 *(b) INTERAGENCY COLLABORATION.—The Adminis-*
12 *trator shall, to the extent practicable, collaborate and co-*
13 *ordinate with the Secretary of Defense, the Secretary of En-*
14 *ergy, and the heads of other relevant Federal agencies on*
15 *technology development, knowledge exchange, lessons*
16 *learned regarding nuclear power and propulsion tech-*
17 *nologies, common fuels, flight demonstrations, and oper-*
18 *ational systems production for space applications.*

19 *(c) REPORT ON NUCLEAR TECHNOLOGY*
20 *PRIORITIZATION.—Not later than 120 days after the date*
21 *of the enactment of this Act, the Administrator shall submit*
22 *to the appropriate committees of Congress a report that de-*
23 *tails the actions taken and planned, including a timeline*
24 *for such actions, to implement subsection (a).*

1 **Subtitle E—STEM Engagement**

2 **SEC. 10851. OFFICE OF STEM ENGAGEMENT.**

3 (a) *SENSE OF CONGRESS.*—*It is the sense of Congress*
4 *that NASA’s inspiring mission, specialized facilities, skilled*
5 *engineering and scientific workforce, and research activities*
6 *present unique opportunities for inspiring public engage-*
7 *ment in STEM and increasing the number of students pur-*
8 *suing STEM degrees and careers.*

9 (b) *ESTABLISHMENT.*—*The Administrator shall estab-*
10 *lish an Office of STEM Engagement (referred to in this*
11 *section as the “Office”) for the purpose of advancing*
12 *progress toward the STEM education goals of the United*
13 *States by enhancing STEM literacy, increasing diversity,*
14 *equity, and inclusion in STEM, and preparing the STEM*
15 *workforce for the future.*

16 (c) *RESPONSIBILITIES.*—*The Office established shall be*
17 *responsible for coordinating efforts and activities among or-*
18 *ganizations across the Administration, including NASA*
19 *headquarters, mission directorates, and NASA centers, de-*
20 *signed—*

21 (1) *to create unique opportunities for students*
22 *and the public to learn from and contribute to the*
23 *work of NASA in exploration and discovery;*

24 (2) *to contribute to the growth of a diverse*
25 *STEM workforce; and*

1 (3) to strengthen public understanding of science
2 by enabling connections to the mission and work of
3 NASA.

4 (d) *PORTFOLIO*.—The Office shall coordinate and ad-
5 minister—

6 (1) the National Space Grant College and Fel-
7 lowship Program under chapter 403 of title 51 United
8 States Code;

9 (2) the Established Program to Stimulate Com-
10 petitive Research under section 40903 of title 51
11 United States Code;

12 (3) the Minority University Research and Edu-
13 cation Project;

14 (4) the NextGen STEM Project; and

15 (5) any other program or activity the Adminis-
16 trator considers appropriate.

17 (e) *TECHNICAL AMENDMENTS*.—Section 40903 of title
18 51, United States Code, is amended—

19 (1) in the section heading, by striking “**Experi-**
20 **mental**” and inserting “**Established**”; and

21 (2) in subsection (a), by striking “*Experi-*
22 *mental*” and inserting “*Established*”.

Subtitle F—Miscellaneous**SEC. 10861. PROGRAM, WORKFORCE, AND INDUSTRIAL BASE
REVIEWS.****(a) REPORT ON INDUSTRIAL BASE FOR CIVIL SPACE
MISSIONS AND OPERATIONS.—**

(1) *IN GENERAL.*—Not later than 1 year after the date of the enactment of this Act, and from time to time thereafter, the Administrator shall submit to the appropriate committees of Congress a report on the United States industrial base for NASA civil space missions and operations.

(2) *ELEMENTS.*—The report required by paragraph (1) shall include the following:

(A) A comprehensive description of the current status of the United States industrial base for NASA civil space missions and operations.

(B) A description and assessment of the weaknesses in the supply chain, skills, manufacturing capacity, raw materials, key components, and other areas of the United States industrial base for NASA civil space missions and operations that could adversely impact such missions and operations if unavailable.

