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2^D SESSION

H. R. 5116

IN THE SENATE OF THE UNITED STATES

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Read twice and referred to the Committee on Commerce, Science, and
Transportation

AN ACT

To invest in innovation through research and development,
to improve the competitiveness of the United States,
and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

1 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

2 (a) **SHORT TITLE.**—This Act may be cited as the
3 “America COMPETES Reauthorization Act of 2010”.

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

Sec. 1. Short title; table of contents.

TITLE I—SCIENCE AND TECHNOLOGY POLICY

Subtitle A—National Nanotechnology Initiative Amendments

Sec. 101. Short title.
Sec. 102. National nanotechnology program amendments.
Sec. 103. Societal dimensions of nanotechnology.
Sec. 104. Technology transfer.
Sec. 105. Research in areas of national importance.
Sec. 106. Nanomanufacturing research.
Sec. 107. Definitions.

**Subtitle B—Networking and Information Technology Research and
Development**

Sec. 111. Short title.
Sec. 112. Program planning and coordination.
Sec. 113. Large-scale research in areas of national importance.
Sec. 114. Cyber-physical systems and information management.
Sec. 115. National Coordination Office.
Sec. 116. Improving networking and information technology education.
Sec. 117. Conforming and technical amendments.

Subtitle C—Other OSTP Provisions

Sec. 121. Federal scientific collections.
Sec. 122. Coordination of manufacturing research and development.
Sec. 123. Interagency public access committee.
Sec. 124. Fulfilling the potential of women in academic science and engineering.
Sec. 125. National Competitiveness and Innovation Strategy.

TITLE II—NATIONAL SCIENCE FOUNDATION

Sec. 201. Short title.

Subtitle A—General Provisions

Sec. 211. Definitions.
Sec. 212. Authorization of appropriations.
Sec. 213. National Science Board administrative amendments.
Sec. 214. Broader impacts review criterion.
Sec. 215. National Center for Science and Engineering Statistics.
Sec. 216. Collection of data on demographics of faculty.

Subtitle B—Research and Innovation

- Sec. 221. Support for potentially transformative research.
- Sec. 222. Facilitating interdisciplinary collaborations for national needs.
- Sec. 223. National Science Foundation manufacturing research and education.
- Sec. 224. Strengthening institutional research partnerships.
- Sec. 225. National Science Board report on mid-scale instrumentation.
- Sec. 226. Sense of Congress on overall support for research infrastructure at the Foundation.
- Sec. 227. Partnerships for innovation.
- Sec. 228. Prize awards.
- Sec. 229. Collaboration in planning for stewardship of large-scale facilities.
- Sec. 230. Green chemistry basic research.

Subtitle C—STEM Education and Workforce Training

- Sec. 241. Graduate student support.
- Sec. 242. Postdoctoral fellowship in STEM education research.
- Sec. 243. Robert Noyce teacher scholarship program.
- Sec. 244. Institutions serving persons with disabilities.
- Sec. 245. Institutional integration.
- Sec. 246. Postdoctoral research fellowships.
- Sec. 247. Broadening participation training and outreach.
- Sec. 248. Transforming undergraduate education in STEM.
- Sec. 249. Twenty-first century graduate education.
- Sec. 250. Undergraduate broadening participation program.
- Sec. 251. Grand challenges in education research.
- Sec. 252. Research experiences for undergraduates.
- Sec. 253. Laboratory science pilot program.
- Sec. 254. STEM industry internship programs.
- Sec. 255. Tribal colleges and universities program.
- Sec. 256. Cyber-enabled learning for national challenges.
- Sec. 257. Sense of Congress.

TITLE III—STEM EDUCATION

- Sec. 301. Coordination of Federal STEM education.
- Sec. 302. Advisory committee on STEM education.
- Sec. 303. STEM education at the Department of Energy.
- Sec. 304. Green energy education.
- Sec. 305. Sense of Congress.
- Sec. 306. Sense of Congress.
- Sec. 307. National Academy of Sciences report on strengthening the capacity of 2-year institutions of higher education to provide STEM opportunities.
- Sec. 308. Encouraging Federal scientists and engineers to participate in STEM education.

TITLE IV—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

- Sec. 401. Short title.
- Sec. 402. Authorization of appropriations.
- Sec. 403. Under Secretary of Commerce for Standards and Technology.
- Sec. 404. Reorganization of NIST laboratories.
- Sec. 405. Federal Government standards and conformity assessment coordination.

- Sec. 406. Manufacturing extension partnership.
- Sec. 407. Emergency communication and tracking technologies research initiative.
- Sec. 408. TIP Advisory Board.
- Sec. 409. Underrepresented minorities.
- Sec. 410. Cyber security standards and guidelines.
- Sec. 411. Nanomaterial initiative.
- Sec. 412. Disaster resilient buildings and infrastructure.
- Sec. 413. Report on the use of modeling and simulation.
- Sec. 414. Green manufacturing and construction.
- Sec. 415. Manufacturing research.
- Sec. 416. Definitions.

TITLE V—INNOVATION

- Sec. 501. Office of Innovation and Entrepreneurship.
- Sec. 502. Federal loan guarantees for innovative technologies in manufacturing.
- Sec. 503. Regional innovation program.
- Sec. 504. Clean Energy Consortium.

TITLE VI—DEPARTMENT OF ENERGY

Subtitle A—Office of Science

- Sec. 601. Short title.
- Sec. 602. Definitions.
- Sec. 603. Mission of the Office of Science.
- Sec. 604. Basic Energy Sciences Program.
- Sec. 605. Biological and Environmental Research Program.
- Sec. 606. Advanced Scientific Computing Research Program.
- Sec. 607. Fusion energy research program.
- Sec. 608. High Energy Physics Program.
- Sec. 609. Nuclear Physics Program.
- Sec. 610. Science Laboratories Infrastructure Program.
- Sec. 611. Authorization of appropriations.

Subtitle B—Advanced Research Projects Agency-Energy

- Sec. 621. Short title.
- Sec. 622. ARPA-E amendments.

Subtitle C—Energy Innovation Hubs

- Sec. 631. Short title.
- Sec. 632. Energy Innovation Hubs.

Subtitle D—Cooperative Research and Development Fund

- Sec. 641. Short title.
- Sec. 642. Cooperative research and development fund.

Subtitle E—Technology Transfer Database

- Sec. 651. Technology transfer database.

TITLE VII—MISCELLANEOUS

- Sec. 701. Sense of Congress.
- Sec. 702. Persons with disabilities.

- Sec. 703. Veterans and service members.
 Sec. 704. Budgetary effects.
 Sec. 705. Limitation.
 Sec. 706. Prohibition on lobbying.
 Sec. 707. Information requests by labor organizations.
 Sec. 708. Limitation.
 Sec. 709. No salaries for viewing pornography.
 Sec. 710. Ineligibility for awards or grants.

1 **TITLE I—SCIENCE AND**
 2 **TECHNOLOGY POLICY**
 3 **Subtitle A—National Nanotechnol-**
 4 **ogy Initiative Amendments**

5 **SEC. 101. SHORT TITLE.**

6 This subtitle may be cited as the “National Nano-
 7 technology Initiative Amendments Act of 2010”.

8 **SEC. 102. NATIONAL NANOTECHNOLOGY PROGRAM AMEND-**
 9 **MENTS.**

10 The 21st Century Nanotechnology Research and De-
 11 velopment Act (15 U.S.C. 7501 et seq.) is amended—

12 (1) by striking section 2(c)(4) and inserting the
 13 following new paragraph:

14 “(4) develop, within 12 months after the date
 15 of enactment of the National Nanotechnology Initia-
 16 tive Amendments Act of 2010, and update every 3
 17 years thereafter, a strategic plan to guide the activi-
 18 ties described under subsection (b) that specifies
 19 near-term and long-term objectives for the Program,
 20 the anticipated time frame for achieving the near-
 21 term objectives, and the metrics to be used for as-

1 assessing progress toward the objectives, and that de-
2 scribes—

3 “(A) how the Program will move results
4 out of the laboratory and into applications for
5 the benefit of society, including through co-
6 operation and collaborations with nanotechnol-
7 ogy research, development, and technology tran-
8 sition initiatives supported by the States;

9 “(B) how the Program will encourage and
10 support interdisciplinary research and develop-
11 ment in nanotechnology; and

12 “(C) proposed research in areas of national
13 importance in accordance with the requirements
14 of section 105 of the National Nanotechnology
15 Initiative Amendments Act of 2010;”;

16 (2) in section 2—

17 (A) in subsection (d)—

18 (i) by redesignating paragraphs (1)
19 through (5) as paragraphs (2) through (6),
20 respectively; and

21 (ii) by inserting the following new
22 paragraph before paragraph (2), as so re-
23 designated by clause (i) of this subpara-
24 graph:

1 “(1) the Program budget, for the previous fiscal
2 year, for each agency that participates in the Pro-
3 gram, including a breakout of spending for the de-
4 velopment and acquisition of research facilities and
5 instrumentation, for each program component area,
6 and for all activities pursuant to subsection
7 (b)(10);” and

8 (B) by inserting at the end the following
9 new subsection:

10 “(e) STANDARDS SETTING.—The agencies partici-
11 pating in the Program shall support the activities of com-
12 mittees involved in the development of standards for nano-
13 technology and may reimburse the travel costs of scientists
14 and engineers who participate in activities of such commit-
15 tees.”;

16 (3) by striking section 3(b) and inserting the
17 following new subsection:

18 “(b) FUNDING.—(1) The operation of the National
19 Nanotechnology Coordination Office shall be supported by
20 funds from each agency participating in the Program. The
21 portion of such Office’s total budget provided by each
22 agency for each fiscal year shall be in the same proportion
23 as the agency’s share of the total budget for the Program
24 for the previous fiscal year, as specified in the report re-
25 quired under section 2(d)(1).

1 “(2) The annual report under section 2(d) shall in-
2 clude—

3 “(A) a description of the funding required by
4 the National Nanotechnology Coordination Office to
5 perform the functions specified under subsection (a)
6 for the next fiscal year by category of activity, in-
7 cluding the funding required to carry out the re-
8 quirements of section 2(b)(10)(D), subsection (d) of
9 this section, and section 5;

10 “(B) a description of the funding required by
11 such Office to perform the functions specified under
12 subsection (a) for the current fiscal year by category
13 of activity, including the funding required to carry
14 out the requirements of subsection (d); and

15 “(C) the amount of funding provided for such
16 Office for the current fiscal year by each agency par-
17 ticipating in the Program.”;

18 (4) by inserting at the end of section 3 the fol-
19 lowing new subsection:

20 “(d) PUBLIC INFORMATION.—(1) The National
21 Nanotechnology Coordination Office shall develop and
22 maintain a database accessible by the public of projects
23 funded under the Environmental, Health, and Safety, the
24 Education and Societal Dimensions, and the Nanomanu-
25 facturing program component areas, or any successor pro-

1 gram component areas, including a description of each
2 project, its source of funding by agency, and its funding
3 history. For the Environmental, Health, and Safety pro-
4 gram component area, or any successor program compo-
5 nent area, projects shall be grouped by major objective as
6 defined by the research plan required under section 103(b)
7 of the National Nanotechnology Initiative Amendments
8 Act of 2010. For the Education and Societal Dimensions
9 program component area, or any successor program com-
10 ponent area, the projects shall be grouped in subcategories
11 of—

12 “(A) education in formal settings;

13 “(B) education in informal settings;

14 “(C) public outreach; and

15 “(D) ethical, legal, and other societal issues.

16 “(2) The National Nanotechnology Coordination Of-
17 fice shall develop, maintain, and publicize information on
18 nanotechnology facilities supported under the Program,
19 and may include information on nanotechnology facilities
20 supported by the States, that are accessible for use by in-
21 dividuals from academic institutions and from industry.
22 The information shall include at a minimum the terms and
23 conditions for the use of each facility, a description of the
24 capabilities of the instruments and equipment available for

1 use at the facility, and a description of the technical sup-
2 port available to assist users of the facility.”;

3 (5) in section 4(a)—

4 (A) by striking “or designate”;

5 (B) by inserting “as a distinct entity”
6 after “Advisory Panel”; and

7 (C) by inserting at the end “The Advisory
8 Panel shall form a subpanel with membership
9 having specific qualifications tailored to enable
10 it to carry out the requirements of subsection
11 (e)(7).”;

12 (6) in section 4(b)—

13 (A) by striking “or designated” and “or
14 designating”; and

15 (B) by adding at the end the following:
16 “At least one member of the Advisory Panel
17 shall be an individual employed by and rep-
18 resenting a minority-serving institution.”;

19 (7) by amending section 5 to read as follows:

20 **“SEC. 5. TRIENNIAL EXTERNAL REVIEW OF THE NATIONAL**
21 **NANOTECHNOLOGY PROGRAM.**

22 “(a) IN GENERAL.—The Director of the National
23 Nanotechnology Coordination Office shall enter into an ar-
24 rangement with the National Research Council of the Na-
25 tional Academy of Sciences to conduct a triennial review

1 of the Program. The Director shall ensure that the ar-
2 rangement with the National Research Council is con-
3 cluded in order to allow sufficient time for the reporting
4 requirements of subsection (b) to be satisfied. Each tri-
5 ennial review shall include an evaluation of the—

6 “(1) research priorities and technical content of
7 the Program, including whether the allocation of
8 funding among program component areas, as des-
9 ignated according to section 2(c)(2), is appropriate;

10 “(2) effectiveness of the Program’s manage-
11 ment and coordination across agencies and dis-
12 ciplines, including an assessment of the effectiveness
13 of the National Nanotechnology Coordination Office;

14 “(3) Program’s scientific and technological ac-
15 complishments and its success in transferring tech-
16 nology to the private sector; and

17 “(4) adequacy of the Program’s activities ad-
18 dressing ethical, legal, environmental, and other ap-
19 propriate societal concerns, including human health
20 concerns.

21 “(b) EVALUATION TO BE TRANSMITTED TO CON-
22 GRESS.—The National Research Council shall document
23 the results of each triennial review carried out in accord-
24 ance with subsection (a) in a report that includes any rec-
25 ommendations for ways to improve the Program’s man-

1 agement and coordination processes and for changes to
2 the Program’s objectives, funding priorities, and technical
3 content. Each report shall be submitted to the Director
4 of the National Nanotechnology Coordination Office, who
5 shall transmit it to the Advisory Panel, the Committee on
6 Commerce, Science, and Transportation of the Senate,
7 and the Committee on Science and Technology of the
8 House of Representatives not later than September 30 of
9 every third year, with the first report due September 30,
10 2010.

11 “(c) FUNDING.—Of the amounts provided in accord-
12 ance with section 3(b)(1), the following amounts shall be
13 available to carry out this section:

14 “(1) \$500,000 for fiscal year 2010.

15 “(2) \$500,000 for fiscal year 2011.

16 “(3) \$500,000 for fiscal year 2012.”; and

17 (8) in section 10—

18 (A) by amending paragraph (2) to read as
19 follows:

20 “(2) NANOTECHNOLOGY.—The term ‘nanotech-
21 nology’ means the science and technology that will
22 enable one to understand, measure, manipulate, and
23 manufacture at the nanoscale, aimed at creating ma-
24 terials, devices, and systems with fundamentally new
25 properties or functions.”; and

1 (B) by adding at the end the following new
2 paragraph:

3 “(7) NANOSCALE.—The term ‘nanoscale’ means
4 one or more dimensions of between approximately 1
5 and 100 nanometers.”.

6 **SEC. 103. SOCIETAL DIMENSIONS OF NANOTECHNOLOGY.**

7 (a) COORDINATOR FOR SOCIETAL DIMENSIONS OF
8 NANOTECHNOLOGY.—The Director of the Office of
9 Science and Technology Policy shall designate an associate
10 director of the Office of Science and Technology Policy
11 as the Coordinator for Societal Dimensions of Nanotech-
12 nology. The Coordinator shall be responsible for oversight
13 of the coordination, planning, and budget prioritization of
14 activities required by section 2(b)(10) of the 21st Century
15 Nanotechnology Research and Development Act (15
16 U.S.C. 7501(b)(10)). The Coordinator shall, with the as-
17 sistance of appropriate senior officials of the agencies
18 funding activities within the Environmental, Health, and
19 Safety and the Education and Societal Dimensions pro-
20 gram component areas of the Program, or any successor
21 program component areas, ensure that the requirements
22 of such section 2(b)(10) are satisfied. The responsibilities
23 of the Coordinator shall include—

24 (1) ensuring that a research plan for the envi-
25 ronmental, health, and safety research activities re-

1 quired under subsection (b) is developed, updated,
2 and implemented and that the plan is responsive to
3 the recommendations of the subpanel of the Advi-
4 sory Panel established under section 4(a) of the 21st
5 Century Nanotechnology Research and Development
6 Act (15 U.S.C. 7503(a)), as amended by this sub-
7 title;

8 (2) encouraging and monitoring the efforts of
9 the agencies participating in the Program to allocate
10 the level of resources and management attention
11 necessary to ensure that the ethical, legal, environ-
12 mental, and other appropriate societal concerns re-
13 lated to nanotechnology, including human health
14 concerns, are addressed under the Program, includ-
15 ing the implementation of the research plan de-
16 scribed in subsection (b); and

17 (3) encouraging the agencies required to de-
18 velop the research plan under subsection (b) to iden-
19 tify, assess, and implement suitable mechanisms for
20 the establishment of public-private partnerships for
21 support of environmental, health, and safety re-
22 search.

23 (b) RESEARCH PLAN.—

24 (1) IN GENERAL.—The Coordinator for Societal
25 Dimensions of Nanotechnology shall convene and

1 chair a panel comprised of representatives from the
2 agencies funding research activities under the Envi-
3 ronmental, Health, and Safety program component
4 area of the Program, or any successor program com-
5 ponent area, and from such other agencies as the
6 Coordinator considers necessary to develop, periodi-
7 cally update, and coordinate the implementation of
8 a research plan for this program component area. In
9 developing and updating the plan, the panel con-
10 vened by the Coordinator shall solicit and be respon-
11 sive to recommendations and advice from—

12 (A) the subpanel of the Advisory Panel es-
13 tablished under section 4(a) of the 21st Cen-
14 tury Nanotechnology Research and Develop-
15 ment Act (15 U.S.C. 7503(a)), as amended by
16 this subtitle; and

17 (B) the agencies responsible for environ-
18 mental, health, and safety regulations associ-
19 ated with the production, use, and disposal of
20 nanoscale materials and products.

21 (2) DEVELOPMENT OF STANDARDS.—The plan
22 required under paragraph (1) shall include a de-
23 scription of how the Program will help to ensure the
24 development of—

1 (A) standards related to nomenclature as-
2 sociated with engineered nanoscale materials;

3 (B) engineered nanoscale standard ref-
4 erence materials for environmental, health, and
5 safety testing; and

6 (C) standards related to methods and pro-
7 cedures for detecting, measuring, monitoring,
8 sampling, and testing engineered nanoscale ma-
9 terials for environmental, health, and safety im-
10 pacts.

11 (3) COMPONENTS OF PLAN.—The plan required
12 under paragraph (1) shall, with respect to activities
13 described in paragraphs (1) and (2)—

14 (A) specify near-term research objectives
15 and long-term research objectives;

16 (B) specify milestones associated with each
17 near-term objective and the estimated time and
18 resources required to reach each milestone;

19 (C) with respect to subparagraphs (A) and
20 (B), describe the role of each agency carrying
21 out or sponsoring research in order to meet the
22 objectives specified under subparagraph (A) and
23 to achieve the milestones specified under sub-
24 paragraph (B);

1 (D) specify the funding allocated to each
2 major objective of the plan and the source of
3 funding by agency for the current fiscal year;
4 and

5 (E) estimate the funding required for each
6 major objective of the plan and the source of
7 funding by agency for the following 3 fiscal
8 years.

9 (4) TRANSMITTAL TO CONGRESS.—The plan re-
10 quired under paragraph (1) shall be submitted not
11 later than 60 days after the date of enactment of
12 this Act to the Committee on Commerce, Science,
13 and Transportation of the Senate and the Com-
14 mittee on Science and Technology of the House of
15 Representatives.

16 (5) UPDATING AND APPENDING TO REPORT.—
17 The plan required under paragraph (1) shall be up-
18 dated annually and appended to the report required
19 under section 2(d) of the 21st Century Nanotechnol-
20 ogy Research and Development Act (15 U.S.C.
21 7501(d)).

22 (c) NANOTECHNOLOGY PARTNERSHIPS.—

23 (1) ESTABLISHMENT.—As part of the program
24 authorized by section 9 of the National Science
25 Foundation Authorization Act of 2002, the Director

1 of the National Science Foundation shall provide 1
2 or more grants to establish partnerships as defined
3 by subsection (a)(2) of that section, except that each
4 such partnership shall include 1 or more businesses
5 engaged in the production of nanoscale materials,
6 products, or devices. Partnerships established in ac-
7 cordance with this subsection shall be designated as
8 “Nanotechnology Education Partnerships”.

9 (2) PURPOSE.—Nanotechnology Education
10 Partnerships shall be designed to recruit and help
11 prepare secondary school students to pursue postsec-
12 ondary level courses of instruction in nanotechnol-
13 ogy. At a minimum, grants shall be used to sup-
14 port—

15 (A) professional development activities to
16 enable secondary school teachers to use cur-
17 ricular materials incorporating nanotechnology
18 and to inform teachers about career possibilities
19 for students in nanotechnology;

20 (B) enrichment programs for students, in-
21 cluding access to nanotechnology facilities and
22 equipment at partner institutions, to increase
23 their understanding of nanoscale science and
24 technology and to inform them about career

1 possibilities in nanotechnology as scientists, en-
2 gineers, and technicians; and

3 (C) identification of appropriate nanotech-
4 nology educational materials and incorporation
5 of nanotechnology into the curriculum for sec-
6 ondary school students at one or more organiza-
7 tions participating in a Partnership.

8 (3) SELECTION.—Grants under this subsection
9 shall be awarded in accordance with subsection (b)
10 of such section 9, except that paragraph (3)(B) of
11 that subsection shall not apply.

12 (d) UNDERGRADUATE EDUCATION PROGRAMS.—

13 (1) ACTIVITIES SUPPORTED.—As part of the
14 activities included under the Education and Societal
15 Dimensions program component area, or any suc-
16 cessor program component area, the Program shall
17 support efforts to introduce nanoscale science, engi-
18 neering, and technology into undergraduate science
19 and engineering education through a variety of
20 interdisciplinary approaches. Activities supported
21 may include—

22 (A) development of courses of instruction
23 or modules to existing courses;

24 (B) faculty professional development; and

1 (C) acquisition of equipment and instru-
2 mentation suitable for undergraduate education
3 and research in nanotechnology.

4 (2) COURSE, CURRICULUM, AND LABORATORY
5 IMPROVEMENT AUTHORIZATION.—There are author-
6 ized to be appropriated to the Director of the Na-
7 tional Science Foundation to carry out activities de-
8 scribed in paragraph (1) through the Course, Cur-
9 riculum, and Laboratory Improvement program
10 from amounts authorized under section
11 7002(c)(2)(B) of the America COMPETES Act,
12 \$5,000,000 for fiscal year 2010.

13 (3) ADVANCED TECHNOLOGY EDUCATION AU-
14 THORIZATION.—There are authorized to be appro-
15 priated to the Director of the National Science
16 Foundation to carry out activities described in para-
17 graph (1) through the Advanced Technology Edu-
18 cation program from amounts authorized under sec-
19 tion 7002(c)(2)(B) of the America COMPETES Act,
20 \$5,000,000 for fiscal year 2010.

21 (e) INTERAGENCY WORKING GROUP.—The National
22 Science and Technology Council shall establish under the
23 Nanoscale Science, Engineering, and Technology Sub-
24 committee an Education Working Group to coordinate,

1 prioritize, and plan the educational activities supported
2 under the Program.

3 (f) SOCIETAL DIMENSIONS IN NANOTECHNOLOGY
4 EDUCATION ACTIVITIES.—Activities supported under the
5 Education and Societal Dimensions program component
6 area, or any successor program component area, that in-
7 volve informal, precollege, or undergraduate nanotechnol-
8 ogy education shall include education regarding the envi-
9 ronmental, health and safety, and other societal aspects
10 of nanotechnology.

11 (g) REMOTE ACCESS TO NANOTECHNOLOGY FACILI-
12 TIES.—(1) Agencies supporting nanotechnology research
13 facilities as part of the Program shall require the entities
14 that operate such facilities to allow access via the Internet,
15 and support the costs associated with the provision of such
16 access, by secondary school students and teachers, to in-
17 struments and equipment within such facilities for edu-
18 cational purposes. The agencies may waive this require-
19 ment for cases when particular facilities would be inappro-
20 priate for educational purposes or the costs for providing
21 such access would be prohibitive.

22 (2) The agencies identified in paragraph (1) shall re-
23 quire the entities that operate such nanotechnology re-
24 search facilities to establish and publish procedures, guide-
25 lines, and conditions for the submission and approval of

1 applications for the use of the facilities for the purpose
2 identified in paragraph (1) and shall authorize personnel
3 who operate the facilities to provide necessary technical
4 support to students and teachers.

5 **SEC. 104. TECHNOLOGY TRANSFER.**

6 (a) **PROTOTYPING.**—

7 (1) **ACCESS TO FACILITIES.**—In accordance
8 with section 2(b)(7) of 21st Century Nanotechnology
9 Research and Development Act (15 U.S.C.
10 7501(b)(7)), the agencies supporting nanotechnology
11 research facilities as part of the Program shall pro-
12 vide access to such facilities to companies for the
13 purpose of assisting the companies in the develop-
14 ment of prototypes of nanoscale products, devices, or
15 processes (or products, devices, or processes enabled
16 by nanotechnology) for determining proof of concept.
17 The agencies shall publicize the availability of these
18 facilities and encourage their use by companies as
19 provided for in this section.