1 (C) *A description and assessment of various*
2 *mechanisms to address and mitigate the weak-*
3 *nesses described pursuant to subparagraph (B).*

4 (D) *A comprehensive list of the collaborative*
5 *efforts, including future and proposed collabo-*
6 *rative efforts, between NASA and the Manufac-*
7 *turing USA institutes of the Department of*
8 *Commerce.*

9 (E) *An assessment of—*

10 (i) *the defense and aerospace manufac-*
11 *turing supply chains relevant to NASA in*
12 *each region of the United States; and*

13 (ii) *the feasibility and benefits of estab-*
14 *lishing a supply chain center of excellence*
15 *in a State in which NASA does not, as of*
16 *the date of the enactment of this Act, have*
17 *a research center or test facility.*

18 (F) *Such other matters relating to the*
19 *United States industrial base for NASA civil*
20 *space missions and operations as the Adminis-*
21 *trator considers appropriate.*

22 (b) *WORKFORCE AND MODELING AND TEST FACILI-*
23 *TIES.—*

24 (1) *REVIEW.—*

1 (A) *IN GENERAL.*—*The Administrator shall*
2 *enter into an arrangement with the National*
3 *Academies of Sciences, Engineering, and Medi-*
4 *cine to carry out a comprehensive review of the*
5 *workforce, skills-base, and modeling and test fa-*
6 *ilities of the Administration.*

7 (B) *ELEMENTS.*—*The review conducted*
8 *under subparagraph (A) shall include the fol-*
9 *lowing:*

10 (i) *A consideration of the use of emerg-*
11 *ing technologies in relevant engineering and*
12 *science disciplines and the skills needed to*
13 *apply such capabilities to Administration*
14 *missions across all mission directorates.*

15 (ii) *Prioritized recommendations on*
16 *actions needed to align the Administration's*
17 *workforce with research objectives and stra-*
18 *tegic goals and on the improvements and*
19 *additions to modeling capabilities and test*
20 *facilities needed to meet the Administra-*
21 *tion's strategic goals and objectives.*

22 (C) *REPORT.*—*Not later than 18 months*
23 *after the date of the enactment of this Act, the*
24 *Administrator shall submit to the appropriate*

1 *committees of Congress report on the results of*
2 *the review conducted under subparagraph (A).*

3 (2) *IMPLEMENTATION PLAN.*—*Not later than 120*
4 *days after the date on which the review under para-*
5 *graph (1) is completed, the Administrator shall sub-*
6 *mit to the appropriate committees of Congress a plan*
7 *for implementing the recommendations contained the*
8 *review.*

9 (3) *REPORT ON NASA INFRASTRUCTURE, WORK-*
10 *FORCE SKILLS AND CAPABILITIES.*—

11 (A) *POLICY AND PROCEDURE.*—

12 (i) *IN GENERAL.*—*The Administrator*
13 *shall develop an Administration policy and*
14 *procedure for assessment, not less frequently*
15 *than every 5 years, of the strategic capabili-*
16 *ties of the Administration, including infra-*
17 *structure and facilities, and workforce skills*
18 *and capabilities.*

19 (ii) *ELEMENTS.*—*The policy and pro-*
20 *cedure developed under clause (i) shall in-*
21 *clude acquiring data and support for Ad-*
22 *ministration decisions and recommenda-*
23 *tions on strategic capabilities, including on*
24 *infrastructure and facilities, and workforce*
25 *skills and capabilities needed to support the*

1 *goals and objectives of the Administration*
2 *through 2040.*

3 *(B) REPORT.—Not later than 1 year after*
4 *the date of the enactment of this Act, the Admin-*
5 *istrator shall submit the policy and procedure*
6 *developed under subparagraph (A) to the appro-*
7 *priate committees of Congress.*

8 *(4) INDEPENDENT PROGRAM ANALYSIS AND*
9 *EVALUATION OFFICE.—*

10 *(A) ESTABLISHMENT.—The Administrator*
11 *shall establish within NASA an Independent*
12 *Program Analysis and Evaluation Office (re-*
13 *ferred to in this paragraph as the “Office”) for*
14 *purposes of independently assessing program*
15 *performance, making programmatic, technical*
16 *risk mitigation and institutional recommenda-*
17 *tions, performing cost estimates and analyses,*
18 *and conducting strategic planning activities,*
19 *among other functions.*

20 *(B) INDEPENDENCE.—The Office shall re-*
21 *main independent of any program, and shall*
22 *have no programmatic responsibilities, so as to*
23 *maintain its independent assessment integrity.*

1 (C) *ACTIVITIES AUTHORIZED.*—*In con-*
2 *ducting the functions of the Office, the Adminis-*
3 *trator may carry out—*

4 (i) *research on program assessment;*

5 (ii) *cost, schedule, and technical esti-*
6 *mation; and*

7 (iii) *other relevant activities for the*
8 *purposes of obtaining the highest level of ex-*
9 *pertise and the most effective decision-mak-*
10 *ing tools with which to inform the Adminis-*
11 *trator.*