20 (2) **PROCEDURES.**—The agencies identified in
21 paragraph (1)—

22 (A) shall establish and publish procedures,
23 guidelines, and conditions for the submission
24 and approval of applications for use of nano-
25 technology facilities;

1 (B) shall publish descriptions of the capa-
2 bilities of facilities available for use under this
3 subsection, including the availability of tech-
4 nical support; and

5 (C) may waive recovery, require full recov-
6 ery, or require partial recovery of the costs as-
7 sociated with use of the facilities for projects
8 under this subsection.

9 (3) SELECTION AND CRITERIA.—In cases when
10 less than full cost recovery is required pursuant to
11 paragraph (2)(C), projects provided access to nano-
12 technology facilities in accordance with this sub-
13 section shall be selected through a competitive,
14 merit-based process, and the criteria for the selec-
15 tion of such projects shall include at a minimum—

16 (A) the readiness of the project for tech-
17 nology demonstration;

18 (B) evidence of a commitment by the ap-
19 plicant for further development of the project to
20 full commercialization if the proof of concept is
21 established by the prototype; and

22 (C) evidence of the potential for further
23 funding from private sector sources following
24 the successful demonstration of proof of con-
25 cept.

1 The agencies may give special consideration in se-
2 lecting projects to applications that are relevant to
3 important national needs or requirements.

4 (b) USE OF EXISTING TECHNOLOGY TRANSFER PRO-
5 GRAMS.—

6 (1) PARTICIPATING AGENCIES.—Each agency
7 participating in the Program shall—

8 (A) encourage the submission of applica-
9 tions for support of nanotechnology related
10 projects to the Small Business Innovation Re-
11 search Program and the Small Business Tech-
12 nology Transfer Program administered by such
13 agencies; and

14 (B) through the National Nanotechnology
15 Coordination Office and within 6 months after
16 the date of enactment of this Act, submit to the
17 Committee on Commerce, Science, and Trans-
18 portation of the Senate and the Committee on
19 Science and Technology of the House of Rep-
20 resentatives—

21 (i) the plan described in section
22 2(c)(7) of the 21st Century Nanotechnol-
23 ogy Research and Development Act (15
24 U.S.C. 7501(c)(7)); and

1 (ii) a report specifying, if the agency
2 administers a Small Business Innovation
3 Research Program and a Small Business
4 Technology Transfer Program—

5 (I) the number of proposals re-
6 ceived for nanotechnology related
7 projects during the current fiscal year
8 and the previous 2 fiscal years;

9 (II) the number of such pro-
10 posals funded in each year;

11 (III) the total number of nano-
12 technology related projects funded and
13 the amount of funding provided for
14 fiscal year 2004 through fiscal year
15 2008; and

16 (IV) a description of the projects
17 identified in accordance with sub-
18 clause (III) which received private sec-
19 tor funding beyond the period of
20 phase II support.

21 (2) NATIONAL INSTITUTE OF STANDARDS AND
22 TECHNOLOGY.—The Director of the National Insti-
23 tute of Standards and Technology in carrying out
24 the requirements of section 28 of the National Insti-

1 tute of Standards and Technology Act (15 U.S.C.
2 278n) shall—

3 (A) in regard to subsection (d) of that sec-
4 tion, encourage the submission of proposals for
5 support of nanotechnology related projects; and

6 (B) in regard to subsection (g) of that sec-
7 tion, include a description of how the require-
8 ment of subparagraph (A) of this paragraph is
9 being met, the number of proposals for nano-
10 technology related projects received, the number
11 of such proposals funded, the total number of
12 such projects funded since the beginning of the
13 Technology Innovation Program, and the out-
14 comes of such funded projects in terms of the
15 metrics developed in accordance with such sub-
16 section (g).

17 (3) TIP ADVISORY BOARD.—The TIP Advisory
18 Board established under section 28(k) of the Na-
19 tional Institute of Standards and Technology Act
20 (15 U.S.C. 278n(k)), in carrying out its responsibil-
21 ities under subsection (k)(3), shall provide the Di-
22 rector of the National Institute of Standards and
23 Technology with—

1 (A) advice on how to accomplish the re-
2 quirement of paragraph (2)(A) of this sub-
3 section; and

4 (B) an assessment of the adequacy of the
5 allocation of resources for nanotechnology re-
6 lated projects supported under the Technology
7 Innovation Program.

8 (c) INDUSTRY LIAISON GROUPS.—An objective of the
9 Program shall be to establish industry liaison groups for
10 all industry sectors that would benefit from applications
11 of nanotechnology. The Nanomanufacturing, Industry Li-
12 aision, and Innovation Working Group of the National
13 Science and Technology Council shall actively pursue es-
14 tablishing such liaison groups.

15 (d) COORDINATION WITH STATE INITIATIVES.—Sec-
16 tion 2(b)(5) of the 21st Century Nanotechnology Research
17 and Development Act (15 U.S.C. 7501(b)(5)) is amended
18 to read as follows:

19 “(5) ensuring United States global leadership in
20 the development and application of nanotechnology,
21 including through coordination and leveraging Fed-
22 eral investments with nanotechnology research, de-
23 velopment, and technology transition initiatives sup-
24 ported by the States;”.

1 **SEC. 105. RESEARCH IN AREAS OF NATIONAL IMPORTANCE.**

2 (a) IN GENERAL.—The Program shall include sup-
3 port for nanotechnology research and development activi-
4 ties directed toward application areas that have the poten-
5 tial for significant contributions to national economic com-
6 petitiveness and for other significant societal benefits. The
7 activities supported shall be designed to advance the devel-
8 opment of research discoveries by demonstrating technical
9 solutions to important problems in such areas as nano-
10 electronics, energy efficiency, health care, and water reme-
11 diation and purification. The Advisory Panel shall make
12 recommendations to the Program for candidate research
13 and development areas for support under this section.

14 (b) CHARACTERISTICS.—

15 (1) IN GENERAL.—Research and development
16 activities under this section shall—

17 (A) include projects selected on the basis
18 of applications for support through a competi-
19 tive, merit-based process;

20 (B) involve collaborations among research-
21 ers in academic institutions and industry, and
22 may involve nonprofit research institutions and
23 Federal laboratories, as appropriate;

24 (C) when possible, leverage Federal invest-
25 ments through collaboration with related State
26 initiatives; and

1 (D) include a plan for fostering the trans-
2 fer of research discoveries and the results of
3 technology demonstration activities to industry
4 for commercial development.

5 (2) PROCEDURES.—Determination of the re-
6 quirements for applications under this subsection,
7 review and selection of applications for support, and
8 subsequent funding of projects shall be carried out
9 by a collaboration of no fewer than 2 agencies par-
10 ticipating in the Program. In selecting applications
11 for support, the agencies shall give special consider-
12 ation to projects that include cost sharing from non-
13 Federal sources.

14 (3) INTERDISCIPLINARY RESEARCH CENTERS.—
15 Research and development activities under this sec-
16 tion may be supported through interdisciplinary
17 nanotechnology research centers, as authorized by
18 section 2(b)(4) of the 21st Century Nanotechnology
19 Research and Development Act (15 U.S.C.
20 7501(b)(4)), that are organized to investigate basic
21 research questions and carry out technology dem-
22 onstration activities in areas such as those identified
23 in subsection (a).

24 (c) REPORT.—Reports required under section 2(d) of
25 the 21st Century Nanotechnology Research and Develop-

1 ment Act (15 U.S.C. 7501(d)) shall include a description
2 of research and development areas supported in accord-
3 ance with this section, including the same budget informa-
4 tion as is required for program component areas under
5 paragraphs (1) and (2) of such section 2(d).

6 **SEC. 106. NANOMANUFACTURING RESEARCH.**

7 (a) RESEARCH AREAS.—The Nanomanufacturing
8 program component area, or any successor program com-
9 ponent area, shall include research on—

10 (1) development of instrumentation and tools
11 required for the rapid characterization of nanoscale
12 materials and for monitoring of nanoscale manufac-
13 turing processes; and

14 (2) approaches and techniques for scaling the
15 synthesis of new nanoscale materials to achieve in-
16 dustrial-level production rates.

17 (b) GREEN NANOTECHNOLOGY.—Interdisciplinary
18 research centers supported under the Program in accord-
19 ance with section 2(b)(4) of the 21st Century Nanotech-
20 nology Research and Development Act (15 U.S.C.
21 7501(b)(4)) that are focused on nanomanufacturing re-
22 search and centers established under the authority of sec-
23 tion 105(b)(3) of this subtitle shall include as part of the
24 activities of such centers—

1 (1) research on methods and approaches to de-
2 velop environmentally benign nanoscale products and
3 nanoscale manufacturing processes, taking into con-
4 sideration relevant findings and results of research
5 supported under the Environmental, Health, and
6 Safety program component area, or any successor
7 program component area;

8 (2) fostering the transfer of the results of such
9 research to industry; and

10 (3) providing for the education of scientists and
11 engineers through interdisciplinary studies in the
12 principles and techniques for the design and develop-
13 ment of environmentally benign nanoscale products
14 and processes.

15 (c) REVIEW OF NANOMANUFACTURING RESEARCH
16 AND RESEARCH FACILITIES.—

17 (1) PUBLIC MEETING.—Not later than 12
18 months after the date of enactment of this Act, the
19 National Nanotechnology Coordination Office shall
20 sponsor a public meeting, including representation
21 from a wide range of industries engaged in
22 nanoscale manufacturing, to—

23 (A) obtain the views of participants at the
24 meeting on—

1 (i) the relevance and value of the re-
2 search being carried out under the Nano-
3 manufacturing program component area of
4 the Program, or any successor program
5 component area; and

6 (ii) whether the capabilities of nano-
7 technology research facilities supported
8 under the Program are adequate—

9 (I) to meet current and near-
10 term requirements for the fabrication
11 and characterization of nanoscale de-
12 vices and systems; and

13 (II) to provide access to and use
14 of instrumentation and equipment at
15 the facilities, by means of networking
16 technology, to individuals who are at
17 locations remote from the facilities;
18 and

19 (B) receive any recommendations on ways
20 to strengthen the research portfolio supported
21 under the Nanomanufacturing program compo-
22 nent area, or any successor program component
23 area, and on improving the capabilities of nano-
24 technology research facilities supported under
25 the Program.

1 Companies participating in industry liaison groups
2 shall be invited to participate in the meeting. The
3 Coordination Office shall prepare a report docu-
4 menting the findings and recommendations resulting
5 from the meeting.

6 (2) ADVISORY PANEL REVIEW.—The Advisory
7 Panel shall review the Nanomanufacturing program
8 component area of the Program, or any successor
9 program component area, and the capabilities of
10 nanotechnology research facilities supported under
11 the Program to assess—

12 (A) whether the funding for the Nano-
13 manufacturing program component area, or any
14 successor program component area, is adequate
15 and receiving appropriate priority within the
16 overall resources available for the Program;

17 (B) the relevance of the research being
18 supported to the identified needs and require-
19 ments of industry;

20 (C) whether the capabilities of nanotech-
21 nology research facilities supported under the
22 Program are adequate—

23 (i) to meet current and near-term re-
24 quirements for the fabrication and charac-

1 terization of nanoscale devices and sys-
2 tems; and

3 (ii) to provide access to and use of in-
4 strumentation and equipment at the facili-
5 ties, by means of networking technology, to
6 individuals who are at locations remote
7 from the facilities; and

8 (D) the level of funding that would be
9 needed to support—

10 (i) the acquisition of instrumentation,
11 equipment, and networking technology suf-
12 ficient to provide the capabilities at nano-
13 technology research facilities described in
14 subparagraph (C); and

15 (ii) the operation and maintenance of
16 such facilities.

17 In carrying out its assessment, the Advisory Panel
18 shall take into consideration the findings and rec-
19 ommendations from the report required under para-
20 graph (1).

21 (3) REPORT.—Not later than 18 months after
22 the date of enactment of this Act, the Advisory
23 Panel shall submit to the Committee on Commerce,
24 Science, and Transportation of the Senate and the
25 Committee on Science and Technology of the House

1 of Representatives a report on its assessment re-
2 quired under paragraph (2), along with any rec-
3 ommendations and a copy of the report prepared in
4 accordance with paragraph (1).

5 **SEC. 107. DEFINITIONS.**

6 In this subtitle, terms that are defined in section 10
7 of the 21st Century Nanotechnology Research and Devel-
8 opment Act (15 U.S.C. 7509) have the meaning given
9 those terms in that section.

10 **Subtitle B—Networking and Infor-**
11 **mation Technology Research**
12 **and Development**

13 **SEC. 111. SHORT TITLE.**

14 This subtitle may be cited as the “Networking and
15 Information Technology Research and Development Act of
16 2010”.

17 **SEC. 112. PROGRAM PLANNING AND COORDINATION.**

18 (a) PERIODIC REVIEWS.—Section 101 of the High-
19 Performance Computing Act of 1991 (15 U.S.C. 5511)
20 is amended by adding at the end the following new sub-
21 section:

22 “(d) PERIODIC REVIEWS.—The agencies identified in
23 subsection (a)(3)(B) shall—

24 “(1) periodically assess the contents and fund-
25 ing levels of the Program Component Areas and re-

1 structure the Program when warranted, taking into
2 consideration any relevant recommendations of the
3 advisory committee established under subsection (b);
4 and

5 “(2) ensure that the Program includes large-
6 scale, long-term, interdisciplinary research and de-
7 velopment activities, including activities described in
8 section 104.”.

9 (b) DEVELOPMENT OF STRATEGIC PLAN.—Section
10 101 of such Act (15 U.S.C. 5511) is amended further by
11 adding after subsection (d), as added by subsection (a)
12 of this section, the following new subsection:

13 “(e) STRATEGIC PLAN.—

14 “(1) IN GENERAL.—The agencies identified in
15 subsection (a)(3)(B), working through the National
16 Science and Technology Council and with the assist-
17 ance of the National Coordination Office established
18 under section 102, shall develop, within 12 months
19 after the date of enactment of the Networking and
20 Information Technology Research and Development
21 Act of 2010, and update every 3 years thereafter, a
22 5-year strategic plan to guide the activities described
23 under subsection (a)(1).

24 “(2) CONTENTS.—The strategic plan shall
25 specify near-term and long-term objectives for the

1 Program, the anticipated time frame for achieving
2 the near-term objectives, the metrics to be used for
3 assessing progress toward the objectives, and how
4 the Program will—

5 “(A) foster the transfer of research and
6 development results into new technologies and
7 applications for the benefit of society, including
8 through cooperation and collaborations with
9 networking and information technology re-
10 search, development, and technology transition
11 initiatives supported by the States;

12 “(B) encourage and support mechanisms
13 for interdisciplinary research and development
14 in networking and information technology, in-
15 cluding through collaborations across agencies,
16 across Program Component Areas, with indus-
17 try, with Federal laboratories (as defined in
18 section 4 of the Stevenson-Wydler Technology
19 Innovation Act of 1980 (15 U.S.C. 3703)), and
20 with international organizations;

21 “(C) address long-term challenges of na-
22 tional importance for which solutions require
23 large-scale, long-term, interdisciplinary research
24 and development;

1 “(D) place emphasis on innovative and
2 high-risk projects having the potential for sub-
3 stantial societal returns on the research invest-
4 ment;

5 “(E) strengthen all levels of networking
6 and information technology education and
7 training programs to ensure an adequate, well-
8 trained workforce; and

9 “(F) attract more women and underrep-
10 resented minorities to pursue postsecondary de-
11 grees in networking and information tech-
12 nology.

13 “(3) NATIONAL RESEARCH INFRASTRUCTURE.—The
14 strategic plan developed in accordance with paragraph (1)
15 shall be accompanied by milestones and roadmaps for es-
16 tablishing and maintaining the national research infra-
17 structure required to support the Program, including the
18 roadmap required by subsection (a)(2)(E).

19 “(4) RECOMMENDATIONS.—The entities involved in
20 developing the strategic plan under paragraph (1) shall
21 take into consideration the recommendations—

22 “(A) of the advisory committee established
23 under subsection (b); and

1 “(B) of the stakeholders whose input was solie-
2 ited by the National Coordination Office, as required
3 under section 102(b)(3).

4 “(5) REPORT TO CONGRESS.—The Director of the
5 National Coordination Office shall transmit the strategic
6 plan required under paragraph (1) to the advisory com-
7 mittee, the Committee on Commerce, Science, and Trans-
8 portation of the Senate, and the Committee on Science
9 and Technology of the House of Representatives.”.

10 (c) ADDITIONAL RESPONSIBILITIES OF DIRECTOR.—
11 Section 101(a)(2) of such Act (15 U.S.C. 5511(a)(2)) is
12 amended—

13 (1) by redesignating subparagraphs (E) and
14 (F) as subparagraphs (F) and (G), respectively; and

15 (2) by inserting after subparagraph (D) the fol-
16 lowing new subparagraph:

17 “(E) encourage and monitor the efforts of
18 the agencies participating in the Program to al-
19 locate the level of resources and management
20 attention necessary to ensure that the strategic
21 plan under subsection (e) is developed and exe-
22 cuted effectively and that the objectives of the
23 Program are met;”.

24 (d) ADVISORY COMMITTEE.—Section 101(b)(1) of
25 such Act (15 U.S.C. 5511(b)(1)) is amended by inserting

1 after “an advisory committee on high-performance com-
2 puting,” the following: “in which the co-chairs shall be
3 members of the President’s Council of Advisors on Science
4 and Technology and with the remainder of the com-
5 mittee”.

6 (e) REPORT.—Section 101(a)(3) of such Act (15
7 U.S.C. 5511(a)(3)) is amended—

8 (1) in subparagraph (C)—

9 (A) by striking “is submitted,” and insert-
10 ing “is submitted, the levels for the previous
11 fiscal year,”; and

12 (B) by striking “each Program Component
13 Area;” and inserting “each Program Compo-
14 nent Area and research area supported in ac-
15 cordance with section 104;”;

16 (2) in subparagraph (D)—

17 (A) by striking “each Program Component
18 Area,” and inserting “each Program Compo-
19 nent Area and research area supported in ac-
20 cordance with section 104;”;

21 (B) by striking “is submitted,” and insert-
22 ing “is submitted, the levels for the previous
23 fiscal year,”; and

24 (C) by striking “and” after the semicolon;

1 (3) by redesignating subparagraph (E) as sub-
2 paragraph (G); and

3 (4) by inserting after subparagraph (D) the fol-
4 lowing new subparagraphs:

5 “(E) include a description of how the ob-
6 jectives for each Program Component Area, and
7 the objectives for activities that involve multiple
8 Program Component Areas, relate to the objec-
9 tives of the Program identified in the strategic
10 plan required under subsection (e);

11 “(F) include—

12 “(i) a description of the funding re-
13 quired by the National Coordination Office
14 to perform the functions specified under
15 section 102(b) for the next fiscal year by
16 category of activity;

17 “(ii) a description of the funding re-
18 quired by such Office to perform the func-
19 tions specified under section 102(b) for the
20 current fiscal year by category of activity;
21 and

22 “(iii) the amount of funding provided
23 for such Office for the current fiscal year
24 by each agency participating in the Pro-
25 gram; and”.

1 (f) DEFINITION.—Section 4 of such Act (15 U.S.C.
2 5503) is amended—

3 (1) by redesignating paragraphs (1) through
4 (7) as paragraphs (2) through (8), respectively;

5 (2) by inserting before paragraph (2), as so re-
6 designated, the following new paragraph:

7 “(1) ‘cyber-physical systems’ means physical or
8 engineered systems whose networking and informa-
9 tion technology functions and physical elements are
10 deeply integrated and are actively connected to the
11 physical world through sensors, actuators, or other
12 means to perform monitoring and control func-
13 tions;”;

14 (3) in paragraph (4), as so redesignated—

15 (A) by striking “high-performance com-
16 puting” and inserting “networking and infor-
17 mation technology”; and

18 (B) by striking “supercomputer” and in-
19 serting “high-end computing”;

20 (4) in paragraph (6), as so redesignated, by
21 striking “network referred to as” and all that fol-
22 lows through the semicolon and inserting “network,
23 including advanced computer networks of Federal
24 agencies and departments;”; and

1 (5) in paragraph (7), as so redesignated, by
2 striking “National High-Performance Computing
3 Program” and inserting “networking and informa-
4 tion technology research and development program”.

5 **SEC. 113. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL**
6 **IMPORTANCE.**

7 Title I of such Act (15 U.S.C. 5511) is amended by
8 adding at the end the following new section:

9 **“SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NA-**
10 **TIONAL IMPORTANCE.**

11 “(a) IN GENERAL.—The Program shall encourage
12 agencies identified in section 101(a)(3)(B) to support
13 large-scale, long-term, interdisciplinary research and de-
14 velopment activities in networking and information tech-
15 nology directed toward application areas that have the po-
16 tential for significant contributions to national economic
17 competitiveness and for other significant societal benefits.
18 Such activities, ranging from basic research to the dem-
19 onstration of technical solutions, shall be designed to ad-
20 vance the development of research discoveries. The advi-
21 sory committee established under section 101(b) shall
22 make recommendations to the Program for candidate re-
23 search and development areas for support under this sec-
24 tion.

25 “(b) CHARACTERISTICS.—

1 “(1) IN GENERAL.—Research and development
2 activities under this section shall—

3 “(A) include projects selected on the basis
4 of applications for support through a competi-
5 tive, merit-based process;

6 “(B) involve collaborations among re-
7 searchers in institutions of higher education
8 and industry, and may involve nonprofit re-
9 search institutions and Federal laboratories, as
10 appropriate;

11 “(C) when possible, leverage Federal in-
12 vestments through collaboration with related
13 State initiatives; and

14 “(D) include a plan for fostering the trans-
15 fer of research discoveries and the results of
16 technology demonstration activities, including
17 from institutions of higher education and Fed-
18 eral laboratories, to industry for commercial de-
19 velopment.

20 “(2) COST-SHARING.—In selecting applications
21 for support, the agencies shall give special consider-
22 ation to projects that include cost sharing from non-
23 Federal sources.

24 “(3) AGENCY COLLABORATION.—If 2 or more
25 agencies identified in section 101(a)(3)(B), or other

1 appropriate agencies, are working on large-scale re-
2 search and development activities in the same area
3 of national importance, then such agencies shall
4 strive to collaborate through joint solicitation and se-
5 lection of applications for support and subsequent
6 funding of projects.

7 “(4) INTERDISCIPLINARY RESEARCH CEN-
8 TERS.—Research and development activities under
9 this section may be supported through interdiscipli-
10 nary research centers that are organized to inves-
11 tigate basic research questions and carry out tech-
12 nology demonstration activities in areas described in
13 subsection (a). Research may be carried out through
14 existing interdisciplinary centers, including those au-
15 thorized under section 7024(b)(2) of the America
16 COMPETES Act (Public Law 110–69; 42 U.S.C.
17 1862o–10).”.

18 **SEC. 114. CYBER-PHYSICAL SYSTEMS AND INFORMATION**
19 **MANAGEMENT.**

20 (a) ADDITIONAL PROGRAM CHARACTERISTICS.—Sec-
21 tion 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is
22 amended—

23 (1) in subparagraph (H), by striking “and”
24 after the semicolon;

1 (2) in subparagraph (I), by striking the period
2 at the end and inserting a semicolon; and

3 (3) by adding at the end the following new sub-
4 paragraphs:

5 “(J) provide for increased understanding
6 of the scientific principles of cyber-physical sys-
7 tems and improve the methods available for the
8 design, development, and operation of cyber-
9 physical systems that are characterized by high
10 reliability, safety, and security; and

11 “(K) provide for research and development
12 on human-computer interactions, visualization,
13 and information management.”.

14 (b) **TASK FORCE.**—Title I of such Act (15 U.S.C.
15 5511) is amended further by adding after section 104, as
16 added by section 113 of this Act, the following new sec-
17 tion:

18 **“SEC. 105. UNIVERSITY/INDUSTRY TASK FORCE.**

19 “(a) **ESTABLISHMENT.**—Not later than 180 days
20 after the date of enactment of the Networking and Infor-
21 mation Technology Research and Development Act of
22 2010, the Director of the National Coordination Office es-
23 tablished under section 102 shall convene a task force to
24 explore mechanisms for carrying out collaborative research
25 and development activities for cyber-physical systems, in-

1 cluding the related technologies required to enable these
2 systems, through a consortium or other appropriate entity
3 with participants from institutions of higher education,
4 Federal laboratories, and industry.

5 “(b) FUNCTIONS.—The task force shall—

6 “(1) develop options for a collaborative model
7 and an organizational structure for such entity
8 under which the joint research and development ac-
9 tivities could be planned, managed, and conducted
10 effectively, including mechanisms for the allocation
11 of resources among the participants in such entity
12 for support of such activities;

13 “(2) propose a process for developing a re-
14 search and development agenda for such entity, in-
15 cluding objectives and milestones;

16 “(3) define the roles and responsibilities for the
17 participants from institutions of higher education,
18 Federal laboratories, and industry in such entity;

19 “(4) propose guidelines for assigning intellec-
20 tual property rights and for the transfer of research
21 results to the private sector; and

22 “(5) make recommendations for how such enti-
23 ty could be funded from Federal, State, and non-
24 governmental sources.

1 “(c) COMPOSITION.—In establishing the task force
2 under subsection (a), the Director of the National Coordi-
3 nation Office shall appoint an equal number of individuals
4 from institutions of higher education and from industry
5 with knowledge and expertise in cyber-physical systems,
6 of which 2 may be selected from Federal laboratories.

7 “(d) REPORT.—Not later than 1 year after the date
8 of enactment of the Networking and Information Tech-
9 nology Research and Development Act of 2010, the Direc-
10 tor of the National Coordination Office shall transmit to
11 the Committee on Commerce, Science, and Transportation
12 of the Senate and the Committee on Science and Tech-
13 nology of the House of Representatives a report describing
14 the findings and recommendations of the task force.”.

15 **SEC. 115. NATIONAL COORDINATION OFFICE.**

16 Section 102 of such Act (15 U.S.C. 5512) is amended
17 to read as follows:

18 **“SEC. 102. NATIONAL COORDINATION OFFICE.**

19 “(a) ESTABLISHMENT.—The Director shall establish
20 a National Coordination Office with a Director and full-
21 time staff.

22 “(b) FUNCTIONS.—The National Coordination Office
23 shall—

24 “(1) provide technical and administrative sup-
25 port to—

1 “(A) the agencies participating in planning
2 and implementing the Program, including such
3 support as needed in the development of the
4 strategic plan under section 101(e); and

5 “(B) the advisory committee established
6 under section 101(b);

7 “(2) serve as the primary point of contact on
8 Federal networking and information technology ac-
9 tivities for government organizations, academia, in-
10 dustry, professional societies, State computing and
11 networking technology programs, interested citizen
12 groups, and others to exchange technical and pro-
13 grammatic information;

14 “(3) solicit input and recommendations from a
15 wide range of stakeholders during the development
16 of each strategic plan required under section 101(e)
17 through the convening of at least 1 workshop with
18 invitees from academia, industry, Federal labora-
19 tories, and other relevant organizations and institu-
20 tions;

21 “(4) conduct public outreach, including the dis-
22 semination of findings and recommendations of the
23 advisory committee, as appropriate; and

24 “(5) promote access to and early application of
25 the technologies, innovations, and expertise derived

1 from Program activities to agency missions and sys-
2 tems across the Federal Government and to United
3 States industry.

4 “(c) SOURCE OF FUNDING.—

5 “(1) IN GENERAL.—The operation of the Na-
6 tional Coordination Office shall be supported by
7 funds from each agency participating in the Pro-
8 gram.

9 “(2) SPECIFICATIONS.—The portion of the total
10 budget of such Office that is provided by each agen-
11 cy for each fiscal year shall be in the same propor-
12 tion as each such agency’s share of the total budget
13 for the Program for the previous fiscal year, as spec-
14 ified in the report required under section
15 101(a)(3).”.

16 **SEC. 116. IMPROVING NETWORKING AND INFORMATION**
17 **TECHNOLOGY EDUCATION.**

18 Section 201(a) of such Act (15 U.S.C. 5521(a)) is
19 amended—

20 (1) by redesignating paragraphs (2) through
21 (4) as paragraphs (3) through (5), respectively; and

22 (2) by inserting after paragraph (1) the fol-
23 lowing new paragraph:

24 “(2) the National Science Foundation shall use
25 its existing programs, in collaboration with other

1 agencies, as appropriate, to improve the teaching
2 and learning of networking and information tech-
3 nology at all levels of education and to increase par-
4 ticipation in networking and information technology
5 fields, including by women and underrepresented mi-
6 norities;”.

7 **SEC. 117. CONFORMING AND TECHNICAL AMENDMENTS.**

8 (a) SECTION 3.—Section 3 of such Act (15 U.S.C.
9 5502) is amended—

10 (1) in the matter preceding paragraph (1), by
11 striking “high-performance computing” and insert-
12 ing “networking and information technology”;

13 (2) in paragraph (1), in the matter preceding
14 subparagraph (A), by striking “high-performance
15 computing” and inserting “networking and informa-
16 tion technology”;

17 (3) in subparagraphs (A) and (F) of paragraph
18 (1), by striking “high-performance computing” each
19 place it appears and inserting “networking and in-
20 formation technology”; and

21 (4) in paragraph (2)—

22 (A) by striking “high-performance com-
23 puting and” and inserting “networking and in-
24 formation technology and”; and

1 (B) by striking “high-performance com-
2 puting network” and inserting “networking and
3 information technology”.

4 (b) TITLE I.—The heading of title I of such Act (15
5 U.S.C. 5511) is amended by striking “**HIGH-PER-**
6 **FORMANCE COMPUTING**” and inserting “**NET-**
7 **WORKING AND INFORMATION TECH-**
8 **NOLOGY**”.

9 (c) SECTION 101.—Section 101 of such Act (15
10 U.S.C. 5511) is amended—

11 (1) in the section heading, by striking “**HIGH-**
12 **PERFORMANCE COMPUTING**” and inserting
13 “**NETWORKING AND INFORMATION TECH-**
14 **NOLOGY RESEARCH AND DEVELOPMENT**”;

15 (2) in subsection (a)—

16 (A) in the subsection heading, by striking
17 “**NATIONAL HIGH-PERFORMANCE COMPUTING**”
18 and inserting “**NETWORKING AND INFORMA-**
19 **TION TECHNOLOGY RESEARCH AND DEVELOP-**
20 **MENT**”;

21 (B) in paragraph (1) of such subsection—

22 (i) in the matter preceding subpara-
23 graph (A), by striking “**National High-Per-**
24 **formance Computing Program**” and insert-
25 ing “networking and information tech-

1 nology research and development pro-
2 gram”;

3 (ii) in subparagraph (A), by striking
4 “high-performance computing, including
5 networking” and inserting “networking
6 and information technology”; and

7 (iii) in subparagraphs (B), (C), and
8 (G), by striking “high-performance” each
9 place it appears and inserting “high-end”;
10 and

11 (C) in paragraph (2) of such subsection—

12 (i) in subparagraphs (A) and (C)—

13 (I) by striking “high-performance
14 computing” each place it appears and
15 inserting “networking and information
16 technology”; and

17 (II) by striking “development,
18 networking,” each place it appears
19 and inserting “development,”; and

20 (ii) in subparagraphs (F) and (G), as
21 redesignated by section 112(c)(1) of this
22 Act, by striking “high-performance” each
23 place it appears and inserting “high-end”;

24 (3) in subsection (b)(1), in the matter pre-
25 ceding subparagraph (A), by striking “high-perform-

1 ance computing” both places it appears and insert-
2 ing “networking and information technology”; and
3 (4) in subsection (c)(1)(A), by striking “high-
4 performance computing” and inserting “networking
5 and information technology”.

6 (d) SECTION 201.—Section 201(a)(1) of such Act
7 (15 U.S.C. 5521(a)(1)) is amended by striking “high-per-
8 formance computing” and all that follows through “net-
9 working;” and inserting “networking and information re-
10 search and development;”.

11 (e) SECTION 202.—Section 202(a) of such Act (15
12 U.S.C. 5522(a)) is amended by striking “high-perform-
13 ance computing” and inserting “networking and informa-
14 tion technology”.

15 (f) SECTION 203.—Section 203(a)(1) of such Act (15
16 U.S.C. 5523(a)(1)) is amended by striking “high-perform-
17 ance computing and networking” and inserting “net-
18 working and information technology”.

19 (g) SECTION 204.—Section 204(a)(1) of such Act
20 (15 U.S.C. 5524(a)(1)) is amended—

21 (1) in subparagraph (A), by striking “high-per-
22 formance computing systems and networks” and in-
23 serting “networking and information technology sys-
24 tems and capabilities”; and

1 (2) in subparagraph (C), by striking “high-per-
2 formance computing” and inserting “networking and
3 information technology”.

4 (h) SECTION 205.—Section 205(a) of such Act (15
5 U.S.C. 5525(a)) is amended by striking “computational”
6 and inserting “networking and information technology”.

7 (i) SECTION 206.—Section 206(a) of such Act (15
8 U.S.C. 5526(a)) is amended by striking “computational
9 research” and inserting “networking and information
10 technology research”.

11 (j) SECTION 208.—Section 208 of such Act (15
12 U.S.C. 5528) is amended—

13 (1) in the section heading, by striking “**HIGH-**
14 **PERFORMANCE COMPUTING**” and inserting
15 “**NETWORKING AND INFORMATION TECH-**
16 **NOLOGY**”; and

17 (2) in subsection (a)—

18 (A) in paragraph (1), by striking “High-
19 performance computing and associated” and in-
20 serting “Networking and information”;

21 (B) in paragraph (2), by striking “high-
22 performance computing” and inserting “net-
23 working and information technologies”;

1 (C) in paragraph (4), by striking “high-
2 performance computers and associated” and in-
3 serting “networking and information”; and

4 (D) in paragraph (5), by striking “high-
5 performance computing and associated” and in-
6 serting “networking and information”.

7 **Subtitle C—Other OSTP Provisions**

8 **SEC. 121. FEDERAL SCIENTIFIC COLLECTIONS.**

9 (a) MANAGEMENT OF SCIENTIFIC COLLECTIONS.—
10 The Office of Science and Technology Policy, in consulta-
11 tion with relevant Federal agencies, shall ensure the devel-
12 opment of formal policies for the management and use of
13 Federal scientific collections to improve the quality, orga-
14 nization, access, including online access, and long-term
15 preservation of such collections for the benefit of the sci-
16 entific enterprise.

17 (b) DEFINITION.—For the purposes of this section,
18 the term “scientific collection” means a set of physical
19 specimens, living or inanimate, created for the purpose of
20 supporting science and serving as a long-term research
21 asset, rather than for their market value as collectibles
22 or their historical, artistic, or cultural significance.

23 (c) CLEARINGHOUSE.—The Office of Science and
24 Technology Policy, in consultation with relevant Federal
25 agencies, shall ensure the development of an online clear-

1 inghouse for information on the contents of and access
2 to Federal scientific collections.

3 (d) DISPOSAL OF COLLECTIONS.—The policies devel-
4 oped under subsection (a) shall—

5 (1) require that, before disposing of a scientific
6 collection, a Federal agency shall—

7 (A) conduct a review of the research value
8 of the collection; and

9 (B) consult with researchers who have
10 used the collection, and other potentially inter-
11 ested parties, concerning—

12 (i) the collection’s value for research
13 purposes; and

14 (ii) possible additional educational
15 uses for the collection; and

16 (2) include procedures for Federal agencies to
17 transfer scientific collections they no longer need to
18 researchers at institutions or other entities qualified
19 to manage the collections.

20 (e) COST PROJECTIONS.—The Office of Science and
21 Technology Policy, in consultation with relevant Federal
22 agencies, shall develop a common set of methodologies to
23 be used by Federal agencies for the assessment and pro-
24 jection of costs associated with the management and pres-
25 ervation of their scientific collections.

1 **SEC. 122. COORDINATION OF MANUFACTURING RESEARCH**
2 **AND DEVELOPMENT.**

3 (a) INTERAGENCY COMMITTEE.—The Director of the
4 Office of Science and Technology Policy shall establish or
5 designate an interagency committee under the National
6 Science and Technology Council with the responsibility for
7 planning and coordinating Federal programs and activities
8 in manufacturing research and development.

9 (b) RESPONSIBILITIES OF COMMITTEE.—The inter-
10 agency committee established or designated under sub-
11 section (a) shall—

12 (1) coordinate the manufacturing research and
13 development programs and activities of the Federal
14 agencies;

15 (2) establish goals and priorities for manufac-
16 turing research and development that will strengthen
17 United States manufacturing; and

18 (3) develop and update every 5 years thereafter
19 a strategic plan to guide Federal programs and ac-
20 tivities in support of manufacturing research and de-
21 velopment, which shall—

22 (A) specify and prioritize near-term and
23 long-term research and development objectives,
24 the anticipated time frame for achieving the ob-
25 jectives, and the metrics for use in assessing
26 progress toward the objectives;

1 (B) specify the role of each Federal agency
2 in carrying out or sponsoring research and de-
3 velopment to meet the objectives of the stra-
4 tegic plan;

5 (C) describe how the Federal agencies sup-
6 porting manufacturing research and develop-
7 ment will foster the transfer of research and de-
8 velopment results into new manufacturing tech-
9 nologies, processes, and products for the benefit
10 of society and the national interest; and

11 (D) describe how the Federal agencies sup-
12 porting manufacturing research and develop-
13 ment will strengthen all levels of manufacturing
14 education and training programs to ensure an
15 adequate, well-trained workforce.

16 (c) RECOMMENDATIONS.—In the development of the
17 strategic plan required under subsection (b)(3), the Direc-
18 tor of the Office of Science and Technology Policy, work-
19 ing through the interagency committee, shall take into
20 consideration the recommendations of a wide range of
21 stakeholders, including representatives from diverse man-
22 ufacturing companies, academia, and other relevant orga-
23 nizations and institutions.

24 (d) REPORT TO CONGRESS.—Not later than 1 year
25 after the date of enactment of this Act, the Director of

1 the Office of Science and Technology Policy shall transmit
2 the strategic plan developed under subsection (b)(3) to the
3 Committee on Commerce, Science, and Transportation of
4 the Senate, and the Committee on Science and Technology
5 of the House of Representatives, and shall transmit subse-
6 quent updates to those committees when completed.

7 **SEC. 123. INTERAGENCY PUBLIC ACCESS COMMITTEE.**

8 (a) ESTABLISHMENT.—The Director of the Office of
9 Science and Technology Policy shall establish a working
10 group under the National Science and Technology Council
11 with the responsibility to coordinate Federal science agen-
12 cy research and policies related to the dissemination and
13 long-term stewardship of the results of unclassified re-
14 search, including digital data and peer-reviewed scholarly
15 publications, supported wholly, or in part, by funding from
16 the Federal science agencies.

17 (b) RESPONSIBILITIES.—The working group estab-
18 lished under subsection (a) shall—

19 (1) coordinate the development or designation
20 of uniform standards for research data, the struc-
21 ture of full text and metadata, navigation tools, and
22 other applications to achieve interoperability across
23 Federal science agencies, across science and engi-
24 neering disciplines, and between research data and
25 scholarly publications, taking into account existing

1 consensus standards, including international stand-
2 ards;

3 (2) coordinate Federal science agency programs
4 and activities that support research and education
5 on tools and systems required to ensure preservation
6 and stewardship of all forms of digital research data,
7 including scholarly publications;

8 (3) work with international science and tech-
9 nology counterparts to maximize interoperability be-
10 tween United States based unclassified research
11 databases and international databases and reposi-
12 tories;

13 (4) solicit input and recommendations from,
14 and collaborate with, non-Federal stakeholders, in-
15 cluding universities, nonprofit and for-profit pub-
16 lishers, libraries, federally funded research scientists,
17 and other organizations and institutions with a stake
18 in long term preservation and access to the results
19 of federally funded research; and

20 (5) establish priorities for coordinating the de-
21 velopment of any Federal science agency policies re-
22 lated to public access to the results of federally
23 funded research to maximize uniformity of such poli-
24 cies with respect to their benefit to, and potential

1 economic or other impact on, the science and engi-
2 neering enterprise and the stakeholders thereof.

3 (c) PATENT OR COPYRIGHT LAW.—Nothing in this
4 section shall be construed to affect any right under the
5 provisions of title 17 or 35, United States Code.

6 (d) REPORT TO CONGRESS.—Not later than 1 year
7 after the date of enactment of this Act, the Director of
8 the Office of Science and Technology Policy shall transmit
9 a report to Congress describing—

10 (1) any priorities established under subsection

11 (b)(5);

12 (2) the status of any Federal science agency
13 policies related to public access to the results of fed-
14 erally funded research; and

15 (3) how any policies developed or being devel-
16 oped by Federal science agencies, as described in
17 paragraph (2), incorporate input from the non-Fed-
18 eral stakeholders described in subsection (b)(4).

19 (e) DEFINITION.—For the purposes of this section,
20 the term “Federal science agency” means any Federal
21 agency with an annual extramural research expenditure
22 of over \$100,000,000.

23 (f) SENSE OF CONGRESS REGARDING PEER RE-
24 VIEW.—It is the sense of Congress that peer review is an
25 important part of the process of ensuring the integrity of

1 the record of scientific research, and that the National
2 Science and Technology Council working group estab-
3 lished under this section should take into account the role
4 that scientific publishers play in the peer review process.

5 **SEC. 124. FULFILLING THE POTENTIAL OF WOMEN IN AKA-**
6 **DEMIC SCIENCE AND ENGINEERING.**

7 (a) DEFINITION.—In this section, the term “Federal
8 science agency” means any Federal agency that is respon-
9 sible for at least 2 percent of total Federal research and
10 development funding to institutions of higher education,
11 according to the most recent data available from the Na-
12 tional Science Foundation.

13 (b) WORKSHOPS TO ENHANCE GENDER EQUITY IN
14 ACADEMIC SCIENCE AND ENGINEERING.—

15 (1) IN GENERAL.—Not later than 6 months
16 after the date of enactment of this Act, the Director
17 of the Office of Science and Technology Policy shall
18 develop a uniform policy for all Federal science
19 agencies to carry out a program of workshops that
20 educate program officers, members of grant review
21 panels, institution of higher education STEM de-
22 partment chairs, and other federally funded re-
23 searchers about methods that minimize the effects of
24 gender bias in evaluation of Federal research grants
25 and in the related academic advancement of actual

1 and potential recipients of these grants, including
2 hiring, tenure, promotion, and selection for any
3 honor based in part on the recipient's research
4 record.

5 (2) INTERAGENCY COORDINATION.—The Direc-
6 tor of the Office of Science and Technology Policy
7 shall ensure that programs of workshops across the
8 Federal science agencies are coordinated and sup-
9 ported jointly as appropriate. As part of this proc-
10 ess, the Director of the Office of Science and Tech-
11 nology Policy shall ensure that at least 1 workshop
12 is supported every 2 years among the Federal
13 science agencies in each of the major science and en-
14 gineering disciplines supported by those agencies.

15 (3) ORGANIZATIONS ELIGIBLE TO CARRY OUT
16 WORKSHOPS.—Federal science agencies may carry
17 out the program of workshops under this subsection
18 by making grants to eligible organizations. In addi-
19 tion to any other organizations made eligible by the
20 Federal science agencies, the following organizations
21 are eligible for grants under this subsection:

22 (A) Nonprofit scientific and professional
23 societies and organizations that represent one
24 or more STEM disciplines.

1 (B) Nonprofit organizations that have the
2 primary mission of advancing the participation
3 of women in STEM.

4 (4) CHARACTERISTICS OF WORKSHOPS.—The
5 workshops shall have the following characteristics:

6 (A) Invitees to workshops shall include at
7 least—

8 (i) the chairs of departments in the
9 relevant discipline from at least the top 50
10 institutions of higher education, as deter-
11 mined by the amount of Federal research
12 and development funds obligated to each
13 institution of higher education in the prior
14 year based on data available from the Na-
15 tional Science Foundation;

16 (ii) members of any standing research
17 grant review panel appointed by the Fed-
18 eral science agencies in the relevant dis-
19 cipline;

20 (iii) in the case of science and engi-
21 neering disciplines supported by the De-
22 partment of Energy, the individuals from
23 each of the Department of Energy Na-
24 tional Laboratories with personnel manage-
25 ment responsibilities comparable to those

1 of an institution of higher education de-
2 partment chair; and

3 (iv) Federal science agency program
4 officers in the relevant discipline, other
5 than program officers that participate in
6 comparable workshops organized and run
7 specifically for that agency's program offi-
8 cers.

9 (B) Activities at the workshops shall in-
10 clude research presentations and interactive dis-
11 cussions or other activities that increase the
12 awareness of the existence of gender bias in the
13 grant-making process and the development of
14 the academic record necessary to qualify as a
15 grant recipient, including recruitment, hiring,
16 tenure review, promotion, and other forms of
17 formal recognition of individual achievement,
18 and provide strategies to overcome such bias.

19 (C) Research presentations and other
20 workshop programs, as appropriate, shall in-
21 clude a discussion of the unique challenges
22 faced by women who are members of histori-
23 cally underrepresented groups.

24 (D) Workshop programs shall include in-
25 formation on best practices and the value of

1 mentoring undergraduate and graduate women
2 students as well as outreach to girls earlier in
3 their STEM education.

4 (5) REPORT.—

5 (A) IN GENERAL.—Not later than 5 years
6 after the date of enactment of this Act, the Di-
7 rector of the Office of Science and Technology
8 Policy shall transmit to the Committee on
9 Science and Technology of the House of Rep-
10 resentatives and the Committee on Commerce,
11 Science, and Transportation of the Senate a re-
12 port evaluating the effectiveness of the program
13 carried out under this subsection to reduce gen-
14 der bias towards women engaged in research
15 funded by the Federal Government. The Direc-
16 tor of the Office of Science and Technology Pol-
17 icy shall include in this report any recommenda-
18 tions for improving the evaluation process de-
19 scribed in subparagraph (B).

20 (B) MINIMUM CRITERIA FOR EVALUA-
21 TION.—In determining the effectiveness of the
22 program, the Director of the Office of Science
23 and Technology Policy shall consider, at a min-
24 imum—

1 (i) the rates of participation by
2 invitees in the workshops authorized under
3 this subsection;

4 (ii) the results of attitudinal surveys
5 conducted on workshop participants before
6 and after the workshops;

7 (iii) any relevant institutional policy
8 or practice changes reported by partici-
9 pants; and

10 (iv) for individuals described in para-
11 graph (4)(A)(i) or (iii) who participated in
12 at least 1 workshop 3 or more years prior
13 to the due date for the report, trends in
14 the data for the department represented by
15 the chair or employee including faculty
16 data related to gender as described in sec-
17 tion 216.

18 (C) INSTITUTIONAL ATTENDANCE AT
19 WORKSHOPS.—As part of the report under sub-
20 paragraph (A), the Director of the Office of
21 Science and Technology Policy shall include a
22 list of institutions of higher education science
23 and engineering departments whose representa-
24 tives attended the workshops required under
25 this subsection.

1 (6) MINIMIZING COSTS.—To the extent prac-
2 ticable, workshops shall be held in conjunction with
3 national or regional disciplinary meetings to mini-
4 mize costs associated with participant travel.

5 (c) EXTENDED RESEARCH GRANT SUPPORT AND IN-
6 TERIM TECHNICAL SUPPORT FOR CAREGIVERS.—

7 (1) POLICIES FOR CAREGIVERS.—Not later
8 than 6 months after the date of enactment of this
9 Act, the Director of the Office of Science and Tech-
10 nology Policy shall develop a uniform policy to—

11 (A) extend the period of grant support for
12 federally funded researchers who have
13 caregiving responsibilities; and

14 (B) provide funding for interim technical
15 staff support for federally funded researchers
16 who take a leave of absence for caregiving re-
17 sponsibilities.

18 (2) REPORT.—Upon developing the policy re-
19 quired under paragraph (1), the Director of the Of-
20 fice of Science and Technology Policy shall transmit
21 a copy of the policy to the Committee on Science
22 and Technology of the House of Representatives and
23 to the Committee on Commerce, Science, and Trans-
24 portation of the Senate.

1 (d) COLLECTION OF DATA ON FEDERAL RESEARCH
2 GRANTS.—

3 (1) IN GENERAL.—Each Federal science agency
4 shall collect standardized annual composite informa-
5 tion on demographics, field, award type and budget
6 request, review score, and funding outcome for all
7 applications for research and development grants to
8 institutions of higher education supported by that
9 agency.

10 (2) REPORTING OF DATA.—

11 (A) The Director of the Office of Science
12 and Technology Policy shall establish a policy
13 to ensure uniformity and standardization of
14 data collection required under paragraph (1).

15 (B) Not later than 2 years after the date
16 of enactment of this Act, and annually there-
17 after, each Federal science agency shall submit
18 data collected under paragraph (1) to the Na-
19 tional Science Foundation.

20 (C) The National Science Foundation shall
21 be responsible for storing and publishing all of
22 the grant data submitted under subparagraph
23 (B), disaggregated and cross-tabulated by race,
24 ethnicity, and gender, in conjunction with the
25 biennial report required under section 37 of the

1 Science and Engineering Equal Opportunities
2 Act (42 U.S.C. 1885d).

3 **SEC. 125. NATIONAL COMPETITIVENESS AND INNOVATION**
4 **STRATEGY.**

5 Not later than one year after the date of the enact-
6 ment of this Act, the Director of the White House Office
7 of Science and Technology Policy shall submit to Congress
8 and the President a national competitiveness and innova-
9 tion strategy for strengthening the innovative and com-
10 petitive capacity of the Federal Government, State and
11 local governments, institutions of higher education, and
12 the private sector that includes—

- 13 (1) proposed legislative changes and action;
- 14 (2) proposed actions to be taken collectively by
15 executive agencies, including White House offices;
- 16 (3) proposed actions to be taken by individual
17 executive agencies, including White House offices;
- 18 and
- 19 (4) a proposal for metrics-based monitoring and
20 oversight of the progress of the Federal Government
21 with respect to improving conditions for the innova-
22 tion occurring in and the competitiveness of the
23 United States.

1 **TITLE II—NATIONAL SCIENCE**
2 **FOUNDATION**

3 **SEC. 201. SHORT TITLE.**

4 This title may be cited as the “National Science
5 Foundation Authorization Act of 2010”.

6 **Subtitle A—General Provisions**

7 **SEC. 211. DEFINITIONS.**

8 In this title:

9 (1) DIRECTOR.—The term “Director” means
10 the Director of the National Science Foundation es-
11 tablished under section 2 of the National Science
12 Foundation Act of 1950 (42 U.S.C. 1861).

13 (2) FOUNDATION.—The term “Foundation”
14 means the National Science Foundation established
15 under section 2 of the National Science Foundation
16 Act of 1950 (42 U.S.C. 1861).

17 (3) INSTITUTION OF HIGHER EDUCATION.—The
18 term “institution of higher education” has the
19 meaning given such term in section 101(a) of the
20 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

21 (4) STATE.—The term “State” means one of
22 the several States, the District of Columbia, the
23 Commonwealth of Puerto Rico, the Virgin Islands,
24 Guam, American Samoa, the Commonwealth of the

1 Northern Mariana Islands, or any other territory or
2 possession of the United States.

3 (5) STEM.—The term “STEM” means science,
4 technology, engineering, and mathematics.

5 (6) UNITED STATES.—The term “United
6 States” means the several States, the District of Co-
7 lumbia, the Commonwealth of Puerto Rico, the Vir-
8 gin Islands, Guam, American Samoa, the Common-
9 wealth of the Northern Mariana Islands, and any
10 other territory or possession of the United States.

11 **SEC. 212. AUTHORIZATION OF APPROPRIATIONS.**

12 (a) FISCAL YEAR 2011.—

13 (1) IN GENERAL.—There are authorized to be
14 appropriated to the Foundation \$7,481,000,000 for
15 fiscal year 2011.