12 (D) *MOON TO MARS ACTIVITIES.*—*The Of-*
13 *fice shall maintain an ongoing, focused effort to*
14 *assess the goals, objectives, requirements, archi-*
15 *tectural approach, cost and schedule, and*
16 *progress of the Administration’s Moon to Mars*
17 *activities.*

18 (5) *INTERNATIONAL SPACE STATION.*—*Not later*
19 *than 1 year after the date of the enactment of this*
20 *Act, the Administrator shall submit to the appro-*
21 *priate committees of Congress the results of an inde-*
22 *pendent estimate by the Office of the cost of con-*
23 *tinuing International Space Station operations*
24 *through September 30, 2030, including—*

1 (A) crew and cargo transportation, research
2 to be undertaken reflecting the priorities de-
3 scribed in section 10816, and maintenance costs;
4 and

5 (B) opportunities for operational efficiencies
6 that could result in cost savings and increased
7 research productivity and the amount of those
8 potential savings and productivity increases.

9 **SEC. 10862. MODIFICATION OF LEASE OF NON-EXCESS**
10 **PROPERTY.**

11 (a) *IN GENERAL.*—Section 20145 of title 51, United
12 States Code, is amended in subsection (g), in the first sen-
13 tence, by striking “December 31, 2022” and inserting “De-
14 cember 31, 2032”.

15 (b) *REPORTING REQUIREMENTS.*—Subsection (f) of
16 such section is amended by adding at the end the following:

17 “(3) *ANNUAL AND CUMULATIVE NUMBER OF*
18 *LEASES.*—The annual and cumulative number of
19 leases entered into under this section, by National
20 Aeronautics and Space Administration center and fa-
21 cility.

22 “(4) *ESTIMATED COST SAVINGS.*—For each ac-
23 tive lease agreement under this section, the estimated
24 cost savings to the Administration resulting from re-

1 *duced maintenance, operating, and associated costs in*
2 *the previous fiscal year.*

3 “(5) *OTHER QUANTIFIABLE BENEFITS.*—*Other*
4 *quantifiable benefits, including additional cost sav-*
5 *ings not included under paragraph (4), to the Admin-*
6 *istration resulting from the use of leases under this*
7 *section.”.*

8 (c) *REPORT ON REQUIREMENTS.*—*Such section is fur-*
9 *ther amended—*

10 (1) *by redesignating subsection (g) as subsection*
11 *(h); and*

12 (2) *by adding after subsection (f) the following:*

13 “(g) *REPORT ON ENHANCED-USE LEASING REQUIRE-*
14 *MENTS.*—*Not later than 270 days after the date of the en-*
15 *actment of the National Aeronautics and Space Adminis-*
16 *tration Authorization Act of 2022, the Administrator shall*
17 *prepare and submit to the Committee on Commerce,*
18 *Science, and Transportation of the Senate and the Com-*
19 *mittee on Science, Space, and Technology of the House of*
20 *Representatives a report on existing requirements for appli-*
21 *cants seeking a lease under this section, including—*

22 “(1) *any requirement related to the involvement*
23 *of foreign entities, foreign entity ownership, and for-*
24 *ign entity investment; and*

1 30, 2023, for expenses necessary to address threats to the
2 Supreme Court of the United States.

3 *TITLE III*

4 *GENERAL PROVISIONS—THIS ACT*

5 *SEC. 301. Each amount appropriated or made avail-*
6 *able by this Act is in addition to amounts otherwise appro-*
7 *priated for the fiscal year involved.*

8 *SEC. 302. No part of any appropriation contained in*
9 *this Act shall remain available for obligation beyond the*
10 *current fiscal year unless expressly so provided herein.*

11 *SEC. 303. Unless otherwise provided for by this Act,*
12 *the additional amounts appropriated by this Act to appro-*
13 *priations accounts shall be available under the authorities*
14 *and conditions applicable to such appropriations accounts*
15 *for fiscal year 2022.*

16 *SEC. 304. Each amount provided by this Act is des-*
17 *ignated by Congress as being for an emergency requirement*
18 *pursuant to section 4001(a)(1) and section 4001(b) of S.*
19 *Con. Res. 14 (117th Congress), the concurrent resolution on*
20 *the budget for fiscal year 2022.*

1 *This division may be cited as the “Supreme Court Se-*
2 *curity Funding Act of 2022”.*

Attest:

Secretary.

117TH CONGRESS
2^D SESSION

H.R. 4346

**SENATE AMENDMENT TO
HOUSE AMENDMENT TO
SENATE AMENDMENT**