16 (2) SPECIFIC ALLOCATIONS.—Of the amount
17 authorized under paragraph (1)—

18 (A) \$6,020,000,000 shall be made avail-
19 able for research and related activities;

20 (B) \$945,000,000 shall be made available
21 for education and human resources;

22 (C) \$166,000,000 shall be made available
23 for major research equipment and facilities con-
24 struction;

1 (D) \$330,000,000 shall be made available
2 for agency operations and award management;

3 (E) \$4,840,000 shall be made available for
4 the Office of the National Science Board; and

5 (F) \$14,830,000 shall be made available
6 for the Office of Inspector General.

7 (b) FISCAL YEAR 2012.—

8 (1) IN GENERAL.—There are authorized to be
9 appropriated to the Foundation \$8,127,000,000 for
10 fiscal year 2012.

11 (2) SPECIFIC ALLOCATIONS.—Of the amount
12 authorized under paragraph (1)—

13 (A) \$6,496,000,000 shall be made avail-
14 able for research and related activities;

15 (B) \$1,020,000,000 shall be made avail-
16 able for education and human resources;

17 (C) \$235,000,000 shall be made available
18 for major research equipment and facilities con-
19 struction;

20 (D) \$356,000,000 shall be made available
21 for agency operations and award management;

22 (E) \$5,010,000 shall be made available for
23 the Office of the National Science Board; and

24 (F) \$15,350,000 shall be made available
25 for the Office of Inspector General.

1 (c) FISCAL YEAR 2013.—

2 (1) IN GENERAL.—There are authorized to be
3 appropriated to the Foundation \$8,764,000,000 for
4 fiscal year 2013.

5 (2) SPECIFIC ALLOCATIONS.—Of the amount
6 authorized under paragraph (1)—

7 (A) \$7,009,000,000 shall be made avail-
8 able for research and related activities;

9 (B) \$1,100,000,000 shall be made avail-
10 able for education and human resources;

11 (C) \$250,000,000 shall be made available
12 for major research equipment and facilities con-
13 struction;

14 (D) \$384,000,000 shall be made available
15 for agency operations and award management;

16 (E) \$5,180,000 shall be made available for
17 the Office of the National Science Board; and

18 (F) \$15,890,000 shall be made available
19 for the Office of Inspector General.

20 (d) FISCAL YEAR 2014.—

21 (1) IN GENERAL.—There are authorized to be
22 appropriated to the Foundation \$9,436,000,000 for
23 fiscal year 2014.

24 (2) SPECIFIC ALLOCATIONS.—Of the amount
25 authorized under paragraph (1)—

1 (A) \$7,562,000,000 shall be made avail-
2 able for research and related activities;

3 (B) \$1,187,000,000 shall be made avail-
4 able for education and human resources;

5 (C) \$250,000,000 shall be made available
6 for major research equipment and facilities con-
7 struction;

8 (D) \$415,000,000 shall be made available
9 for agency operations and award management;

10 (E) \$5,370,000 shall be made available for
11 the Office of the National Science Board; and

12 (F) \$16,440,000 shall be made available
13 for the Office of Inspector General.

14 (e) FISCAL YEAR 2015.—

15 (1) IN GENERAL.—There are authorized to be
16 appropriated to the Foundation \$10,161,000,000 for
17 fiscal year 2015.

18 (2) SPECIFIC ALLOCATIONS.—Of the amount
19 authorized under paragraph (1)—

20 (A) \$8,160,000,000 shall be made avail-
21 able for research and related activities;

22 (B) \$1,281,000,000 shall be made avail-
23 able for education and human resources;

1 (C) \$250,000,000 shall be made available
2 for major research equipment and facilities con-
3 struction;

4 (D) \$447,000,000 shall be made available
5 for agency operations and award management;

6 (E) \$5,550,000 shall be made available for
7 the Office of the National Science Board; and

8 (F) \$17,020,000 shall be made available
9 for the Office of Inspector General.

10 **SEC. 213. NATIONAL SCIENCE BOARD ADMINISTRATIVE**
11 **AMENDMENTS.**

12 (a) **STAFFING AT THE NATIONAL SCIENCE BOARD.**—
13 Section 4(g) of the National Science Foundation Act of
14 1950 (42 U.S.C. 1863(g)) is amended by striking “not
15 more than 5”.

16 (b) **SCIENCE AND ENGINEERING INDICATORS DUE**
17 **DATE.**—Section 4(j)(1) of the National Science Founda-
18 tion Act of 1950 (42 U.S.C. 1863(j)(1)) is amended by
19 striking “January 15” and inserting “May 31”.

20 (c) **NATIONAL SCIENCE BOARD REPORTS.**—Section
21 4(j)(2) of the National Science Foundation Act of 1950
22 (42 U.S.C. 1863(j)(2)) is amended by inserting “within
23 the authority of the Foundation (or otherwise as requested
24 by the appropriate Congressional committees of jurisdic-
25 tion or the President)” after “individual policy matters”.

1 (d) BOARD ADHERENCE TO SUNSHINE ACT.—Sec-
2 tion 15(a) of the National Science Foundation Authoriza-
3 tion Act of 2002 (42 U.S.C. 1862n-5(a)) is amended—

4 (1) by striking paragraph (3) and redesignating
5 paragraphs (4) and (5) as paragraphs (3) and (4),
6 respectively;

7 (2) in paragraph (3), as so redesignated by
8 paragraph (1) of this subsection—

9 (A) by striking “February 15” and insert-
10 ing “April 15”; and

11 (B) by striking “the audit required under
12 paragraph (3) along with” and inserting “any”;
13 and

14 (3) in paragraph (4), as so redesignated by
15 paragraph (1) of this subsection, by striking “To fa-
16 cilitate the audit required under paragraph (3) of
17 this subsection, the” and inserting “The”.

18 **SEC. 214. BROADER IMPACTS REVIEW CRITERION.**

19 (a) GOALS.—The Foundation shall apply a Broader
20 Impacts Review Criterion to achieve the following goals:

21 (1) Increased economic competitiveness of the
22 United States.

23 (2) Development of a globally competitive
24 STEM workforce.

1 (3) Increased participation of women and
2 underrepresented minorities in STEM.

3 (4) Increased partnerships between academia
4 and industry.

5 (5) Improved pre-K–12 STEM education and
6 teacher development.

7 (6) Improved undergraduate STEM education.

8 (7) Increased public scientific literacy.

9 (8) Increased national security.

10 (b) POLICY.—Not later than 6 months after the date
11 of enactment of this Act, the Director shall develop and
12 implement a policy for the Broader Impacts Review Cri-
13 terion that—

14 (1) provides for educating professional staff at
15 the Foundation, merit review panels, and applicants
16 for Foundation research grants on the policy devel-
17 oped under this subsection;

18 (2) clarifies that the activities of grant recipi-
19 ents undertaken to satisfy the Broader Impacts Re-
20 view Criterion shall—

21 (A) to the extent practicable employ proven
22 strategies and models and draw on existing pro-
23 grams and activities; and

24 (B) when novel approaches are justified,
25 build on the most current research results;

1 (3) allows for some portion of funds allocated to
2 broader impacts under a research grant to be used
3 for assessment and evaluation of the broader im-
4 pacts activity;

5 (4) encourages institutions of higher education
6 and other nonprofit education or research organiza-
7 tions to develop and provide, either as individual in-
8 stitutions or in partnerships thereof, appropriate
9 training and programs to assist Foundation-funded
10 principal investigators at their institutions in achiev-
11 ing the goals of the Broader Impacts Review Cri-
12 terion as described in subsection (a); and

13 (5) requires principal investigators applying for
14 Foundation research grants to provide evidence of
15 institutional support for the portion of the investiga-
16 tor's proposal designed to satisfy the Broader Im-
17 pacts Review Criterion, including evidence of rel-
18 evant training, programs, and other institutional re-
19 sources available to the investigator from either their
20 home institution or organization or another institu-
21 tion or organization with relevant expertise.

22 **SEC. 215. NATIONAL CENTER FOR SCIENCE AND ENGINEER-**
23 **ING STATISTICS.**

24 (a) ESTABLISHMENT.—There is established within
25 the Foundation a National Center for Science and Engi-

1 neering Statistics (in this section referred to as the “Cen-
2 ter”), that shall serve as a central Federal clearinghouse
3 for the collection, interpretation, analysis, and dissemina-
4 tion of objective data on science, engineering, technology,
5 and research and development.

6 (b) DUTIES.—In carrying out subsection (a) of this
7 section, the Director, acting through the Center shall—

8 (1) collect, acquire, analyze, report, and dis-
9 seminate statistical data related to the science and
10 engineering enterprise in the United States and
11 other nations that is relevant and useful to practi-
12 tioners, researchers, policymakers, and the public,
13 including statistical data on—

14 (A) research and development trends;

15 (B) the science and engineering workforce;

16 (C) United States competitiveness in
17 science, engineering, technology, and research
18 and development; and

19 (D) the condition and progress of United
20 States STEM education;

21 (2) support research using the data it collects,
22 and on methodologies in areas related to the work
23 of the Center; and

1 (3) the number and percent of faculty who are
2 in nontenure-track positions, including teaching and
3 research, by gender, race, and age;

4 (4) the number of faculty who are reviewed for
5 promotion, including tenure, and the percentage of
6 that number who are promoted, by gender, race, and
7 age;

8 (5) faculty years in rank by gender, race, and
9 age;

10 (6) faculty attrition by gender, race, and age;

11 (7) the number and percent of faculty hired by
12 rank, gender, race, and age; and

13 (8) the number and percent of faculty in leader-
14 ship positions, including endowed or named chairs,
15 serving on promotion and tenure committees, by
16 gender, race, and age.

17 (b) RECOMMENDATIONS.—The Director shall solicit
18 input and recommendations from relevant stakeholders,
19 including representatives from institutions of higher edu-
20 cation and nonprofit organizations, on the collection of
21 data required under subsection (a), including the develop-
22 ment of standard definitions on the terms and categories
23 to be used in the collection of such data.

24 (c) REPORT TO CONGRESS.—Not later than 2 years
25 after the date of enactment of this Act, the Director shall

1 submit a report to Congress on how the Foundation will
2 gather the demographic data on STEM faculty, includ-
3 ing—

4 (1) a description of the data to be reported and
5 the sources of those data;

6 (2) justification for the exclusion of any data
7 described in paragraph (1); and

8 (3) a list of the definitions for the terms and
9 categories, such as “faculty” and “leadership posi-
10 tions”, to be applied in the reporting of all data de-
11 scribed in paragraph (1).

12 **Subtitle B—Research and** 13 **Innovation**

14 **SEC. 221. SUPPORT FOR POTENTIALLY TRANSFORMATIVE** 15 **RESEARCH.**

16 (a) **POLICY.**—The Director shall establish a policy
17 that requires the Foundation to use at least 5 percent of
18 its research budget to fund high-risk, high-reward basic
19 research proposals. Support for facilities and infrastruc-
20 ture, including preconstruction design and operations and
21 maintenance of major research facilities, shall not be
22 counted as part of the research budget for the purposes
23 of this section.

24 (b) **IMPLEMENTATION.**—In implementing such policy,
25 the Foundation may—

1 (1) develop solicitations specifically for high-
2 risk, high-reward basic research;

3 (2) establish review panels for the primary pur-
4 pose of selecting high-risk, high-reward proposals or
5 modify instructions to standard review panels to re-
6 quire identification of high-risk, high-reward pro-
7 posals; and

8 (3) support workshops and participate in con-
9 ferences with the primary purpose of identifying new
10 opportunities for high-risk, high-reward basic re-
11 search, especially at interdisciplinary interfaces.

12 (c) DEFINITION.—For purposes of this section, the
13 term “high-risk, high-reward basic research” means re-
14 search driven by ideas that have the potential to radically
15 change our understanding of an important existing sci-
16 entific or engineering concept, or leading to the creation
17 of a new paradigm or field of science or engineering, and
18 that is characterized by its challenge to current under-
19 standing or its pathway to new frontiers.

20 **SEC. 222. FACILITATING INTERDISCIPLINARY COLLABORA-**
21 **TIONS FOR NATIONAL NEEDS.**

22 (a) IN GENERAL.—The Director shall award competi-
23 tive, merit-based awards in amounts not to exceed
24 \$5,000,000 over a period of up to 5 years to interdiscipli-
25 nary research collaborations that are likely to assist in ad-

1 dressing critical challenges to national security, competi-
2 tiveness, and societal well-being and that—

3 (1) involve at least 2 co-equal principal inves-
4 tigators at the same or different institutions;

5 (2) draw upon well-integrated, diverse teams of
6 investigators, including students or postdoctoral re-
7 searchers, from one or more disciplines; and

8 (3) foster creativity and pursue high-risk, high-
9 reward research.

10 (b) PRIORITY.—In selecting grant recipients under
11 this section, the Director shall give priority to applicants
12 that propose to utilize advances in cyberinfrastructure and
13 simulation-based science and engineering.

14 **SEC. 223. NATIONAL SCIENCE FOUNDATION MANUFAC-**
15 **TURING RESEARCH AND EDUCATION.**

16 (a) MANUFACTURING RESEARCH.—The Director
17 shall carry out a program to award merit-reviewed, com-
18 petitive grants to institutions of higher education to sup-
19 port fundamental research leading to transformative ad-
20 vances in manufacturing technologies, processes, and en-
21 terprises that will support United States manufacturing
22 through improved performance, productivity, sustain-
23 ability, and competitiveness. Research areas may in-
24 clude—

25 (1) nanomanufacturing;

1 (2) manufacturing and construction machines
2 and equipment, including robotics, automation, and
3 other intelligent systems;

4 (3) manufacturing enterprise systems;

5 (4) advanced sensing and control techniques;

6 (5) materials processing; and

7 (6) information technologies for manufacturing,
8 including predictive and real-time models and sim-
9 ulations, and virtual manufacturing.

10 (b) **MANUFACTURING EDUCATION.**—In order to help
11 ensure a well-trained manufacturing workforce, the Direc-
12 tor shall award grants to strengthen and expand scientific
13 and technical education and training in advanced manu-
14 facturing, including through the Foundation’s Advanced
15 Technological Education program.

16 **SEC. 224. STRENGTHENING INSTITUTIONAL RESEARCH**
17 **PARTNERSHIPS.**

18 (a) **IN GENERAL.**—For any Foundation research
19 grant, in an amount greater than \$2,000,000, to be car-
20 ried out through a partnership that includes one or more
21 minority-serving institutions or predominantly under-
22 graduate institutions and one or more institutions de-
23 scribed in subsection (b), the Director shall award funds
24 directly, according to the budget justification described in
25 the grant proposal, to at least two of the institutions of

1 higher education in the partnership, including at least one
2 minority-serving institution or one predominantly under-
3 graduate institution, to ensure a strong and equitable
4 partnership.

5 (b) INSTITUTIONS.—The institutions referred to in
6 subsection (a) are institutions of higher education that are
7 among the 100 institutions receiving, over the 3-year pe-
8 riod immediately preceding the awarding of grants, the
9 highest amount of research funding from the Foundation.

10 (c) REPORT.—Not later than one year after the date
11 of enactment of this Act, the Director shall provide a re-
12 port to Congress on institutional research partnerships
13 identified in subsection (a) funded in the previous fiscal
14 year.

15 **SEC. 225. NATIONAL SCIENCE BOARD REPORT ON MID-**
16 **SCALE INSTRUMENTATION.**

17 (a) MID-SCALE RESEARCH INSTRUMENTATION
18 NEEDS.—The National Science Board shall evaluate the
19 needs, across all disciplines supported by the Foundation,
20 for mid-scale research instrumentation that falls between
21 the instruments funded by the Major Research Instrumen-
22 tation program and the very large projects funded by the
23 Major Research Equipment and Facilities Construction
24 program.

1 (b) REPORT ON MID-SCALE RESEARCH INSTRUMENTEN-
2 TATION PROGRAM.—Not later than 1 year after the date
3 of enactment of this Act, the National Science Board shall
4 submit to Congress a report on mid-scale research instru-
5 mentation at the Foundation. At a minimum, this report
6 shall include—

7 (1) the findings from the Board’s evaluation of
8 instrumentation needs required under subsection (a),
9 including a description of differences across dis-
10 ciplines and Foundation research directorates;

11 (2) a recommendation or recommendations re-
12 garding how the Foundation should set priorities for
13 mid-scale instrumentation across disciplines and
14 Foundation research directorates;

15 (3) a recommendation or recommendations re-
16 garding the appropriateness of expanding existing
17 programs, including the Major Research Instrumen-
18 tation program or the Major Research Equipment
19 and Facilities Construction program, to support
20 more instrumentation at the mid-scale;

21 (4) a recommendation or recommendations re-
22 garding the need for and appropriateness of a new,
23 Foundation-wide program or initiative in support of
24 mid-scale instrumentation, including any rec-
25 ommendations regarding the administration of and

1 budget for such a program or initiative and the ap-
2 propriate scope of instruments to be funded under
3 such a program or initiative; and

4 (5) any recommendation or recommendations
5 regarding other options for supporting mid-scale re-
6 search instrumentation at the Foundation.

7 **SEC. 226. SENSE OF CONGRESS ON OVERALL SUPPORT FOR**
8 **RESEARCH INFRASTRUCTURE AT THE FOUN-**
9 **DATION.**

10 It is the sense of Congress that the Foundation
11 should strive to keep the percentage of the Foundation
12 budget devoted to research infrastructure in the range of
13 24 to 27 percent, as recommended in the 2003 National
14 Science Board report entitled “Science and Engineering
15 Infrastructure for the 21st Century”.

16 **SEC. 227. PARTNERSHIPS FOR INNOVATION.**

17 (a) IN GENERAL.—The Director shall carry out a
18 program to award merit-reviewed, competitive grants to
19 institutions of higher education to establish and to expand
20 partnerships that promote innovation and increase the
21 economic and social impact of research by developing tools
22 and resources to connect new scientific discoveries to prac-
23 tical uses.

24 (b) PARTNERSHIPS.—

1 (1) IN GENERAL.—To be eligible for funding
2 under this section, an institution of higher education
3 must propose establishment of a partnership that—

4 (A) includes at least one private sector en-
5 tity; and

6 (B) may include other institutions of high-
7 er education, public sector institutions, private
8 sector entities, and social enterprise nonprofit
9 organizations.

10 (2) PRIORITY.—In selecting grant recipients
11 under this section, the Director shall give priority to
12 partnerships that include one or more institutions of
13 higher education that are among the 100 institu-
14 tions receiving, over the 3-year period immediately
15 preceding the awarding of grants, the highest
16 amount of research funding from the Foundation
17 and at least one of the following:

18 (A) A minority serving institution.

19 (B) A primarily undergraduate institution.

20 (C) A 2-year institution of higher edu-
21 cation.

22 (c) PROGRAM.—Proposals funded under this section
23 shall seek to—

24 (1) increase the economic or social impact of
25 the most promising research at the institution or in-

1 stitutions of higher education that are members of
2 the partnership through knowledge transfer or com-
3 mercialization;

4 (2) increase the engagement of faculty and stu-
5 dents across multiple disciplines and departments,
6 including faculty and students in schools of business
7 and other appropriate non-STEM fields and dis-
8 ciplines in knowledge transfer activities;

9 (3) enhance education and mentoring of stu-
10 dents and faculty in innovation and entrepreneur-
11 ship through networks, courses, and development of
12 best practices and curricula;

13 (4) strengthen the culture of the institution or
14 institutions of higher education to undertake and
15 participate in activities related to innovation and
16 leading to economic or social impact;

17 (5) broaden the participation of all types of in-
18 stitutions of higher education in activities to meet
19 STEM workforce needs and promote innovation and
20 knowledge transfer; and

21 (6) build lasting partnerships with local and re-
22 gional businesses, local and State governments, and
23 other relevant entities.

24 (d) **ADDITIONAL CRITERIA.**—In selecting grant re-
25 cipients under this section, the Director shall also consider

1 the extent to which the applicants are able to demonstrate
2 evidence of institutional support for, and commitment
3 to—

4 (1) achieving the goals of the program as de-
5 scribed in subsection (c);

6 (2) expansion to an institution-wide program if
7 the initial proposal is not for an institution-wide pro-
8 gram; and

9 (3) sustaining any new innovation tools and re-
10 sources generated from funding under this program.

11 (e) LIMITATION.—No funds provided under this sec-
12 tion may be used to construct or renovate a building or
13 structure.

14 **SEC. 228. PRIZE AWARDS.**

15 (a) SHORT TITLE.—This section may be cited as the
16 “Generating Extraordinary New Innovations in the
17 United States Act of 2010”.

18 (b) IN GENERAL.—The Director shall carry out a
19 pilot program to award innovation inducement cash prizes
20 in any area of research supported by the Foundation. The
21 Director may carry out a program of cash prizes only in
22 conformity with this section.

23 (c) TOPICS.—In identifying topics for prize competi-
24 tions under this section, the Director shall—

1 (1) consult widely both within and outside the
2 Federal Government;

3 (2) give priority to high-risk, high-reward re-
4 search challenges and to problems whose solution
5 could improve the economic competitiveness of the
6 United States; and

7 (3) give consideration to the extent to which the
8 topics have the potential to raise public awareness
9 about federally sponsored research.

10 (d) TYPES OF CONTESTS.—The Director shall con-
11 sider all categories of innovation inducement prizes, in-
12 cluding—

13 (1) contests in which the award is to the first
14 team or individual who accomplishes a stated objec-
15 tive; and

16 (2) contests in which the winner is the team or
17 individual who comes closest to achieving an objec-
18 tive within a specified time.

19 (e) ADVERTISING AND ANNOUNCEMENT.—

20 (1) ADVERTISING AND SOLICITATION OF COM-
21 PETITORS.—The Director shall widely advertise
22 prize competitions to encourage broad participation,
23 including by individuals, institutions of higher edu-
24 cation, nonprofit organizations, and businesses.

1 (2) ANNOUNCEMENT THROUGH FEDERAL REG-
2 ISTER NOTICE.—The Director shall announce each
3 prize competition by publishing a notice in the Fed-
4 eral Register. This notice shall include the subject of
5 the competition, the duration of the competition, the
6 eligibility requirements for participation in the com-
7 petition, the process for participants to register for
8 the competition, the amount of the prize, and the
9 criteria for awarding the prize, including the method
10 by which the prize winner or winners will be se-
11 lected.

12 (3) TIME TO ANNOUNCEMENT.—The Director
13 shall announce a prize competition within 18 months
14 after receipt of appropriated funds.

15 (f) FUNDING.—

16 (1) FUNDING SOURCES.—Prizes under this sec-
17 tion shall consist of Federal appropriated funds and
18 any funds raised pursuant to donations authorized
19 under section 11(f) of the National Science Founda-
20 tion Act of 1950 (42 U.S.C. 1870(f)) for specific
21 prize competitions.

22 (2) ANNOUNCEMENT OF PRIZES.—The Director
23 may not issue a notice as required by subsection
24 (e)(2) until all of the funds needed to pay out the
25 announced amount of the prize have been appro-

1 priated or committed in writing by another entity
2 pursuant to paragraph (1).

3 (g) ELIGIBILITY.—To be eligible to win a prize under
4 this section, an individual or entity—

5 (1) shall have complied with all of the require-
6 ments under this section;

7 (2) in the case of a private entity, shall be in-
8 corporated in and maintain a primary place of busi-
9 ness in the United States, and in the case of an in-
10 dividual, whether participating singly or in a group,
11 shall be a United States citizen or national, or an
12 alien lawfully admitted to the United States for per-
13 manent residence;

14 (3) shall not be a Federal entity, a Federal em-
15 ployee acting within the scope of his or her employ-
16 ment, or a person employed at a Federal laboratory
17 acting within the scope of his or her employment;
18 and

19 (4) shall not have utilized Federal funds to en-
20 gage in research on the topic for which the prize is
21 being awarded.

22 (h) AWARDS.—

23 (1) NUMBER OF COMPETITIONS.—The Director
24 may announce up to 5 prize competitions through
25 the end of fiscal year 2013.

1 (2) SIZE OF AWARD.—The Director may deter-
2 mine the amount of each prize award based on the
3 prize topic, but no award shall be less than
4 \$1,000,000 or greater than \$3,000,000.

5 (3) SELECTING WINNERS.—The Director may
6 convene an expert panel to select a winner of a prize
7 competition. If the panel is unable to select a win-
8 ner, the Director shall determine the winner of the
9 prize.

10 (4) PUBLIC OUTREACH.—The Director shall
11 publicly award prizes utilizing the Foundation’s ex-
12 isting public affairs and public outreach resources.

13 (i) ADMINISTERING THE COMPETITION.—The Direc-
14 tor may enter into an agreement with a private, nonprofit
15 entity to administer the prize competition, subject to the
16 provisions of this section.

17 (j) INTELLECTUAL PROPERTY.—The Federal Gov-
18 ernment shall not, by virtue of offering or awarding a
19 prize under this section, be entitled to any intellectual
20 property rights derived as a consequence of, or in direct
21 relation to, the participation by a registered participant
22 in a competition authorized by this section. This sub-
23 section shall not be construed to prevent the Federal Gov-
24 ernment from negotiating a license for the use of intellec-

1 tual property developed for a prize competition under this
2 section.

3 (k) LIABILITY.—The Director may require a reg-
4 istered participant in a prize competition under this sec-
5 tion to waive liability against the Federal Government for
6 injuries and damages that result from participation in
7 such competition.

8 (l) NONSUBSTITUTION.—Any programs created
9 under this section shall not be considered a substitute for
10 Federal research and development programs.

11 (m) REPORTING REQUIREMENT.—Not later than 5
12 years after the date of enactment of this Act, the National
13 Science Board shall transmit to Congress a report con-
14 taining the results of a review and assessment of the pilot
15 program under this section, including—

16 (1) a description of the nature and status of all
17 completed or ongoing prize competitions carried out
18 under this section, including any scientific achieve-
19 ments, publications, intellectual property, or com-
20 mercialized technology that resulted from such com-
21 petitions;

22 (2) any recommendations regarding changes to,
23 the termination of, or continuation of the pilot pro-
24 gram;

1 (3) an analysis of whether the program is at-
2 tracting contestants more diverse than the Founda-
3 tion's traditional academic constituency;

4 (4) an analysis of whether public awareness of
5 innovation or of the goal of the particular prize or
6 prizes is enhanced;

7 (5) an analysis of whether the Foundation's
8 public image or ability to increase public scientific
9 literacy is enhanced through the use of innovation
10 inducement prizes; and

11 (6) an analysis of the extent to which private
12 funds are being used to support registered partici-
13 pants.

14 (n) EARLY TERMINATION OF CONTESTS.—The Di-
15 rector shall terminate a prize contest before any registered
16 participant wins if the Director determines that an unreg-
17 istered entity has produced an innovation that would oth-
18 erwise have qualified for the prize award.

19 (o) AUTHORIZATION OF APPROPRIATIONS.—

20 (1) IN GENERAL.—

21 (A) AWARDS.—There are authorized to be
22 appropriated to the Director for the period en-
23 compassing fiscal years 2011 through 2013
24 \$12,000,000 for carrying out this section.

1 (B) ADMINISTRATION.—Of the amounts
2 authorized in subparagraph (A), not more than
3 15 percent for each fiscal year shall be available
4 for the administrative costs of carrying out this
5 section.

6 (2) CARRYOVER OF FUNDS.—Funds appro-
7 priated for prize awards under this section shall re-
8 main available until expended, and may be trans-
9 ferred, reprogrammed, or expended for other pur-
10 poses as authorized by law only after the expiration
11 of 7 fiscal years after the fiscal year for which the
12 funds were originally appropriated. No provision in
13 this section permits obligation or payment of funds
14 in violation of section 1341 of title 31 of the United
15 States Code (commonly referred to as the Anti-Defi-
16 ciency Act).

17 **SEC. 229. COLLABORATION IN PLANNING FOR STEWARD-**
18 **SHIP OF LARGE-SCALE FACILITIES.**

19 It is the sense of Congress that the Foundation
20 should, in its planning for construction and stewardship
21 of large facilities, coordinate and collaborate with other
22 Federal agencies, including the Department of Energy's
23 Office of Science, to ensure that joint investments may
24 be made when practicable. In particular, the Foundation
25 should ensure that it responds to recommendations by the

1 National Academy of Sciences and working groups con-
2 vened by the National Science and Technology Council re-
3 garding such facilities and opportunities for partnership
4 with other agencies in the design and construction of such
5 facilities. For facilities in which research in multiple dis-
6 ciplines will be possible, the Director should include mul-
7 tiple units within the Foundation during the planning
8 process.

9 **SEC. 230. GREEN CHEMISTRY BASIC RESEARCH.**

10 The Director shall establish a Green Chemistry Basic
11 Research program to award competitive, merit-based
12 grants to support research into green and sustainable
13 chemistry which will lead to clean, safe, and economical
14 alternatives to traditional chemical products and practices.
15 The research program shall provide sustained support for
16 green chemistry research, education, and technology
17 transfer through—

18 (1) merit-reviewed competitive grants to indi-
19 vidual investigators and teams of investigators, in-
20 cluding, to the extent practicable, young investiga-
21 tors, for research;

22 (2) grants to fund collaborative research part-
23 nerships among universities, industry, and nonprofit
24 organizations;

1 (3) symposia, forums, and conferences to in-
2 crease outreach, collaboration, and dissemination of
3 green chemistry advances and practices; and

4 (4) education, training, and retraining of under-
5 graduate and graduate students and professional
6 chemists and chemical engineers, including through
7 partnerships with industry, in green chemistry
8 science and engineering.

9 **Subtitle C—STEM Education and** 10 **Workforce Training**

11 **SEC. 241. GRADUATE STUDENT SUPPORT.**

12 (a) FINDING.—The Congress finds that—

13 (1) the Integrative Graduate Education and Re-
14 search Traineeship program is an important pro-
15 gram for training the next generation of scientists
16 and engineers in team-based interdisciplinary re-
17 search and problem solving, and for providing them
18 with the many additional skills, such as communica-
19 tion skills, needed to thrive in diverse STEM ca-
20 reers; and

21 (2) the Integrative Graduate Education and Re-
22 search Traineeship program is no less valuable to
23 the preparation and support of graduate students
24 than the Foundation’s Graduate Research Fellow-
25 ship program.

1 (b) EQUAL TREATMENT OF IGERT AND GRF.—Be-
2 ginning in fiscal year 2011, the Director shall increase or,
3 if necessary, decrease funding for the Foundation’s Inte-
4 grative Graduate Education and Research Traineeship
5 program (or any program by which it is replaced) at least
6 at the same rate as it increases or decreases funding for
7 the Graduate Research Fellowship program.

8 (c) SUPPORT FOR GRADUATE STUDENT RESEARCH
9 FROM THE RESEARCH ACCOUNT.—For each of the fiscal
10 years 2011 through 2015, at least 50 percent of the total
11 Foundation funds allocated to the Integrative Graduate
12 Education and Research Traineeship program and the
13 Graduate Research Fellowship program shall come from
14 funds appropriated for Research and Related Activities.

15 (d) COST OF EDUCATION ALLOWANCE FOR GRF
16 PROGRAM.—Section 10 of the National Science Founda-
17 tion Act of 1950 (42 U.S.C. 1869) is amended—

18 (1) by inserting “(a)” before “The Foundation
19 is authorized”; and

20 (2) by adding at the end the following new sub-
21 section:

22 “(b) The Director shall establish for each year the
23 amount to be awarded for scholarships and fellowships
24 under this section for that year. Each such scholarship
25 and fellowship shall include a cost of education allowance

1 of \$12,000, subject to any restrictions on the use of cost
2 of education allowance as determined by the Director.”.

3 **SEC. 242. POSTDOCTORAL FELLOWSHIP IN STEM EDU-**
4 **CATION RESEARCH.**

5 (a) IN GENERAL.—The Director shall establish
6 postdoctoral fellowships in STEM education research to
7 provide recent doctoral degree graduates in STEM fields
8 with the necessary skills to assume leadership roles in
9 STEM education research, program development, and
10 evaluation in our Nation’s diverse educational institutions.

11 (b) AWARDS.—

12 (1) DURATION.—Fellowships may be awarded
13 under this section for a period of up to 24 months
14 in duration, renewable for an additional 12 months.
15 The Director shall establish criteria for eligibility for
16 renewal of the fellowship.

17 (2) STIPEND.—The Director shall determine
18 the amount of the award for a fellowship, which
19 shall include a stipend and a research allowance, and
20 may include an educational allowance.

21 (3) LOCATION.—A fellowship shall be awarded
22 for research at any institution of higher education
23 that offers degrees in fields supported by the Foun-
24 dation, or at any institution or organization that the

1 Director determines is eligible for education research
2 grants from the Foundation.

3 (4) NUMBER OF AWARDS.—The Director may
4 award up to 20 new fellowships per year.

5 (c) RESEARCH.—Fellowships under this section shall
6 be awarded for research on STEM education at any edu-
7 cational level, including grades pre-K–12, undergraduate,
8 graduate, and general public education, in both formal and
9 informal settings. Research topics may include—

10 (1) learning processes and progressions;

11 (2) knowledge transfer, including curriculum
12 development;

13 (3) uses of technology as teaching and learning
14 tools;

15 (4) integrating STEM fields; and

16 (5) assessment of student learning and program
17 evaluation.

18 (d) ELIGIBILITY.—To be eligible for a fellowship
19 under this section, an individual must—

20 (1) be a United States citizen or national, or an
21 alien lawfully admitted to the United States for per-
22 manent residence, at the time of application; and

23 (2) have received a doctoral degree in one of the
24 STEM fields supported by the Foundation within 3
25 years prior to the fellowship application deadline.

1 (e) OUTREACH.—In carrying out the program under
2 this section, the Director shall conduct outreach efforts
3 to encourage applications from underrepresented groups.

4 **SEC. 243. ROBERT NOYCE TEACHER SCHOLARSHIP PRO-**
5 **GRAM.**

6 (a) MATCHING REQUIREMENT.—Section 10A(h)(1)
7 of the National Science Foundation Authorization Act of
8 2002 (42 U.S.C. 1862n–1a(h)(1)) is amended to read as
9 follows:

10 “(1) IN GENERAL.—An eligible entity receiving
11 a grant under this section shall provide, from non-
12 Federal sources, to carry out the activities supported
13 by the grant—

14 “(A) in the case of grants in an amount of
15 less than \$1,500,000, an amount equal to at
16 least 30 percent of the amount of the grant, at
17 least one half of which shall be in cash; and

18 “(B) in the case of grants in an amount of
19 \$1,500,000 or more, an amount equal to at
20 least 50 percent of the amount of the grant, at
21 least one half of which shall be in cash.”.

22 (b) RETIRING STEM PROFESSIONALS.—Section 10A
23 of the National Science Foundation Authorization Act of
24 2002 (42 U.S.C. 1862n–1a) is amended in subsection

1 (a)(2)(A) by inserting “including retiring professionals in
2 those fields,” after “mathematics professionals,”.

3 **SEC. 244. INSTITUTIONS SERVING PERSONS WITH DISABIL-**
4 **ITIES.**

5 For the purposes of the activities and programs sup-
6 ported by the Foundation, institutions of higher education
7 chartered to serve large numbers of students with disabil-
8 ities, including Gallaudet University, Landmark College,
9 and the National Technical Institute for the Deaf, shall
10 have a designation consistent with the designation for
11 other institutions that serve populations underrepresented
12 in STEM to ensure that institutions of higher education
13 chartered to serve persons with disabilities can benefit
14 from STEM bridge programs and from research partner-
15 ships with major research universities. Nothing in this sec-
16 tion shall be construed to amend or otherwise affect any
17 of the definitions for minority-serving institutions under
18 title III or title V of the Higher Education Act of 1965.

19 **SEC. 245. INSTITUTIONAL INTEGRATION.**

20 (a) INNOVATION THROUGH INSTITUTIONAL INTE-
21 GRATION.—The Director shall award grants for the insti-
22 tutional integration of projects funded by the Foundation
23 with a focus on education, or on broadening participation
24 in STEM by underrepresented groups, for the purpose of
25 increasing collaboration and coordination across funded

1 projects and institutions and expanding the impact of such
2 projects within and among institutions of higher education
3 in an innovative and sustainable manner.

4 (b) PROGRAM ACTIVITIES.—The program under this
5 section shall support integrative activities that involve the
6 strategic and innovative combination of Foundation-fund-
7 ed projects and that provide for—

8 (1) additional opportunities to increase the re-
9 cruitment, retention, and degree attainment of
10 underrepresented groups in STEM disciplines;

11 (2) the inclusion of programming, practices,
12 and policies that encourage the integration of edu-
13 cation and research;

14 (3) seamless transitions from one educational
15 level to another, including from a 2-year to a 4-year
16 institution; and

17 (4) other activities that expand and deepen the
18 impact of Foundation-funded projects with a focus
19 on education, or on broadening participation in
20 STEM by underrepresented groups, and enhance
21 their sustainability.

22 (c) REVIEW CRITERIA.—In selecting recipients of
23 grants under this section, the Director shall consider at
24 a minimum—

1 (1) the extent to which the proposed project ad-
2 dresses the goals of project and program integration
3 and adds value to the existing funded projects;

4 (2) the extent to which there is a proven record
5 of success for the existing projects on which the pro-
6 posed integration project is based; and

7 (3) the extent to which the proposed project ad-
8 dresses the modification of programming, practices,
9 and policies necessary to achieve the purpose de-
10 scribed in subsection (a).

11 (d) **PRIORITY.**—In selecting recipients of grants
12 under this section, the Director shall give priority to pro-
13 posals for which a senior institutional administrator, in-
14 cluding a dean or other administrator of equal or higher
15 rank, serves as the principal investigator.

16 **SEC. 246. POSTDOCTORAL RESEARCH FELLOWSHIPS.**

17 (a) **IN GENERAL.**—The Director shall establish a
18 Foundation-wide postdoctoral research fellowship pro-
19 gram, to award competitive, merit-based postdoctoral re-
20 search fellowships in any field of research supported by
21 the Foundation.

22 (b) **DURATION AND AMOUNT.**—Fellowships may be
23 awarded under this section for a period of up to 3 years
24 in duration. The Director shall determine the amount of
25 the award for a fellowship, which shall include a stipend

1 and a research allowance, and may include an educational
2 allowance.

3 (c) ELIGIBILITY.—To be eligible to receive a fellow-
4 ship under this section, an individual—

5 (1) must be a United States citizen or national,
6 or an alien lawfully admitted to the United States
7 for permanent residence, at the time of application;

8 (2) must have received a doctoral degree in any
9 field of research supported by the Foundation within
10 3 years prior to the fellowship application deadline,
11 or will complete a doctoral degree no more than 1
12 year after the application deadline; and

13 (3) may not have previously received funding as
14 the principal investigator of a research grant from
15 the Foundation, unless such funding was received as
16 a graduate student.

17 (d) PRIORITY.—In evaluating applications for fellow-
18 ships under this section, the Director shall give priority
19 to applications that include—

20 (1) proposals for interdisciplinary research; or

21 (2) proposals for high-risk, high-reward re-
22 search.

23 (e) ADDITIONAL CONSIDERATIONS.—

24 (1) IN GENERAL.—In evaluating applications
25 for fellowships under this section, the Director shall

1 give consideration to the goal of promoting the par-
2 ticipation of individuals identified in section 33 or
3 34 of the Science and Engineering Equal Opportuni-
4 ties Act (42 U.S.C. 1885a or 1885b) and veterans.

5 (2) DEFINITION.—For purposes of this sub-
6 section, the term “veteran” means a person who—

7 (A) served on active duty (other than ac-
8 tive duty for training) in the Armed Forces of
9 the United States for a period of more than
10 180 consecutive days, and who was discharged
11 or released therefrom under conditions other
12 than dishonorable; or

13 (B) served on active duty (other than ac-
14 tive duty for training) in the Armed Forces of
15 the United States and was discharged or re-
16 leased from such service for a service-connected
17 disability before serving 180 consecutive days.

18 For purposes of subparagraph (B), the term “serv-
19 ice-connected” has the meaning given such term
20 under section 101 of title 38, United States Code.

21 (f) NONSUBSTITUTION.—The fellowship program au-
22 thorized under this section is not intended to replace or
23 reduce support for postdoctoral research through existing
24 programs at the Foundation.

1 (g) OUTREACH.—In carrying out the program under
2 this section, the Director shall conduct outreach efforts
3 to encourage applications from underrepresented groups.

4 **SEC. 247. BROADENING PARTICIPATION TRAINING AND**
5 **OUTREACH.**

6 The Director shall provide education and training—

7 (1) to Foundation staff and grant proposal re-
8 view panels on effective mechanisms and tools for
9 broadening participation in STEM by underrep-
10 resented groups, including reviewer selection and
11 mitigation of implicit bias in the review process; and

12 (2) to Foundation staff on related outreach ap-
13 proaches.

14 **SEC. 248. TRANSFORMING UNDERGRADUATE EDUCATION**
15 **IN STEM.**

16 Section 17 of the National Science Foundation Au-
17 thorization Act of 2002 (42 U.S.C. 1862n–6) is amended
18 to read as follows:

19 **“SEC. 17. TRANSFORMING UNDERGRADUATE EDUCATION**
20 **IN STEM.**

21 “(a) IN GENERAL.—The Director shall award grants,
22 on a competitive, merit-reviewed basis, to institutions of
23 higher education (or to consortia thereof) to reform under-
24 graduate STEM education for the purpose of increasing
25 the number and quality of students studying toward and

1 completing baccalaureate degrees in STEM and improving
2 the STEM learning outcomes for all undergraduate stu-
3 dents, including through—

4 “(1) development, implementation, and assess-
5 ment of innovative, research-based approaches to
6 transforming the teaching and learning of discipli-
7 nary or interdisciplinary STEM at the under-
8 graduate level; and

9 “(2) expansion of successful STEM reform ef-
10 forts beyond a single course or group of courses to
11 achieve reform within an entire academic unit, or ex-
12 pansion of successful reform efforts beyond a single
13 academic unit to other STEM academic units within
14 an institution or to comparable academic units at
15 other institutions.

16 “(b) USES OF FUNDS.—Activities supported by
17 grants under this section may include—

18 “(1) creation of multidisciplinary or inter-
19 disciplinary courses or programs that formalize col-
20 laborations for the purpose of improved student in-
21 struction and research in STEM;

22 “(2) expansion of undergraduate STEM re-
23 search opportunities to include interdisciplinary re-
24 search opportunities and research opportunities in

1 industry, at Federal labs, and at international re-
2 search institutions or research sites;

3 “(3) implementation or expansion of bridge pro-
4 grams, including programs that address student
5 transition from 2-year to 4-year institutions, and co-
6 hort, tutoring, or mentoring programs proven to en-
7 hance student recruitment or persistence to degree
8 completion in STEM, including recruitment or per-
9 sistence to degree completion of individuals identi-
10 fied in section 33 or 34 of the Science and Engineer-
11 ing Equal Opportunities Act (42 U.S.C. 1885a or
12 1885b);

13 “(4) improvement of undergraduate STEM
14 education for nonmajors, including education ma-
15 jors;

16 “(5) implementation of evidence-based, tech-
17 nology-driven reform efforts that directly impact un-
18 dergraduate STEM instruction or research experi-
19 ences;

20 “(6) development and implementation of faculty
21 and graduate teaching assistant development pro-
22 grams focused on improved instruction, mentoring,
23 assessment of student learning, and support of un-
24 dergraduate STEM students;

1 “(7) support for graduate students and
2 postdoctoral fellows to participate in instructional or
3 assessment activities at primarily undergraduate in-
4 stitutions;

5 “(8) research on teaching and learning of
6 STEM at the undergraduate level related to the pro-
7 posed reform effort, including assessment and eval-
8 uation of the proposed reform activities, research on
9 scalability and sustainability of approaches to re-
10 form, and development and implementation of longi-
11 tudinal studies of students included in the proposed
12 reform effort; and

13 “(9) support for initiatives that advance the in-
14 tegration of global challenges such as sustainability
15 into disciplinary and interdisciplinary STEM edu-
16 cation.

17 “(c) PARTNERSHIP.—An institution of higher edu-
18 cation may partner with one or more other nonprofit edu-
19 cation or research organizations, including scientific and
20 engineering societies, for the purposes of carrying out the
21 activities authorized under this section.

22 “(d) SELECTION PROCESS.—

23 “(1) APPLICATIONS.—An institution of higher
24 education seeking a grant under this section shall
25 submit an application to the Director at such time,

1 in such manner, and containing such information as
2 the Director may require. The application shall in-
3 clude, at a minimum—

4 “(A) a description of the proposed reform
5 effort;

6 “(B) a description of the research findings
7 that will serve as the basis for the proposed re-
8 form effort or, in the case of applications that
9 propose an expansion of a previously imple-
10 mented reform effort, a description of the pre-
11 viously implemented reform effort, including in-
12 dicators of success such as data on student re-
13 cruitment, persistence to degree completion,
14 and academic achievement;

15 “(C) evidence of institutional support for,
16 and commitment to, the proposed reform effort,
17 including long-term commitment to implement
18 successful strategies from the current reform
19 effort beyond the academic unit or units in-
20 cluded in the grant proposal or to disseminate
21 successful strategies to other institutions;

22 “(D) a description of existing or planned
23 institutional policies and practices regarding
24 faculty hiring, promotion, tenure, and teaching

1 assignment that reward faculty contributions to
2 undergraduate STEM education; and

3 “(E) a description of the plans for assess-
4 ment and evaluation of the proposed reform ac-
5 tivities, including evidence of participation by
6 individuals with experience in assessment and
7 evaluation of teaching and learning programs.

8 “(2) REVIEW OF APPLICATIONS.—In selecting
9 grant recipients under this section, the Director
10 shall consider at a minimum—

11 “(A) the likelihood of success in under-
12 taking the proposed effort at the institution
13 submitting the application, including the extent
14 to which the faculty, staff, and administrators
15 of the institution are committed to making the
16 proposed institutional reform a priority of the
17 participating academic unit or units;

18 “(B) the degree to which the proposed re-
19 form will contribute to change in institutional
20 culture and policy such that a greater value is
21 placed on faculty engagement in undergraduate
22 education;

23 “(C) the likelihood that the institution will
24 sustain or expand the reform beyond the period
25 of the grant; and

1 “(D) the degree to which scholarly assess-
2 ment and evaluation plans are included in the
3 design of the reform effort, including the degree
4 to which such assessment and evaluation con-
5 tribute to the systematic accumulation of
6 knowledge on STEM education.

7 “(3) PRIORITY.—For proposals that include an
8 expansion of existing reform efforts beyond a single
9 academic unit, the Director shall give priority to
10 proposals for which a senior institutional adminis-
11 trator, including a dean or other administrator of
12 equal or higher rank, serves as the principal investi-
13 gator or a coprincipal investigator.

14 “(4) GRANT DISTRIBUTION.—The Director
15 shall ensure, to the extent practicable, that grants
16 awarded under this section are made to a variety of
17 types of institutions of higher education.”.

18 **SEC. 249. TWENTY-FIRST CENTURY GRADUATE EDUCATION.**

19 (a) IN GENERAL.—The Director shall award grants,
20 on a competitive, merit-reviewed basis, to institutions of
21 higher education to implement or expand research-based
22 reforms in master’s and doctoral level STEM education
23 that emphasize preparation for diverse careers utilizing
24 STEM degrees, including at diverse types of institutions

1 of higher education, in industry, and at government agen-
2 cies and research laboratories.

3 (b) USES OF FUNDS.—Activities supported by grants
4 under this section may include—

5 (1) creation of multidisciplinary or interdiscipli-
6 nary courses or programs for the purpose of im-
7 proved student instruction and research in STEM;

8 (2) expansion of graduate STEM research op-
9 portunities to include interdisciplinary research op-
10 portunities and research opportunities in industry,
11 at Federal laboratories, and at international re-
12 search institutions or research sites;

13 (3) development and implementation of future
14 faculty training programs focused on improved in-
15 struction, mentoring, assessment of student learn-
16 ing, and support of undergraduate STEM students;

17 (4) support and training for graduate students
18 to participate in instructional activities beyond the
19 traditional teaching assistantship, and especially as
20 part of ongoing educational reform efforts, including
21 at pre-K–12 schools, informal science education in-
22 stitutions, and primarily undergraduate institutions;

23 (5) creation, improvement, or expansion of in-
24 novative graduate programs such as science master’s
25 degree programs;

1 (6) development and implementation of semi-
2 nars, workshops, and other professional development
3 activities that increase the ability of graduate stu-
4 dents to engage in innovation, technology transfer,
5 and entrepreneurship;

6 (7) development and implementation of semi-
7 nars, workshops, and other professional development
8 activities that increase the ability of graduate stu-
9 dents to effectively communicate their research find-
10 ings to technical audiences outside of their own dis-
11 cipline and to nontechnical audiences;

12 (8) expansion of successful STEM reform ef-
13 forts beyond a single academic unit to other STEM
14 academic units within an institution or to com-
15 parable academic units at other institutions; and

16 (9) research on teaching and learning of STEM
17 at the graduate level related to the proposed reform
18 effort, including assessment and evaluation of the
19 proposed reform activities and research on scalability
20 and sustainability of approaches to reform.

21 (c) PARTNERSHIP.—An institution of higher edu-
22 cation may partner with one or more other nonprofit edu-
23 cation or research organizations, including scientific and
24 engineering societies, for the purposes of carrying out the
25 activities authorized under this section.

1 (d) SELECTION PROCESS.—

2 (1) APPLICATIONS.—An institution of higher
3 education seeking a grant under this section shall
4 submit an application to the Director at such time,
5 in such manner, and containing such information as
6 the Director may require. The application shall in-
7 clude, at a minimum—

8 (A) a description of the proposed reform
9 effort;

10 (B) in the case of applications that propose
11 an expansion of a previously implemented re-
12 form effort at the applicant's institution or at
13 other institutions, a description of the pre-
14 viously implemented reform effort;

15 (C) evidence of institutional support for,
16 and commitment to, the proposed reform effort,
17 including long-term commitment to implement
18 successful strategies from the current reform
19 effort beyond the academic unit or units in-
20 cluded in the grant proposal or to disseminate
21 successful strategies to other institutions; and

22 (D) a description of the plans for assess-
23 ment and evaluation of the grant proposed re-
24 form activities.

1 (2) REVIEW OF APPLICATIONS.—In selecting
2 grant recipients under this section, the Director
3 shall consider at a minimum—

4 (A) the likelihood of success in under-
5 taking the proposed effort at the institution
6 submitting the application, including the extent
7 to which the faculty, staff, and administrators
8 of the institution are committed to making the
9 proposed institutional reform a priority of the
10 participating academic unit or units;

11 (B) the degree to which the proposed re-
12 form will contribute to change in institutional
13 culture and policy such that a greater value is
14 placed on preparing graduate students for di-
15 verse careers utilizing STEM degrees;

16 (C) the likelihood that the institution will
17 sustain or expand the reform beyond the period
18 of the grant; and

19 (D) the degree to which scholarly assess-
20 ment and evaluation plans are included in the
21 design of the reform effort.

22 (e) REPEAL.—Section 7034 of the America COM-
23 PETES Act (42 U.S.C. 1862o–13) is repealed.

1 **SEC. 250. UNDERGRADUATE BROADENING PARTICIPATION**
2 **PROGRAM.**

3 (a) UNDERGRADUATE BROADENING PARTICIPATION
4 PROGRAM.—The Foundation shall continue to support the
5 Historically Black Colleges and Universities Under-
6 graduate Program, the Louis Stokes Alliances for Minor-
7 ity Participation program, and the Tribal Colleges and
8 Universities Program as separate programs at least
9 through September 30, 2011.

10 (b) PLAN.—Prior to any realignment or consolidation
11 of the programs described in subsection (a), in addition
12 to the Hispanic-Serving Institutions Undergraduate Pro-
13 gram required by section 7033 of the America COM-
14 PETES Act (42 U.S.C. 1862o–12), the Director shall de-
15 velop a plan clarifying the objectives and rationale for such
16 changes. The plan shall include a description of how such
17 changes would result in—

18 (1) meeting or strengthening the common goal
19 of the separate programs to increase the number of
20 individuals from underrepresented groups attaining
21 undergraduate STEM degrees; and

22 (2) addressing the unique needs of the different
23 types of minority serving institutions and underrep-
24 resented groups currently provided for by the sepa-
25 rate programs.

1 (c) RECOMMENDATIONS.—In the development of the
2 plan required under subsection (b), the Director shall at
3 a minimum—

4 (1) consider the recommendations and findings
5 of the National Academy of Sciences report required
6 by section 7032 of the America COMPETES Act
7 (Public Law 110–69); and

8 (2) solicit recommendations and feedback from
9 a wide range of stakeholders, including representa-
10 tives from minority serving institutions, other insti-
11 tutions of higher education, and other entities with
12 expertise on effective mechanisms to increase the re-
13 cruitment and retention of members of underrep-
14 resented groups in STEM fields, and the attainment
15 of STEM degrees by underrepresented groups.

16 (d) APPROVAL BY CONGRESS.—The plan developed
17 under this section shall be transmitted to Congress at least
18 3 months prior to the implementation of any realignment
19 or consolidation of the programs described in subsection
20 (a).

21 **SEC. 251. GRAND CHALLENGES IN EDUCATION RESEARCH.**

22 (a) IN GENERAL.—The Director and the Secretary
23 of Education shall collaborate, in consultation with the Di-
24 rector of the National Institutes of Health, in—

1 (1) identifying, prioritizing, and developing
2 strategies to address grand challenges in research
3 and development on the teaching and learning of
4 STEM at the pre-K–12 level, in formal and informal
5 settings, for diverse learning populations, including
6 individuals identified in section 33 or 34 of the
7 Science and Engineering Equal Opportunities Act
8 (42 U.S.C. 1885a or 1885b), and students in rural
9 schools;

10 (2) carrying out research and development to
11 address the grand challenges identified in paragraph
12 (1); and

13 (3) ensuring the dissemination of the results of
14 such research and development.

15 (b) STAKEHOLDER INPUT.—In identifying the grand
16 challenges required in subsection (a), the Director and the
17 Secretary shall—

18 (1) take into consideration critical research
19 gaps identified in existing reports, including reports
20 by the National Academies, on the teaching and
21 learning of STEM at the pre-K–12 level in formal
22 and informal settings; and

23 (2) solicit input from a wide range of stake-
24 holders, including local and State education officials,
25 STEM teachers, STEM education researchers, sci-

1 entific and engineering societies, STEM faculty at
2 institutions of higher education, informal STEM
3 education providers, businesses with a large STEM
4 workforce, and other stakeholders in the teaching
5 and learning of STEM at the pre-K–12 level, and
6 may enter into an arrangement with the National
7 Research Council for these purposes.

8 (c) TOPICS TO CONSIDER.—In identifying the grand
9 challenges required in subsection (a), the Director and the
10 Secretary, in order to provide students with increased ac-
11 cess to rigorous courses of study in STEM, increase the
12 number of students who are prepared for advanced study
13 and careers in STEM, and increase the effective teaching
14 of STEM subjects, shall at a minimum consider the fol-
15 lowing topics:

16 (1) Research on scalability, sustainability, and
17 replication of successful STEM activities, programs,
18 and models, in formal and informal environments.

19 (2) Research that utilizes a systems approach
20 to identifying challenges and opportunities to im-
21 prove the teaching and learning of STEM, including
22 development and evaluation of model systems that
23 support improved teaching and learning of STEM
24 across entire school districts and States, and encom-
25 passing and integrating the teaching and learning of

1 STEM in formal and informal venues, and in K–12
2 schools and institutions of higher education.

3 (3) Research to understand what makes a
4 STEM teacher effective and pre-service and in-serv-
5 ice STEM teacher training and professional develop-
6 ment effective, including development of tools and
7 methodologies to measure STEM teacher effective-
8 ness.

9 (4) Research and development on cyber-enabled
10 tools and programs and television based tools and
11 programs for learning and teaching STEM, includ-
12 ing development of tools and methodologies for as-
13 sessing cyber and television enabled teaching and
14 learning.

15 (5) Research and development on STEM teach-
16 ing and learning in informal environments, including
17 development of tools and methodologies for assessing
18 STEM teaching and learning in informal environ-
19 ments.

20 (6) Research and development on how inte-
21 grating engineering with mathematics and science
22 education may—

23 (A) improve student learning of mathe-
24 matics and science;

1 (B) increase student interest and persist-
2 ence in STEM; or

3 (C) improve student understanding of engi-
4 neering design principles and of the built world.

5 (7) Research to understand what makes hands-
6 on, inquiry-based classroom experiences effective, in-
7 cluding development of tools and methodologies for
8 assessing such experiences.

9 (d) REPORT TO CONGRESS.—Not later than 18
10 months after the date of enactment of this Act, the Direc-
11 tor and the Secretary shall report back to Congress with
12 a description of—

13 (1) the grand challenges identified pursuant to
14 this section;

15 (2) the role of each agency in supporting re-
16 search and development activities to address the
17 grand challenges;

18 (3) the common metrics that will be used to as-
19 sess progress toward meeting the grand challenges;

20 (4) plans for periodically updating the grand
21 challenges;

22 (5) how the agencies will disseminate the re-
23 sults of research and development activities carried
24 out under this section to STEM education practi-
25 tioners, to other Federal agencies that support

1 STEM programs and activities, and to non-Federal
2 funders of STEM education; and

3 (6) how the agencies will support implementa-
4 tion of best practices identified by the research and
5 development activities.

6 **SEC. 252. RESEARCH EXPERIENCES FOR UNDERGRADU-**
7 **ATES.**

8 (a) RESEARCH SITES.—The Director shall award
9 grants, on a merit-reviewed, competitive basis, to institu-
10 tions of higher education, nonprofit organizations, or con-
11 sortia of such institutions and organizations, for sites des-
12 ignated by the Director to provide research experiences for
13 6 or more undergraduate STEM students for sites des-
14 ignated at primarily undergraduate institutions of higher
15 education and 10 or more undergraduate STEM students
16 for all other sites, with consideration given to the goal of
17 promoting the participation of individuals identified in sec-
18 tion 33 or 34 of the Science and Engineering Equal Op-
19 portunities Act (42 U.S.C. 1885a or 1885b). The Director
20 shall ensure that—

21 (1) at least half of the students participating in
22 a program funded by a grant under this subsection
23 at each site shall be recruited from institutions of
24 higher education where research opportunities in
25 STEM are limited, including 2-year institutions;

1 (2) the awards provide undergraduate research
2 experiences in a wide range of STEM disciplines;

3 (3) the awards support a variety of projects, in-
4 cluding independent investigator-led projects, inter-
5 disciplinary projects, and multi-institutional projects
6 (including virtual projects);

7 (4) students participating in each program
8 funded have mentors, including during the academic
9 year to the extent practicable, to help connect the
10 students' research experiences to the overall aca-
11 demic course of study and to help students achieve
12 success in courses of study leading to a bacca-
13 laureate degree in a STEM field;

14 (5) mentors and students are supported with
15 appropriate salary or stipends; and

16 (6) student participants are tracked, for em-
17 ployment and continued matriculation in STEM
18 fields, through receipt of the undergraduate degree
19 and for at least 3 years thereafter.

20 (b) INCLUSION OF UNDERGRADUATES IN STANDARD
21 RESEARCH GRANTS.—The Director shall require that
22 every recipient of a research grant from the Foundation
23 proposing to include 1 or more students enrolled in certifi-
24 cate, associate, or baccalaureate degree programs in car-
25 rying out the research under the grant shall request sup-

1 port, including stipend support, for such undergraduate
2 students as part of the research proposal itself rather than
3 as a supplement to the research proposal, unless such un-
4 dergraduate participation was not foreseeable at the time
5 of the original proposal.

6 **SEC. 253. LABORATORY SCIENCE PILOT PROGRAM.**

7 Section 7026 of the America COMPETES Act (Pub-
8 lic Law 110–69) is amended by striking subsections (d)
9 and (e).

10 **SEC. 254. STEM INDUSTRY INTERNSHIP PROGRAMS.**

11 (a) IN GENERAL.—The Director may award grants,
12 on a competitive, merit-reviewed basis, to institutions of
13 higher education, or consortia thereof, to establish or ex-
14 pand partnerships with local or regional private sector en-
15 tities, for the purpose of providing undergraduate students
16 with integrated internship experiences that connect private
17 sector internship experiences with the students’ STEM
18 coursework. Such partnerships may also include industry
19 or professional associations.

20 (b) PRIORITY.—In awarding grants under this sec-
21 tion, the Director shall give priority to institutions of high-
22 er education or consortia thereof that demonstrate signifi-
23 cant outreach to and coordination with local or regional
24 private sector entities in developing academic courses de-

1 signed to provide students with the skills necessary for em-
2 ployment in local or regional companies.

3 (c) OUTREACH TO RURAL COMMUNITIES.—The
4 Foundation shall conduct outreach to institutions of high-
5 er education and private sector entities in rural areas to
6 encourage those entities to participate in partnerships
7 under this section.

8 (d) COST-SHARE.—The Director shall require a 50
9 percent non-Federal cost-share from partnerships estab-
10 lished or expanded under this section.

11 (e) RESTRICTION.—No Federal funds provided under
12 this section may be used—

13 (1) for the purpose of providing stipends or
14 compensation to students for private sector intern-
15 ships; or

16 (2) as payment or reimbursement to private
17 sector entities, except for institutions of higher edu-
18 cation.

19 (f) REPORT.—Not less than 3 years after the date
20 of enactment of this Act, the Director shall submit a re-
21 port to Congress on the number and total value of awards
22 made under this section, the number of students affected
23 by those awards, any evidence of the effect of those awards
24 on workforce preparation and jobs placement for partici-

1 participating students, and an economic and ethnic breakdown
2 of the participating students.

3 **SEC. 255. TRIBAL COLLEGES AND UNIVERSITIES PROGRAM.**

4 (a) IN GENERAL.—The Director shall continue to
5 support a program to award grants on a competitive,
6 merit-reviewed basis to tribal colleges and universities (as
7 defined in section 316 of the Higher Education Act of
8 1965 (20 U.S.C. 1059c)), including institutions described
9 in section 317 of such Act (20 U.S.C. 1059d), to enhance
10 the quality of undergraduate STEM education at such in-
11 stitutions and to increase the retention and graduation
12 rates of Native American students pursuing associate’s or
13 baccalaureate degrees in STEM.

14 (b) PROGRAM COMPONENTS.—Grants awarded under
15 this section shall support—

16 (1) activities to improve courses and curriculum
17 in STEM;

18 (2) faculty development;

19 (3) stipends for undergraduate students partici-
20 pating in research; and

21 (4) other activities consistent with subsection
22 (a), as determined by the Director.

23 (c) INSTRUMENTATION.—Funding provided under
24 this section may be used for instrumentation.

1 **SEC. 256. CYBER-ENABLED LEARNING FOR NATIONAL**
2 **CHALLENGES.**

3 The Director shall, in consultation with appropriate
4 Federal agencies, identify ways to use cyber-enabled learn-
5 ing to create an innovative STEM workforce and to help
6 retrain and retain our existing STEM workforce to ad-
7 dress national challenges, including national security and
8 competitiveness.

9 **SEC. 257. SENSE OF CONGRESS.**

10 It is the sense of Congress that retaining graduate-
11 level talent trained at American universities in Science,
12 Technology, Engineering, and Mathematics (STEM) fields
13 is critical to enhancing the competitiveness of American
14 businesses.

15 **TITLE III—STEM EDUCATION**

16 **SEC. 301. COORDINATION OF FEDERAL STEM EDUCATION.**

17 (a) **SHORT TITLE.**—This section may be cited as the
18 “STEM Education Coordination Act of 2010”.

19 (b) **DEFINITION.**—In this section, the term “STEM”
20 means science, technology, engineering, and mathematics.

21 (c) **ESTABLISHMENT.**—The Director of the Office of
22 Science and Technology Policy shall establish a committee
23 under the National Science and Technology Council with
24 the responsibility to coordinate Federal programs and ac-
25 tivities in support of STEM education, including at the
26 National Science Foundation, the Department of Energy,

1 the National Aeronautics and Space Administration, the
2 National Oceanic and Atmospheric Administration, the
3 Department of Education, and all other Federal agencies
4 that have programs and activities in support of STEM
5 education.

6 (d) RESPONSIBILITIES OF THE COMMITTEE.—The
7 committee established under subsection (c) shall—

8 (1) coordinate the STEM education activities
9 and programs of the Federal agencies;

10 (2) develop, implement through the partici-
11 pating agencies, and update once every 5 years a 5-
12 year STEM education strategic plan, which shall—

13 (A) specify and prioritize annual and long-
14 term objectives;

15 (B) specify the common metrics that will
16 be used to assess progress toward achieving the
17 objectives;

18 (C) describe the approaches that will be
19 taken by each participating agency to assess the
20 effectiveness of its STEM education programs
21 and activities;

22 (D) with respect to subparagraph (A), de-
23 scribe the role of each agency in supporting
24 programs and activities designed to achieve the
25 objectives;

1 (E) describe the approaches that will be
2 taken by each agency to increase the participa-
3 tion of underrepresented minority groups in
4 STEM studies and careers both for programs
5 specifically designed to broaden participation
6 and for all programs in general, including by
7 providing for programs and activities that in-
8 crease participation by individuals in these
9 groups at all institutions, and by increasing the
10 engagement of Historically Black Colleges and
11 Universities and minority-serving institutions in
12 the STEM education and outreach activities
13 supported by the agencies; and

14 (F) describe the approaches that will be
15 taken by each participating agency to conduct
16 outreach designed to promote widespread public
17 understanding of career opportunities in the
18 STEM fields specific to the workforce needs of
19 each agency, including outreach to women,
20 Latinos, African-Americans, Native Americans,
21 and other students from groups underrep-
22 resented in STEM; and

23 (3) establish, periodically update, and maintain
24 an inventory of federally sponsored STEM education
25 programs and activities, including documentation of

1 assessments of the effectiveness of such programs
2 and activities and rates of participation by underrep-
3 resented minorities in such programs and activities;
4 and

5 (4) establish and maintain a publically acces-
6 sible online database of all federally sponsored
7 STEM education programs and activities at all levels
8 and for all audiences, including students, teachers,
9 and the general public.

10 (e) RESPONSIBILITIES OF OSTP.—The Director of
11 the Office of Science and Technology Policy shall encour-
12 age and monitor the efforts of the participating agencies
13 to ensure that the strategic plan under subsection (d)(2)
14 is developed and executed effectively and that the objec-
15 tives of the strategic plan are met.

16 (f) REPORT.—The Director of the Office of Science
17 and Technology Policy shall transmit a report annually to
18 Congress at the time of the President’s budget request de-
19 scribing the plan required under subsection (d)(2). The
20 annual report shall include—

21 (1) a description of the STEM education pro-
22 grams and activities for the previous and current fis-
23 cal years, and the proposed programs and activities
24 under the President’s budget request, of each par-
25 ticipating Federal agency;

1 (2) the levels of funding for each participating
2 Federal agency for the programs and activities de-
3 scribed under paragraph (1) for the previous fiscal
4 year and under the President’s budget request;

5 (3) except for the initial annual report, a de-
6 scription of the progress made in carrying out the
7 implementation plan, including a description of the
8 outcome of any program assessments completed in
9 the previous year, and any changes made to that
10 plan since the previous annual report; and

11 (4) a description of how the participating Fed-
12 eral agencies will disseminate information about fed-
13 erally supported resources for STEM education
14 practitioners, including teacher professional develop-
15 ment programs, to States and to STEM education
16 practitioners, including to teachers and administra-
17 tors in high-need schools, as defined in section 200
18 of the Higher Education Act of 1965 (20 U.S.C.
19 1021).

20 **SEC. 302. ADVISORY COMMITTEE ON STEM EDUCATION.**

21 (a) **IN GENERAL.**—The President shall establish or
22 designate an advisory committee on science, technology,
23 engineering, and mathematics (STEM) education.

24 (b) **MEMBERSHIP.**—The advisory committee estab-
25 lished or designated by the President under subsection (a)

1 shall be chaired by at least 2 members of the President's
2 Council of Advisors on Science and Technology, with the
3 remaining advisory committee membership consisting of
4 non-Federal members who are specially qualified to pro-
5 vide the President with advice and information on STEM
6 education. Membership of the advisory committee, at a
7 minimum, shall include individuals from the following cat-
8 egories of individuals and organizations:

9 (1) Elementary school and secondary school ad-
10 ministrator associations.

11 (2) STEM educator professional associations.

12 (3) Organizations that provide informal STEM
13 education activities.

14 (4) Institutions of higher education.

15 (5) Scientific and engineering professional soci-
16 eties.

17 (6) Business and industry associations.

18 (7) Foundations that fund STEM education ac-
19 tivities.

20 (c) RESPONSIBILITIES.—The responsibilities of the
21 advisory committee shall include—

22 (1) soliciting input from teachers and adminis-
23 trators in both public and private schools, local edu-
24 cational agencies, States, and other public and pri-
25 vate STEM education stakeholder groups for the

1 purpose of informing the Federal agencies that sup-
2 port STEM education programs on the STEM edu-
3 cation needs of States and school districts, including
4 the unique needs of schools in rural areas;

5 (2) soliciting input from all STEM education,
6 including through the interagency committee estab-
7 lished under section 301, stakeholder groups regard-
8 ing STEM education programs, including STEM
9 education research programs, supported by Federal
10 agencies;

11 (3) providing advice to the Federal agencies, in-
12 cluding through the interagency committee estab-
13 lished under section 301, that support STEM edu-
14 cation programs on how their programs can be bet-
15 ter aligned with the needs of States and school dis-
16 tricts as identified in paragraph (1), consistent with
17 the mission of each agency;

18 (4) offering guidance to the President on cur-
19 rent STEM education activities, research findings,
20 and best practices, with the purpose of increasing
21 connectivity between public and private STEM edu-
22 cation efforts;

23 (5) facilitating improved coordination between
24 federally supported STEM education programs and

1 activities and State level activities, including the ef-
2 forts of P-16 and P-20 councils in the States; and

3 (6) providing advice to Federal agencies on how
4 their STEM technical training and education pro-
5 grams can be better aligned with the workforce
6 needs of States and regions.

7 (d) DEFINITIONS.—For purposes of this section:

8 (1) P-16.—The term “P-16” refers to a system
9 of education that encompasses preschool through un-
10 dergraduate level education.

11 (2) P-20.—The term “P-20” refers to a system
12 of education that encompasses preschool through
13 graduate level education.

14 **SEC. 303. STEM EDUCATION AT THE DEPARTMENT OF EN-**
15 **ERGY.**

16 (a) DEFINITIONS.—Section 5002 of the America
17 COMPETES Act (42 U.S.C. 16531) is amended—

18 (1) by redesignating paragraphs (2) through
19 (4) as paragraphs (3) through (5), respectively; and

20 (2) by inserting after paragraph (1) the fol-
21 lowing new paragraph:

22 “(2) ENERGY SYSTEMS SCIENCE AND ENGI-
23 NEERING.—The term ‘energy systems science and
24 engineering’ means—

1 “(A) nuclear science and engineering, in-
2 cluding—

3 “(i) nuclear engineering;

4 “(ii) nuclear chemistry;

5 “(iii) radiochemistry; and

6 “(iv) health physics;

7 “(B) hydrocarbon system science and engi-
8 neering, including—

9 “(i) petroleum or reservoir engineer-
10 ing;

11 “(ii) environmental geoscience;

12 “(iii) petrophysics;

13 “(iv) geophysics;

14 “(v) geochemistry;

15 “(vi) petroleum geology;

16 “(vii) ocean engineering;

17 “(viii) environmental engineering; and

18 “(ix) carbon capture and sequestra-
19 tion science and engineering;

20 “(C) energy efficiency and renewable en-
21 ergy technology systems science and engineer-
22 ing, including with respect to—

23 “(i) solar technology systems;

24 “(ii) wind technology systems;

25 “(iii) buildings technology systems;

1 “(iv) transportation technology sys-
2 tems;

3 “(v) hydropower systems;

4 “(vi) marine and hydrokinetic tech-
5 nology systems;

6 “(vii) geothermal systems; and

7 “(viii) biomass technology systems;

8 and

9 “(D) energy storage and distribution sys-
10 tems science and engineering, including with re-
11 spect to—

12 “(i) energy storage; and

13 “(ii) energy delivery.”.

14 (b) SCIENCE, TECHNOLOGY, ENGINEERING, AND
15 MATHEMATICS EDUCATION PROGRAMS.—Subpart B of
16 the Department of Energy Science Education Enhance-
17 ment Act (42 U.S.C. 7381g et seq.) is amended—

18 (1) in section 3170—

19 (A) by amending paragraph (1) to read as
20 follows:

21 “(1) DIRECTOR.—The term ‘Director’ means
22 the Director of STEM Education appointed or des-
23 ignated under section 3171(c)(1).”;

24 (B) by redesignating paragraph (2) as
25 paragraph (3);

1 (C) by inserting after paragraph (1) the
2 following new paragraph:

3 “(2) ENERGY SYSTEMS SCIENCE AND ENGI-
4 NEERING.—The term ‘energy systems science and
5 engineering’ means—

6 “(A) nuclear science and engineering, in-
7 cluding—

8 “(i) nuclear engineering;

9 “(ii) nuclear chemistry;

10 “(iii) radiochemistry; and

11 “(iv) health physics;

12 “(B) hydrocarbon system science and engi-
13 neering, including—

14 “(i) petroleum or reservoir engineer-
15 ing;

16 “(ii) environmental geoscience;

17 “(iii) petrophysics;

18 “(iv) geophysics;

19 “(v) geochemistry;

20 “(vi) petroleum geology;

21 “(vii) ocean engineering;

22 “(viii) environmental engineering; and

23 “(ix) carbon capture and sequestra-
24 tion science and engineering;

1 “(C) energy efficiency and renewable en-
2 ergy technology systems science and engineer-
3 ing, including with respect to—

4 “(i) solar technology systems;

5 “(ii) wind technology systems;

6 “(iii) buildings technology systems;

7 “(iv) transportation technology sys-
8 tems;

9 “(v) hydropower systems;

10 “(vi) marine and hydrokinetic tech-
11 nology systems;

12 “(vii) geothermal systems; and

13 “(viii) biomass technology systems;

14 and

15 “(D) energy storage and distribution sys-
16 tems science and engineering, including with re-
17 spect to—

18 “(i) energy storage; and

19 “(ii) energy delivery.”; and

20 (D) by adding at the end the following new
21 paragraph:

22 “(4) STEM.—The term ‘STEM’ means science,
23 technology, engineering, and mathematics.”;

24 (2) by striking chapters 1, 2, 3, 4, and 6;

1 (3) by inserting after section 3170 the following
2 new chapter:

3 **“CHAPTER 1—STEM EDUCATION**

4 **“SEC. 3171. STEM EDUCATION.**

5 “(a) IN GENERAL.—The Secretary of Energy shall
6 develop, conduct, support, promote, and coordinate formal
7 and informal educational activities that leverage the De-
8 partment’s unique content expertise and facilities to con-
9 tribute to improving STEM education at all levels in the
10 United States, and to enhance awareness and under-
11 standing of STEM, including energy sciences, in order to
12 create a diverse skilled scientific and technical workforce
13 essential to meeting the challenges facing the Department
14 and the Nation in the 21st century.

15 “(b) PROGRAMS.—The Secretary shall carry out evi-
16 dence-based programs designed to increase student inter-
17 est and participation, including by women and underrep-
18 resented minority students, improve public literacy and
19 support, and improve the teaching and learning of energy
20 systems science and engineering and other STEM dis-
21 ciplines supported by the Department. Programs author-
22 ized under this subsection may include—

23 “(1) informal educational programming de-
24 signed to excite and inspire students and the general
25 public about energy systems science and engineering

1 and other STEM disciplines supported by the De-
2 partment, while strengthening their content knowl-
3 edge in these fields;

4 “(2) teacher training and professional develop-
5 ment opportunities for pre-service and in-service ele-
6 mentary and secondary teachers designed to increase
7 the content knowledge of teachers in energy systems
8 science and engineering and other STEM disciplines
9 supported by the Department, including through
10 hands-on research experiences;

11 “(3) research opportunities for secondary school
12 students, including internships at the National Lab-
13 oratories, that provide secondary school students
14 with hands-on research experiences as well as expo-
15 sure to working scientists;

16 “(4) research opportunities at the National
17 Laboratories for undergraduate and graduate stu-
18 dents pursuing degrees in energy systems science
19 and engineering and other STEM disciplines sup-
20 ported by the Department;

21 “(5) competitive scholarships, fellowships, and
22 traineeships for undergraduate and graduate stu-
23 dents in energy systems science and engineering and
24 other STEM disciplines supported by the Depart-
25 ment;

1 “(6) competitive grants for institutions of high-
2 er education (as defined under section 101(a) of the
3 Higher Education Act of 1965 (20 U.S.C.
4 1001(a))), including 2-year institutions of higher
5 education, to establish or expand degree programs or
6 courses in energy systems science and engineering;
7 and

8 “(7) professional training for energy auditors,
9 field technicians, and building contractors, in the
10 areas of building energy retrofits and audits or re-
11 lated renewable energy technology installations.

12 “(c) ORGANIZATION OF STEM EDUCATION PRO-
13 GRAMS.—

14 “(1) DIRECTOR OF STEM EDUCATION.—The
15 Secretary shall appoint or designate a Director of
16 STEM Education, who shall have the principal re-
17 sponsibility to oversee and coordinate all programs
18 and activities of the Department in support of
19 STEM education, including energy systems science
20 and engineering education, across all functions of
21 the Department.

22 “(2) QUALIFICATIONS.—The Director shall be
23 an individual, who by reason of professional back-
24 ground and experience, is specially qualified to ad-
25 vise the Secretary on all matters pertaining to

1 STEM education, including energy systems science
2 and engineering education, at the Department.

3 “(3) DUTIES.—The Director shall—

4 “(A) oversee and coordinate all programs
5 in support of STEM education, including en-
6 ergy systems science and engineering education,
7 across all functions of the Department;

8 “(B) represent the Department as the
9 principal interagency liaison for all STEM edu-
10 cation programs, unless otherwise represented
11 by the Secretary, the Under Secretary for
12 Science, or the Under Secretary for Energy;

13 “(C) prepare the annual budget and advise
14 the Under Secretary for Science and the Under
15 Secretary for Energy on all budgetary issues for
16 STEM education, including energy systems
17 science and engineering education, relative to
18 the programs of the Department;

19 “(D) establish, periodically update, and
20 maintain a publicly accessible online inventory
21 of STEM education programs and activities, in-
22 cluding energy systems science and engineering
23 education programs and activities;

1 “(E) develop, implement, and update the
2 Department of Energy STEM education stra-
3 tegic plan, as required by subsection (d);

4 “(F) increase, to the maximum extent
5 practicable, the participation and advancement
6 of women and underrepresented minorities at
7 every level of STEM education, including en-
8 ergy systems science and engineering education;
9 and

10 “(G) perform such other matters relating
11 to STEM education as are required by the Sec-
12 retary, the Under Secretary for Science, or the
13 Under Secretary for Energy.

14 “(d) DEPARTMENT OF ENERGY STEM EDUCATION
15 STRATEGIC PLAN.—The Director of STEM education ap-
16 pointed or designated under subsection (c)(1) shall de-
17 velop, implement, and update once every 3 years a 3-year
18 STEM education strategic plan for the Department, which
19 shall—

20 “(1) identify and prioritize annual and long-
21 term STEM education goals and objectives for the
22 Department that are aligned with the overall goals
23 of the National Science and Technology Council
24 Committee on STEM Education Strategic plan re-

1 required under section 301(d)(2) of the STEM Edu-
2 cation Coordination Act of 2010;

3 “(2) describe the role of each program or activ-
4 ity of the Department in contributing to the goals
5 and objectives identified under paragraph (1);

6 “(3) specify the metrics that will be used to as-
7 sess progress toward achieving those goals and ob-
8 jectives; and

9 “(4) describe the approaches that will be taken
10 to assess the effectiveness of each STEM education
11 program and activity supported by the Department.

12 “(e) OUTREACH TO STUDENTS FROM UNDERREP-
13 RESENTED GROUPS.—In carrying out a program author-
14 ized under this section, the Secretary shall give consider-
15 ation to the goal of promoting the participation of individ-
16 uals identified in section 33 or 34 of the Science and Engi-
17 neering Equal Opportunities Act (42 U.S.C. 1885a or
18 1885b).

19 “(f) CONSULTATION AND PARTNERSHIP WITH
20 OTHER AGENCIES.—In carrying out the programs and ac-
21 tivities authorized under this section, the Secretary shall—

22 “(1) consult with the Secretary of Education
23 and the Director of the National Science Foundation
24 regarding activities designed to improve elementary
25 and secondary STEM education; and

1 “(2) consult and partner with the Director of
2 the National Science Foundation in carrying out
3 programs under this section designed to build capac-
4 ity in STEM education at the undergraduate and
5 graduate level, including by supporting excellent pro-
6 posals in energy systems science and engineering
7 that are submitted for funding to the Foundation’s
8 Advanced Technological Education Program.”; and

9 (4) in section 3191—

10 (A) in subsection (a)—

11 (i) by striking “web-based” and in-
12 serting “, through a publicly available
13 website,”; and

14 (ii) by inserting “and project-based
15 learning opportunities” after “laboratory
16 experiments”;

17 (B) in subsection (b)(1), by inserting “, in-
18 cluding energy systems science and engineer-
19 ing” after “the science of energy”; and

20 (C) by striking subsection (d).

21 (c) ENERGY APPLIED SCIENCE TALENT EXPANSION
22 PROGRAM FOR INSTITUTIONS OF HIGHER EDUCATION.—

23 (1) AMENDMENT.—Strike sections 5004 and
24 5005 of the America COMPETES Act (42 U.S.C.

1 16532 and 16533) and insert the following new sec-
2 tion:

3 **“SEC. 5004. ENERGY APPLIED SCIENCE TALENT EXPANSION**
4 **PROGRAM FOR INSTITUTIONS OF HIGHER**
5 **EDUCATION.**

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

7 “(1) to address the decline in the number of
8 and resources available to energy systems science
9 and engineering programs at institutions of higher
10 education, including community colleges; and

11 “(2) to increase the number of graduates with
12 degrees in energy systems science and engineering,
13 an area of strategic importance to the economic
14 competitiveness and energy security of the United
15 States.

16 “(b) ESTABLISHMENT.—The Secretary shall award
17 grants, on a competitive, merit-reviewed basis, to institu-
18 tions of higher education to implement or expand the en-
19 ergy systems science and engineering educational and
20 technical training capabilities of the institution, and to
21 provide merit-based financial support for master’s and
22 doctoral level students pursuing courses of study and re-
23 search in energy systems sciences and engineering.

1 “(c) USE OF FUNDS.—An institution of higher edu-
2 cation that receives a grant under this section may use
3 the grant to—

4 “(1) provide traineeships, including stipends
5 and cost of education allowances, to master’s and
6 doctoral students;

7 “(2) develop or expand multidisciplinary or
8 interdisciplinary courses or programs;

9 “(3) recruit and retain new faculty;

10 “(4) develop or improve core and specialized
11 course content;

12 “(5) encourage interdisciplinary and multidisci-
13 plinary research collaborations;

14 “(6) support outreach efforts to recruit stu-
15 dents, including individuals identified in section 33
16 or 34 of the Science and Engineering Equal Oppor-
17 tunities Act (42 U.S.C. 1885a or 1885b); and

18 “(7) pursue opportunities for collaboration with
19 industry and National Laboratories.

20 “(d) CRITERIA.—Criteria for awarding a grant under
21 this section shall be based on—

22 “(1) the potential to attract new students to the
23 program;

24 “(2) academic rigor; and

1 “(3) the ability to offer hands-on education and
2 training opportunities for graduate students in the
3 emerging areas of energy systems science and engi-
4 neering.

5 “(e) PRIORITY.—The Secretary shall give priority to
6 proposals that involve active partnerships with a National
7 Laboratory or other energy systems science and engineer-
8 ing related entity, as determined by the Secretary.

9 “(f) DURATION AND AMOUNT.—

10 “(1) DURATION.—A grant under this section
11 may be for up to 5 years in duration.

12 “(2) AMOUNT.—An institution of higher edu-
13 cation that receives a grant under this section shall
14 be eligible for up to \$1,000,000 for each year of the
15 grant period.

16 “(g) AUTHORIZATION OF APPROPRIATIONS.—There
17 are authorized to be appropriated to the Secretary to carry
18 out this section—

19 “(1) \$30,000,000 for fiscal year 2011;

20 “(2) \$32,000,000 for fiscal year 2012;

21 “(3) \$36,000,000 for fiscal year 2013;

22 “(4) \$38,000,000 for fiscal year 2014; and

23 “(5) \$40,000,000 for fiscal year 2015.”.

24 “(2) CONFORMING AMENDMENT.—The table of
25 contents for the America COMPETES Act is

1 amended by striking the items relating to sections
2 5004 and 5005 and inserting the following:

Sec. 5004. Energy applied science talent expansion program for institutions of
higher education.

3 (d) DEPARTMENT OF ENERGY EARLY CAREER
4 AWARDS FOR SCIENCE, ENGINEERING, AND MATHE-
5 MATICS RESEARCHERS.—Section 5006 of the America
6 COMPETES Act (42 U.S.C. 16534) is amended—

7 (1) in subsection (a), by striking “Director of
8 the Office” and all that follows through “shall
9 carry” and inserting “Secretary shall carry”;

10 (2) in subsection (b)(1)—

11 (A) in subparagraph (A), by inserting “per
12 year” after “\$80,000”; and

13 (B) in subparagraph (B), by striking
14 “\$125,000” and inserting “\$175,000 per year”;

15 (3) in subsection (c)(1), by striking “, as deter-
16 mined by the Director”;

17 (4) in subsections (c)(2), (e), (f), and (g), by
18 striking “Director” each place it appears and insert-
19 ing “Secretary”;

20 (5) in subsection (d), by striking “merit-re-
21 viewed” and inserting “merit-based, peer reviewed”;
22 and

23 (6) in subsection (h)—

1 (A) by striking “, acting through the Di-
2 rector,”; and

3 (B) by striking “\$25,000,000 for each of
4 fiscal years 2008 through 2010” and inserting
5 “such sums as are necessary”.

6 (e) PROTECTING AMERICA’S COMPETITIVE EDGE
7 (PACE) GRADUATE FELLOWSHIP PROGRAM.—Section
8 5009 of the America COMPETES Act (42 U.S.C. 16536)
9 is amended—

10 (1) in subsection (c)—

11 (A) in paragraph (1), by striking “involv-
12 ing written and oral interviews, that will result
13 in a wide distribution of awards throughout the
14 United States,”; and

15 (B) in paragraph (2)(B)(iv), by striking
16 “verbal and”;

17 (2) in subsection (d)(1)(B)(i), by inserting
18 “partial or full” before “graduate tuition”; and

19 (3) by striking subsection (f).

20 (f) REPEAL.—Section 3164 of the Department of En-
21 ergy Science Education Enhancement Act (42 U.S.C.
22 7381a) is repealed.

23 **SEC. 304. GREEN ENERGY EDUCATION.**

24 (a) SHORT TITLE.—This section may be cited as the
25 “Green Energy Education Act of 2010”.

1 (b) DEFINITION.—For the purposes of this section:

2 (1) DIRECTOR.—The term “Director” means
3 the Director of the National Science Foundation.

4 (2) HIGH PERFORMANCE BUILDING.—The term
5 “high performance building” has the meaning given
6 that term in section 914(a) of the Energy Policy Act
7 of 2005 (42 U.S.C. 16194(a)).

8 (c) GRADUATE TRAINING IN ENERGY RESEARCH
9 AND DEVELOPMENT.—

10 (1) FUNDING.—In carrying out research, devel-
11 opment, demonstration, and commercial application
12 activities authorized for the Department of Energy,
13 the Secretary may contribute funds to the National
14 Science Foundation for the Integrative Graduate
15 Education and Research Traineeship program to
16 support projects that enable graduate education re-
17 lated to such activities.

18 (2) CONSULTATION.—The Director shall con-
19 sult with the Secretary when preparing solicitations
20 and awarding grants for projects described in para-
21 graph (1).

22 (d) CURRICULUM DEVELOPMENT FOR HIGH PER-
23 FORMANCE BUILDING DESIGN.—

24 (1) FUNDING.—In carrying out advanced en-
25 ergy technology research, development, demonstra-

1 tion, and commercial application activities author-
2 ized for the Department of Energy related to high
3 performance buildings, the Secretary may contribute
4 funds to curriculum development activities at the
5 National Science Foundation for the purpose of im-
6 proving undergraduate or graduate interdisciplinary
7 engineering and architecture education related to the
8 design and construction of high performance build-
9 ings, including development of curricula, of labora-
10 tory activities, of training practicums, or of design
11 projects. A primary goal of curriculum development
12 activities supported under this subsection shall be to
13 improve the ability of engineers, architects, land-
14 scape architects, and planners to work together on
15 the incorporation of advanced energy technologies
16 during the design and construction of high perform-
17 ance buildings.

18 (2) CONSULTATION.—The Director shall con-
19 sult with the Secretary when preparing solicitations
20 and awarding grants for projects described in para-
21 graph (1).

22 (3) PRIORITY.—In awarding grants with re-
23 spect to which the Secretary has contributed funds
24 under this subsection, the Director shall give priority
25 to applications from departments, programs, or cen-

1 ters of a school of engineering that are partnered
2 with schools, departments, or programs of design,
3 architecture, landscape architecture, and city, re-
4 gional, or urban planning.

5 **SEC. 305. SENSE OF CONGRESS.**

6 It is the Sense of Congress that—

7 (1) in order to maintain our Nation’s competi-
8 tiveness, we must improve the quality of STEM edu-
9 cation in the Nation;

10 (2) the incorporation of engineering education
11 at the elementary and secondary levels has the po-
12 tential to improve student learning and achievement
13 in science and mathematics, and to increase the
14 technological literacy of all students;

15 (3) formal and informal educational providers,
16 including K–12 schools, should integrate engineering
17 design principles into their curriculum; and

18 (4) exposing elementary and secondary students
19 to engineering education can expand students’ un-
20 derstanding of engineering and their awareness of
21 career opportunities in these fields.

22 **SEC. 306. SENSE OF CONGRESS.**

23 For science, technology, engineering, and mathe-
24 matics (STEM) education programs or activities author-
25 ized under this Act or amendments made by this Act, it

1 is the sense of Congress that when more than 1 applicant
2 is competing for the same grant and the applications from
3 each applicant are considered equal in merit by the grant-
4 awarding authority, the grant-awarding authority shall
5 give additional consideration to any of the following:

6 (1) An applicant that has not previously re-
7 ceived funding.

8 (2) An applicant that is an institution of higher
9 education in a rural area.

10 **SEC. 307. NATIONAL ACADEMY OF SCIENCES REPORT ON**
11 **STRENGTHENING THE CAPACITY OF 2-YEAR**
12 **INSTITUTIONS OF HIGHER EDUCATION TO**
13 **PROVIDE STEM OPPORTUNITIES.**

14 Not later than 6 months after the date of enactment
15 of this Act, the Office of Science and Technology Policy
16 shall enter into a contract with the National Academy of
17 Sciences to carry out a study evaluating the role of 2-year
18 institutions of higher education as STEM educators, in-
19 cluding in the preparation of students for direct entry into
20 the STEM workforce and in preparation of students for
21 transition into 4-year STEM degree programs, as well as
22 the role of the Federal Government in helping 2-year insti-
23 tutions of higher education build their capacity to be effec-
24 tive STEM educators. At a minimum, the report shall in-
25 clude—

1 (1) an evaluation of the current capacity of 2-
2 year institutions of higher education to be effective
3 STEM educators, including in the preparation of
4 students for direct entry into the STEM workforce
5 and for transition into 4-year STEM degree pro-
6 grams;

7 (2) a description of existing challenges to ex-
8 panding opportunities for 2-year institutions of high-
9 er education to provide and enhance STEM learning
10 and provide STEM degrees that prepare students
11 well for direct entry into the STEM workforce or for
12 transition into 4-year degree programs;

13 (3) identification and description of Federal
14 programs that have successfully strengthened the ca-
15 pacity of 2-year institutions of higher education to
16 provide and enhance STEM opportunities;

17 (4) a recommendation or recommendations re-
18 garding how Federal agencies should set priorities
19 for supporting STEM education at 2-year institu-
20 tions of higher education;

21 (5) a recommendation or recommendations re-
22 garding ways Federal agencies can provide increased
23 opportunities for 2-year institutions of higher edu-
24 cation to participate across their portfolios of STEM
25 education and research programs, including—

1 (A) ways to engage 2-year institution of
2 higher education faculty and students with re-
3 search experiences;

4 (B) strategies for improving the cur-
5 riculum and teaching of developmental mathe-
6 matics given that many 2-year institutions of
7 higher education provide remediation in mathe-
8 matics and other STEM coursework; and

9 (C) enhancing the basic scientific labora-
10 tory infrastructure; and

11 (6) a recommendation or recommendations re-
12 garding the need for and appropriateness of new
13 Federal programs in support of STEM education at
14 2-year institutions of higher education.

15 **SEC. 308. ENCOURAGING FEDERAL SCIENTISTS AND ENGI-**
16 **NEERS TO PARTICIPATE IN STEM EDU-**
17 **CATION.**

18 Not later than 6 months after the date of enactment
19 of this Act, the Director of the Office of Science and Tech-
20 nology Policy, in consultation with the Department of
21 Education, shall develop a policy to—

22 (1) increase volunteerism in STEM education
23 activities by encouraging scientists and engineers
24 from Federal science agencies conducting non-
25 military scientific research and development, includ-

1 ing scientists and engineers of the federally funded
2 research and development centers supported by
3 those agencies, to volunteer in STEM education ac-
4 tivities, and by providing administrative support for
5 such scientists and engineers to engage in such vol-
6 unteerism; and

7 (2) support increased communication and part-
8 nerships between scientists and engineers from Fed-
9 eral science agencies conducting nonmilitary sci-
10 entific research and development, including scientists
11 and engineers of the federally funded research and
12 development centers supported by those agencies,
13 and elementary and secondary schools and teachers
14 through volunteerism in STEM education activities.

15 **TITLE IV—NATIONAL INSTITUTE**
16 **OF STANDARDS AND TECH-**
17 **NOLOGY**

18 **SEC. 401. SHORT TITLE.**

19 This title may be cited as the “National Institute of
20 Standards and Technology Authorization Act of 2010”.

21 **SEC. 402. AUTHORIZATION OF APPROPRIATIONS.**

22 (a) FISCAL YEAR 2011.—

23 (1) IN GENERAL.—There are authorized to be
24 appropriated to the Secretary of Commerce

1 \$991,100,000 for the National Institute of Stand-
2 ards and Technology for fiscal year 2011.

3 (2) SPECIFIC ALLOCATIONS.—Of the amount
4 authorized under paragraph (1)—

5 (A) \$620,000,000 shall be authorized for
6 scientific and technical research and services
7 laboratory activities;

8 (B) \$125,000,000 shall be authorized for
9 the construction and maintenance of facilities;
10 and

11 (C) \$246,100,000 shall be authorized for
12 industrial technology services activities, of
13 which—

14 (i) \$95,000,000 shall be authorized
15 for the Technology Innovation Program
16 under section 28 of the National Institute
17 of Standards and Technology Act (15
18 U.S.C. 278n);

19 (ii) \$141,100,000 shall be authorized
20 for the Manufacturing Extension Partner-
21 ship program under sections 25 and 26 of
22 such Act (15 U.S.C. 278k and 278l); and

23 (iii) \$10,000,000 shall be authorized
24 for the Malcolm Baldrige National Quality
25 Award program under section 17 of the

1 Stevenson-Wydler Technology Innovation
2 Act of 1980 (15 U.S.C. 3711a).

3 (b) FISCAL YEAR 2012.—

4 (1) IN GENERAL.—There are authorized to be
5 appropriated to the Secretary of Commerce
6 \$992,400,000 for the National Institute of Stand-
7 ards and Technology for fiscal year 2012.

8 (2) SPECIFIC ALLOCATIONS.—Of the amount
9 authorized under paragraph (1)—

10 (A) \$657,200,000 shall be authorized for
11 scientific and technical research and services
12 laboratory activities;

13 (B) \$85,000,000 shall be authorized for
14 the construction and maintenance of facilities;
15 and

16 (C) \$250,200,000 shall be authorized for
17 industrial technology services activities, of
18 which—

19 (i) \$89,000,000 shall be authorized
20 for the Technology Innovation Program
21 under section 28 of the National Institute
22 of Standards and Technology Act (15
23 U.S.C. 278n);

24 (ii) \$150,900,000 shall be authorized
25 for the Manufacturing Extension Partner-

1 ship program under sections 25 and 26 of
2 such Act (15 U.S.C. 278k and 278l); and
3 (iii) \$10,300,000 shall be authorized
4 for the Malcolm Baldrige National Quality
5 Award program under section 17 of the
6 Stevenson-Wydler Technology Innovation
7 Act of 1980 (15 U.S.C. 3711a).

8 (c) FISCAL YEAR 2013.—

9 (1) IN GENERAL.—There are authorized to be
10 appropriated to the Secretary of Commerce
11 \$1,079,809,000 for the National Institute of Stand-
12 ards and Technology for fiscal year 2013.

13 (2) SPECIFIC ALLOCATIONS.—Of the amount
14 authorized under paragraph (1)—

15 (A) \$696,700,000 shall be authorized for
16 scientific and technical research and services
17 laboratory activities;

18 (B) \$122,000,000 shall be authorized for
19 the construction and maintenance of facilities;
20 and

21 (C) \$261,109,000 shall be authorized for
22 industrial technology services activities, of
23 which—

24 (i) \$89,000,000 shall be authorized
25 for the Technology Innovation Program

1 under section 28 of the National Institute
2 of Standards and Technology Act (15
3 U.S.C. 278n);

4 (ii) \$161,500,000 shall be authorized
5 for the Manufacturing Extension Partner-
6 ship program under sections 25 and 26 of
7 such Act (15 U.S.C. 278k and 278l); and

8 (iii) \$10,609,000 shall be authorized
9 for the Malcolm Baldrige National Quality
10 Award program under section 17 of the
11 Stevenson-Wydler Technology Innovation
12 Act of 1980 (15 U.S.C. 3711a).

13 (d) FISCAL YEAR 2014.—

14 (1) IN GENERAL.—There are authorized to be
15 appropriated to the Secretary of Commerce
16 \$1,126,227,000 for the National Institute of Stand-
17 ards and Technology for fiscal year 2014.

18 (2) SPECIFIC ALLOCATIONS.—Of the amount
19 authorized under paragraph (1)—

20 (A) \$738,500,000 shall be authorized for
21 scientific and technical research and services
22 laboratory activities;

23 (B) \$124,000,000 shall be authorized for
24 the construction and maintenance of facilities;
25 and

1 (C) \$263,727,000 shall be authorized for
2 industrial technology services activities, of
3 which—

4 (i) \$80,000,000 shall be authorized
5 for the Technology Innovation Program
6 under section 28 of the National Institute
7 of Standards and Technology Act (15
8 U.S.C. 278n);

9 (ii) \$172,800,000 shall be authorized
10 for the Manufacturing Extension Partner-
11 ship program under sections 25 and 26 of
12 such Act (15 U.S.C. 278k and 278l); and

13 (iii) \$10,927,000 shall be authorized
14 for the Malcolm Baldrige National Quality
15 Award program under section 17 of the
16 Stevenson-Wydler Technology Innovation
17 Act of 1980 (15 U.S.C. 3711a).

18 (e) FISCAL YEAR 2015.—

19 (1) IN GENERAL.—There are authorized to be
20 appropriated to the Secretary of Commerce
21 \$1,191,955,000 for the National Institute of Stand-
22 ards and Technology for fiscal year 2015.

23 (2) SPECIFIC ALLOCATIONS.—Of the amount
24 authorized under paragraph (1)—

1 (A) \$782,800,000 shall be authorized for
2 scientific and technical research and services
3 laboratory activities;

4 (B) \$133,000,000 shall be authorized for
5 the construction and maintenance of facilities;
6 and

7 (C) \$276,155,000 shall be authorized for
8 industrial technology services activities, of
9 which—

10 (i) \$80,000,000 shall be authorized
11 for the Technology Innovation Program
12 under section 28 of the National Institute
13 of Standards and Technology Act (15
14 U.S.C. 278n);

15 (ii) \$184,900,000 shall be authorized
16 for the Manufacturing Extension Partner-
17 ship program under sections 25 and 26 of
18 such Act (15 U.S.C. 278k and 278l); and

19 (iii) \$11,255,000 shall be authorized
20 for the Malcolm Baldrige National Quality
21 Award program under section 17 of the
22 Stevenson-Wydler Technology Innovation
23 Act of 1980 (15 U.S.C. 3711a).

1 **SEC. 403. UNDER SECRETARY OF COMMERCE FOR STAND-**
2 **ARDS AND TECHNOLOGY.**

3 (a) ESTABLISHMENT.—Section 4 of the National In-
4 stitute of Standards and Technology Act is amended to
5 read as follows:

6 **“SEC. 4. UNDER SECRETARY OF COMMERCE FOR STAND-**
7 **ARDS AND TECHNOLOGY.**

8 “(a) ESTABLISHMENT.—There shall be in the De-
9 partment of Commerce an Under Secretary of Commerce
10 for Standards and Technology (in this section referred to
11 as the ‘Under Secretary’).

12 “(b) APPOINTMENT.—The Under Secretary shall be
13 appointed by the President by and with the advice and
14 consent of the Senate.

15 “(c) COMPENSATION.—The Under Secretary shall be
16 compensated at the rate in effect for level III of the Exec-
17 utive Schedule under section 5314 of title 5, United States
18 Code.

19 “(d) DUTIES.—The Under Secretary shall serve as
20 the Director of the Institute and shall perform such duties
21 as required of the Director by the Secretary under this
22 Act or by law.

23 “(e) APPLICABILITY.—The individual serving as the
24 Director of the Institute on the date of enactment of the
25 National Institute of Standards and Technology Author-
26 ization Act of 2010 shall also serve as the Under Secretary

1 until such time as a successor is appointed under sub-
2 section (b).”.

3 (b) CONFORMING AMENDMENTS.—

4 (1) TITLE 5, UNITED STATES CODE.—

5 (A) LEVEL III.—Section 5314 of title 5,
6 United States Code, is amended by inserting
7 before the item “Associate Attorney General”
8 the following:

9 “Under Secretary of Commerce for Standards
10 and Technology, who also serves as Director of the
11 National Institute of Standards and Technology.”.

12 (B) LEVEL IV.—Section 5315 of title 5,
13 United States Code, is amended by striking
14 “Director, National Institute of Standards and
15 Technology, Department of Commerce.”.

16 (2) NATIONAL INSTITUTE OF STANDARDS AND
17 TECHNOLOGY ACT.—Section 5 of the National Insti-
18 tute of Standards and Technology Act (15 U.S.C.
19 274) is amended by striking the first, fifth, and
20 sixth sentences.

21 **SEC. 404. REORGANIZATION OF NIST LABORATORIES.**

22 (a) ORGANIZATION.—The Director shall reorganize
23 the scientific and technical research and services labora-
24 tory program into the following operational units:

1 (1) The Physical Measurement Laboratory,
2 whose mission is to realize and disseminate the na-
3 tional standards for length, mass, time and fre-
4 quency, electricity, temperature, force, and radiation
5 by activities including fundamental research in
6 measurement science, the provision of measurement
7 services and standards, and the provision of testing
8 facilities resources for use by the Federal Govern-
9 ment.

10 (2) The Information Technology Laboratory,
11 whose mission is to develop and disseminate stand-
12 ards, measurements, and testing capabilities for
13 interoperability, security, usability, and reliability of
14 information technologies, including cyber security
15 standards and guidelines for Federal agencies,
16 United States industry, and the public, through fun-
17 damental and applied research in computer science,
18 mathematics, and statistics.

19 (3) The Engineering Laboratory, whose mission
20 is to develop and disseminate advanced manufac-
21 turing and construction technologies to the United
22 States manufacturing and construction industries
23 through activities including measurement science re-
24 search, performance metrics, tools for engineering
25 applications, and promotion of standards adoption.

1 (4) The Material Measurement Laboratory,
2 whose mission is to serve as the national reference
3 laboratory in biological, chemical, and material
4 sciences and engineering through activities including
5 fundamental research in the composition, structure,
6 and properties of biological and environmental mate-
7 rials and processes, the development of certified ref-
8 erence materials and critically evaluated data, and
9 other programs to assure measurement quality in
10 materials and biotechnology fields.

11 (5) The Center for Nanoscale Science and
12 Technology, a national shared-use facility for
13 nanoscale fabrication and measurement, whose mis-
14 sion is to develop innovative nanoscale measurement
15 and fabrication capabilities to support researchers
16 from industry, institutions of higher education, the
17 National Institute of Standards and Technology, and
18 other Federal agencies in nanoscale technology from
19 discovery to production.

20 (6) The NIST Center for Neutron Research, a
21 national user facility, whose mission is to provide
22 neutron-based measurement capabilities to research-
23 ers from industry, institutions of higher education,
24 the National Institute of Standards and Technology,
25 and other Federal agencies in support of materials

1 research, nondestructive evaluation, neutron imag-
2 ing, chemical analysis, neutron standards, dosimetry,
3 and radiation metrology.

4 (b) **ADDITIONAL DUTIES.**—The Director may assign
5 additional duties to the operational units listed in sub-
6 section (a) that are consistent with the missions of such
7 units.

8 (c) **REVISION.**—

9 (1) **IN GENERAL.**—Subsequent to the reorga-
10 nization required under subsection (a), the Director
11 may revise the organization of the scientific and
12 technical research and services laboratory program.

13 (2) **REPORT TO CONGRESS.**—Any revision to
14 the organization of such program under paragraph
15 (1) shall be submitted in a report to the Committee
16 on Science and Technology of the House of Rep-
17 resentatives and the Committee on Commerce,
18 Science, and Transportation of the Senate at least
19 60 days before the effective date of such revision.

20 **SEC. 405. FEDERAL GOVERNMENT STANDARDS AND CON-**
21 **FORMITY ASSESSMENT COORDINATION.**

22 (a) **COORDINATION.**—Section 2(b) of the National In-
23 stitute of Standards and Technology Act (15 U.S.C.
24 272(b)) is amended—

1 (1) in paragraph (12), by striking “and” after
2 the semicolon;

3 (2) in paragraph (13), by striking the period at
4 the end and inserting a semicolon; and

5 (3) by adding after paragraph (13) the fol-
6 lowing:

7 “(14) to promote collaboration among Federal
8 departments and agencies and private sector stake-
9 holders in the development and implementation of
10 standards and conformity assessment frameworks to
11 address specific Federal Government policy goals;
12 and

13 “(15) to convene Federal departments and
14 agencies, as appropriate, to—

15 “(A) coordinate and determine Federal
16 Government positions on specific policy issues
17 related to the development of international tech-
18 nical standards and conformity assessment-re-
19 lated activities; and

20 “(B) coordinate Federal department and
21 agency engagement in the development of inter-
22 national technical standards and conformity as-
23 sessment-related activities.”.

24 (b) REPORT.—The Director, in consultation with ap-
25 propriate Federal agencies, shall submit a report annually

1 to Congress addressing the Federal Government’s tech-
2 nical standards and conformity assessment-related activi-
3 ties. The report shall identify—

4 (1) current and anticipated international stand-
5 ards and conformity assessment-related issues that
6 have the potential to impact the competitiveness and
7 innovation capabilities of the United States;

8 (2) any action being taken by the Federal Gov-
9 ernment to address these issues and the Federal
10 agency taking that action; and

11 (3) any action that the Director is taking or
12 will take to ensure effective Federal Government en-
13 gagement on technical standards and conformity as-
14 sessment-related issues, as appropriate, where the
15 Federal Government is not effectively engaged.

16 **SEC. 406. MANUFACTURING EXTENSION PARTNERSHIP.**

17 (a) COMMUNITY COLLEGE SUPPORT.—Section 25(a)
18 of the National Institute of Standards and Technology Act
19 (15 U.S.C. 278k(a)) is amended—

20 (1) in paragraph (4), by striking “and” after
21 the semicolon;

22 (2) in paragraph (5), by striking the period at
23 the end and inserting “; and”; and

24 (3) by adding after paragraph (5) the following:

1 “(6) providing to community colleges informa-
2 tion about the job skills needed in small- and me-
3 dium-sized manufacturing businesses in the regions
4 they serve.”.

5 (b) INNOVATIVE SERVICES INITIATIVE.—Section 25
6 of such Act (15 U.S.C. 278k) is amended by adding at
7 the end the following:

8 “(g) INNOVATIVE SERVICES INITIATIVE.—

9 “(1) ESTABLISHMENT.—The Director may es-
10 tablish, within the Centers program under this sec-
11 tion, an innovative services initiative to assist small-
12 and medium-sized manufacturers in—

13 “(A) reducing their energy usage and envi-
14 ronmental waste to improve profitability; and

15 “(B) accelerating the domestic commer-
16 cialization of new product technologies, includ-
17 ing components for renewable energy systems.

18 “(2) MARKET DEMAND.—The Director may not
19 undertake any activity to accelerate the domestic
20 commercialization of a new product technology
21 under this subsection unless an analysis of market
22 demand for the new product technology has been
23 conducted.”.

1 (c) REPORTS.—Section 25 of such Act (15 U.S.C.
2 278k) is further amended by adding after subsection (g),
3 as added by subsection (b), the following:

4 “(h) REPORTS.—

5 “(1) IN GENERAL.—In submitting the 3-year
6 programmatic planning document and annual up-
7 dates under section 23, the Director shall include an
8 assessment of the Director’s governance of the pro-
9 gram established under this section.

10 “(2) CRITERIA.—In conducting such assess-
11 ment, the Director shall use the criteria established
12 pursuant to the Malcolm Baldrige National Quality
13 Award under section 17(d)(1)(C) of the Stevenson-
14 Wydler Technology Innovation Act of 1980 (15
15 U.S.C. 3711a(d)(1)(C)).”.

16 (d) HOLLINGS MANUFACTURING EXTENSION PART-
17 NERSHIP PROGRAM COST-SHARING.—Section 25(c) of
18 such Act (15 U.S.C. 278k(c)) is amended by adding at
19 the end the following:

20 “(7) Notwithstanding paragraphs (1), (3), and
21 (5), for fiscal year 2011 through fiscal year 2015,
22 the Secretary may not provide to a Center more
23 than 50 percent of the costs incurred by such Center
24 and may not require that a Center’s cost share ex-
25 ceed 50 percent.

1 “(8) Not later than 4 years after the date of
2 enactment of the National Institute of Standards
3 and Technology Authorization Act of 2010, the Sec-
4 retary shall submit to Congress a report on the cost
5 share requirements under the program. The report
6 shall—

7 “(A) discuss various cost share structures,
8 including the cost share structure in place prior
9 to such date of enactment and the cost share
10 structure in place under paragraph (7), and the
11 effect of such cost share structures on indi-
12 vidual Centers and the overall program; and

13 “(B) include a recommendation for how
14 best to structure the cost share requirement
15 after fiscal year 2015 to provide for the long-
16 term sustainability of the program.”.

17 (e) ADVISORY BOARD.—Section 25(e)(4) of such Act
18 (15 U.S.C. 278k(e)(4)) is amended to read as follows:

19 “(4) FEDERAL ADVISORY COMMITTEE ACT AP-
20 PLICABILITY.—

21 “(A) IN GENERAL.—In discharging its du-
22 ties under this subsection, the MEP Advisory
23 Board shall function solely in an advisory ca-
24 pacity, in accordance with the Federal Advisory
25 Committee Act.

1 “(B) EXCEPTION.—Section 14 of the Fed-
2 eral Advisory Committee Act shall not apply to
3 the MEP Advisory Board.”.

4 (f) DEFINITIONS.—Section 25 of such Act (15 U.S.C.
5 278k) is further amended by adding after subsection (h),
6 as added by subsection (c), the following:

7 “(i) DEFINITION.—In this section, the term ‘commu-
8 nity college’ means an institution of higher education (as
9 defined under section 101(a) of the Higher Education Act
10 of 1965 (20 U.S.C. 1001(a))) at which the highest degree
11 that is predominately awarded to students is an associate’s
12 degree.”.

13 (g) EVALUATION OF OBSTACLES UNIQUE TO SMALL
14 MANUFACTURERS.—Section 25 of such Act (15 U.S.C.
15 278k) is further amended by adding after subsection (i),
16 as added by subsection (f), the following:

17 “(j) EVALUATION OF OBSTACLES UNIQUE TO SMALL
18 MANUFACTURERS.—The Director shall—

19 “(1) evaluate obstacles that are unique to small
20 manufacturers that prevent such manufacturers
21 from effectively competing in the global market;

22 “(2) implement a comprehensive plan to train
23 the Centers to address such obstacles; and

24 “(3) facilitate improved communication between
25 the Centers to assist such manufacturers in imple-

1 menting appropriate, targeted solutions to such ob-
2 stacles.”.

3 **SEC. 407. EMERGENCY COMMUNICATION AND TRACKING**
4 **TECHNOLOGIES RESEARCH INITIATIVE.**

5 (a) ESTABLISHMENT.—The Director shall establish a
6 research initiative to support the development of emer-
7 gency communication and tracking technologies for use in
8 locating trapped individuals in confined spaces, such as
9 underground mines, and other shielded environments,
10 such as high-rise buildings or collapsed structures, where
11 conventional radio communication is limited.

12 (b) ACTIVITIES.—In order to carry out this section,
13 the Director shall work with the private sector and appro-
14 priate Federal agencies to—

15 (1) perform a needs assessment to identify and
16 evaluate the measurement, technical standards, and
17 conformity assessment needs required to improve the
18 operation and reliability of such emergency commu-
19 nication and tracking technologies;

20 (2) support the development of technical stand-
21 ards and conformance architecture to improve the
22 operation and reliability of such emergency commu-
23 nication and tracking technologies; and

1 (3) incorporate and build upon existing reports
2 and studies on improving emergency communica-
3 tions.

4 (c) REPORT.—Not later than 18 months after the
5 date of enactment of this Act, the Director shall submit
6 to Congress and make publicly available a report describ-
7 ing the assessment performed under subsection (b)(1) and
8 making recommendations about research priorities to ad-
9 dress gaps in the measurement, technical standards, and
10 conformity assessment needs identified by such assess-
11 ment.

12 **SEC. 408. TIP ADVISORY BOARD.**

13 Section 28(k)(4) of the National Institute of Stand-
14 ards and Technology Act (15 U.S.C. 278n(k)(4)) is
15 amended to read as follows:

16 “(4) FEDERAL ADVISORY COMMITTEE ACT AP-
17 PLICABILITY.—

18 “(A) IN GENERAL.—In discharging its du-
19 ties under this subsection, the TIP Advisory
20 Board shall function solely in an advisory ca-
21 pacity, in accordance with the Federal Advisory
22 Committee Act.

23 “(B) EXCEPTION.—Section 14 of the Fed-
24 eral Advisory Committee Act shall not apply to
25 the TIP Advisory Board.”.

1 **SEC. 409. UNDERREPRESENTED MINORITIES.**

2 (a) RESEARCH FELLOWSHIPS.—Section 18 of the
3 National Institute of Standards and Technology Act (15
4 U.S.C. 278g–1) is amended by adding at the end the fol-
5 lowing:

6 “(c) UNDERREPRESENTED MINORITIES.—In evalu-
7 ating applications for fellowships under this section, the
8 Director shall give consideration to the goal of promoting
9 the participation of underrepresented minorities in re-
10 search areas supported by the Institute.”.

11 (b) POSTDOCTORAL FELLOWSHIP PROGRAM.—Sec-
12 tion 19 of such Act (15 U.S.C. 278g–2) is amended by
13 adding at the end the following: “In evaluating applica-
14 tions for fellowships under this section, the Director shall
15 give consideration to the goal of promoting the participa-
16 tion of underrepresented minorities in research areas sup-
17 ported by the Institute.”.

18 (c) TEACHER DEVELOPMENT.—Section 19A(c) of
19 such Act (15 U.S.C. 278g–2a(c)) is amended by adding
20 at the end the following: “The Director shall give special
21 consideration to an application from a teacher from a
22 high-need school, as defined in section 200 of the Higher
23 Education Act of 1965 (20 U.S.C. 1021).”.

24 **SEC. 410. CYBER SECURITY STANDARDS AND GUIDELINES.**

25 Cyber security standards and guidelines developed by
26 the National Institute of Standards and Technology for

1 use by United States industry and the public shall be vol-
2 untary.

3 **SEC. 411. NANOMATERIAL INITIATIVE.**

4 The Director shall carry out a nanomaterial research
5 initiative to—

6 (1) develop reference materials for nanomate-
7 rials and derived products to be used in
8 benchmarking toxicity, calibrating instruments, and
9 facilitating laboratory comparisons;

10 (2) assist in the development of international
11 documentary standards relating to nanomaterials;

12 (3) develop instruments and measurement
13 methods to determine the physical and chemical
14 properties of nanomaterials; and

15 (4) gather and develop data to support the cor-
16 relation of physical and chemical properties of nano-
17 materials to any environmental, safety, or other
18 risks.

19 **SEC. 412. DISASTER RESILIENT BUILDINGS AND INFRA-
20 STRUCTURE.**

21 (a) ESTABLISHMENT.—The Director shall carry out
22 a disaster resilient buildings and infrastructure program.

23 (b) REAL-SCALE STRUCTURES.—As part of the pro-
24 gram, the Director shall—

1 (1) develop the capability to test real-scale
2 structures under realistic fire and structural loading
3 conditions; and

4 (2) assist in the validation of predictive models
5 by developing a database on the performance of
6 large-scale structures under realistic fire and struc-
7 tural loading conditions.

8 (c) DATABASE.—As part of the program, the Direc-
9 tor shall develop a database on the performance of the
10 built environment during natural and man-made hazard
11 events.

12 **SEC. 413. REPORT ON THE USE OF MODELING AND SIMULA-**
13 **TION.**

14 (a) IN GENERAL.—Within 1 year after the date of
15 enactment of this Act, the Director shall submit a report
16 to Congress examining the use of high-performance com-
17 putational modeling and simulation by small- and me-
18 dium-sized manufacturers.

19 (b) SPECIFIC REQUIREMENTS.—Such report shall in-
20 clude the following:

21 (1) An assessment of the current utilization of
22 high-performance computational modeling and sim-
23 ulation by small- and medium-sized manufacturers.

24 (2) An examination of any barriers or chal-
25 lenges to the use of high-performance computational

1 modeling and simulation by small- and medium-sized
2 manufacturers, including—

3 (A) access to high-performance computing
4 facilities and resources;

5 (B) the availability of software and other
6 applications tailored to meet the needs of such
7 manufacturers;

8 (C) appropriate expertise and training; and

9 (D) the availability of tools and other
10 methods to understand and manage the costs
11 and risks associated with transitioning to the
12 use of computational modeling and simulation.

13 (3) Recommendations for addressing any bar-
14 riers or challenges identified in paragraph (2) and,
15 if appropriate, suggestions for action that the Fed-
16 eral Government may take to foster the development
17 and utilization of high-performance computing re-
18 sources by small- and medium-sized manufacturers.

19 (c) CONSULTATION.—In carrying out this section, the
20 Director shall consult with the Office of Science and Tech-
21 nology Policy and with other relevant Federal agencies.

22 **SEC. 414. GREEN MANUFACTURING AND CONSTRUCTION.**

23 The Director shall carry out a green manufacturing
24 and construction initiative to—

1 (1) develop accurate sustainability metrics and
2 practices for use in manufacturing;

3 (2) advance the development of standards and
4 the creation of an information infrastructure to com-
5 municate sustainability information about suppliers;
6 and

7 (3) improve energy performance, service life,
8 and indoor air quality of new and retrofitted build-
9 ings through validated measurement data.

10 **SEC. 415. MANUFACTURING RESEARCH.**

11 (a) IN GENERAL.—The Director shall carry out a
12 program to support transformational manufacturing re-
13 search.

14 (b) ACTIVITIES.—As part of such program, the Di-
15 rector shall—

16 (1) develop and disseminate measurement tools
17 and capabilities for new additive manufacturing and
18 robotics technologies and methods;

19 (2) establish new techniques and methods to ef-
20 ficiently generate and assemble products integrating
21 nanoscale materials and devices; and

22 (3) carry out other research with significant
23 transformational potential for manufacturing.

24 **SEC. 416. DEFINITIONS.**

25 In this title:

1 (1) DIRECTOR.—The term “Director” means
2 the Director of the National Institute of Standards
3 and Technology.

4 (2) FEDERAL AGENCY.—The term “Federal
5 agency” has the meaning given such term in section
6 4 of the Stevenson-Wydler Technology Innovation
7 Act of 1980 (15 U.S.C. 3703).

8 **TITLE V—INNOVATION**

9 **SEC. 501. OFFICE OF INNOVATION AND ENTREPRENEUR-** 10 **SHIP.**

11 The Stevenson-Wydler Technology Innovation Act of
12 1980 (15 U.S.C. 3701 et seq.) is amended by adding at
13 the end the following new section:

14 **“SEC. 24. OFFICE OF INNOVATION AND ENTREPRENEUR-** 15 **SHIP.**

16 “(a) IN GENERAL.—The Secretary shall establish an
17 Office of Innovation and Entrepreneurship to foster inno-
18 vation and the commercialization of new technologies,
19 products, processes, and services with the goal of pro-
20 moting productivity and economic growth in the United
21 States.

22 “(b) DUTIES.—The Office of Innovation and Entre-
23 preneurship shall be responsible for—

24 “(1) developing policies to accelerate innovation
25 and advance the commercialization of research and

1 development, including federally funded research and
2 development;

3 “(2) identifying existing barriers to innovation
4 and commercialization, including access to capital
5 and other resources, and ways to overcome those
6 barriers;

7 “(3) providing access to relevant data, research,
8 and technical assistance on innovation and commer-
9 cialization;

10 “(4) strengthening collaboration on and coordi-
11 nation of policies relating to innovation and commer-
12 cialization, including those focused on the needs of
13 small businesses and rural communities, within the
14 Department of Commerce and between the Depart-
15 ment of Commerce and other Federal agencies, as
16 appropriate; and

17 “(5) any other duties as determined by the Sec-
18 retary.

19 “(c) ADVISORY COMMITTEE.—The Secretary shall es-
20 tablish an Advisory Council on Innovation and Entrepre-
21 neurship to provide advice to the Secretary on carrying
22 out subsection (b).”.

1 **SEC. 502. FEDERAL LOAN GUARANTEES FOR INNOVATIVE**
2 **TECHNOLOGIES IN MANUFACTURING.**

3 The Stevenson-Wydler Technology Innovation Act of
4 1980 (15 U.S.C. 3701 et seq.) is further amended by add-
5 ing after section 24, as added by section 501 of this title,
6 the following new section:

7 **“SEC. 25. FEDERAL LOAN GUARANTEES FOR INNOVATIVE**
8 **TECHNOLOGIES IN MANUFACTURING.**

9 “(a) **ESTABLISHMENT.**—The Secretary shall estab-
10 lish a program to provide loan guarantees for obligations
11 to small- or medium-sized manufacturers for the use or
12 production of innovative technologies.

13 “(b) **ELIGIBLE PROJECTS.**—A loan guarantee may be
14 made under such program only for a project that reequips,
15 expands, or establishes a manufacturing facility in the
16 United States to—

17 “(1) use an innovative technology or an innova-
18 tive process in manufacturing; or

19 “(2) manufacture an innovative technology
20 product or an integral component of such product.

21 “(c) **ELIGIBLE BORROWER.**—A loan guarantee may
22 be made under such program only for a borrower who is
23 a small- or medium-sized manufacturer, as determined by
24 the Secretary under the criteria established pursuant to
25 subsection (m).

1 “(d) LIMITATION ON AMOUNT.—A loan guarantee
2 shall not exceed an amount equal to 80 percent of the obli-
3 gation, as estimated at the time at which the loan guar-
4 antee is issued.

5 “(e) LIMITATIONS ON LOAN GUARANTEE.—No loan
6 guarantee shall be made unless the Secretary determines
7 that—

8 “(1) there is a reasonable prospect of repay-
9 ment of the principal and interest on the obligation
10 by the borrower;

11 “(2) the amount of the obligation (when com-
12 bined with amounts available to the borrower from
13 other sources) is sufficient to carry out the project;

14 “(3) the obligation is not subordinate to other
15 financing;

16 “(4) the obligation bears interest at a rate that
17 does not exceed a level that the Secretary determines
18 appropriate, taking into account the prevailing rate
19 of interest in the private sector for similar loans and
20 risks; and

21 “(5) the term of an obligation requires full re-
22 payment over a period not to exceed the lesser of—

23 “(A) 30 years; or

1 “(B) 90 percent of the projected useful
2 life, as determined by the Secretary, of the
3 physical asset to be financed by the obligation.

4 “(f) DEFAULTS.—

5 “(1) PAYMENT BY SECRETARY.—

6 “(A) IN GENERAL.—If a borrower defaults
7 (as defined in regulations promulgated by the
8 Secretary and specified in the loan guarantee)
9 on the obligation, the holder of the loan guar-
10 antee shall have the right to demand payment
11 of the unpaid amount from the Secretary.

12 “(B) PAYMENT REQUIRED.—Within such
13 period as may be specified in the loan guar-
14 antee or related agreements, the Secretary shall
15 pay to the holder of the loan guarantee the un-
16 paid interest on and unpaid principal of the ob-
17 ligation as to which the borrower has defaulted,
18 unless the Secretary finds that there was no de-
19 fault by the borrower in the payment of interest
20 or principal or that the default has been rem-
21 edied.

22 “(C) FORBEARANCE.—Nothing in this sub-
23 section precludes any forbearance by the holder
24 of the obligation for the benefit of the borrower

1 which may be agreed upon by the parties to the
2 obligation and approved by the Secretary.

3 “(2) SUBROGATION.—

4 “(A) IN GENERAL.—If the Secretary
5 makes a payment under paragraph (1), the Sec-
6 retary shall be subrogated to the rights, as
7 specified in the loan guarantee, of the recipient
8 of the payment or related agreements including,
9 if appropriate, the authority (notwithstanding
10 any other provision of law) to—

11 “(i) complete, maintain, operate,
12 lease, or otherwise dispose of any property
13 acquired pursuant to such loan guarantee
14 or related agreement; or

15 “(ii) permit the borrower, pursuant to
16 an agreement with the Secretary, to con-
17 tinue to pursue the purposes of the project
18 if the Secretary determines that such an
19 agreement is in the public interest.

20 “(B) SUPERIORITY OF RIGHTS.—The
21 rights of the Secretary, with respect to any
22 property acquired pursuant to a loan guarantee
23 or related agreements, shall be superior to the
24 rights of any other person with respect to the
25 property.

1 “(3) NOTIFICATION.—If the borrower defaults
2 on an obligation, the Secretary shall notify the At-
3 torney General of the default.

4 “(g) PAYMENT OF PRINCIPAL AND INTEREST BY
5 SECRETARY.—With respect to any obligation guaranteed
6 under this section, the Secretary may enter into a contract
7 to pay, and pay, holders of the obligation for and on behalf
8 of the borrower from funds appropriated for that purpose
9 the principal and interest payments that become due and
10 payable on the unpaid balance of the obligation if the Sec-
11 retary finds that—

12 “(1)(A) the borrower is unable to make the
13 payments and is not in default;

14 “(B) it is in the public interest to permit the
15 borrower to continue to pursue the project; and

16 “(C) the probable net benefit to the Federal
17 Government in paying the principal and interest will
18 be greater than that which would result in the event
19 of a default;

20 “(2) the amount of the payment that the Sec-
21 retary is authorized to pay shall be no greater than
22 the amount of principal and interest that the bor-
23 rower is obligated to pay under the obligation being
24 guaranteed; and

1 “(3) the borrower agrees to reimburse the Sec-
2 retary for the payment (including interest) on terms
3 and conditions that are satisfactory to the Secretary.

4 “(h) TERMS AND CONDITIONS.—A loan guarantee
5 under this section shall include such detailed terms and
6 conditions as the Secretary determines appropriate to—

7 “(1) protect the interests of the United States
8 in the case of default; and

9 “(2) have available all the patents and tech-
10 nology necessary for any person selected, including
11 the Secretary, to complete and operate the project.

12 “(i) CONSULTATION.—In establishing the terms and
13 conditions of a loan guarantee under this section, the Sec-
14 retary shall consult with the Secretary of the Treasury.

15 “(j) FEES.—

16 “(1) IN GENERAL.—The Secretary shall charge
17 and collect fees for loan guarantees in amounts the
18 Secretary determines are sufficient to cover applica-
19 ble administrative expenses.

20 “(2) AVAILABILITY.—Fees collected under this
21 subsection shall—

22 “(A) be deposited by the Secretary into the
23 Treasury of the United States; and

1 “(B) remain available until expended, sub-
2 ject to such other conditions as are contained in
3 annual appropriations Acts.

4 “(3) LIMITATION.—In charging and collecting
5 fees under paragraph (1), the Secretary shall take
6 into consideration the amount of the obligation.

7 “(k) RECORDS.—

8 “(1) IN GENERAL.—With respect to a loan
9 guarantee under this section, the borrower, the lend-
10 er, and any other appropriate party shall keep such
11 records and other pertinent documents as the Sec-
12 retary shall prescribe by regulation, including such
13 records as the Secretary may require to facilitate an
14 effective audit.

15 “(2) ACCESS.—The Secretary and the Comp-
16 troller General of the United States, or their duly
17 authorized representatives, shall have access to
18 records and other pertinent documents for the pur-
19 pose of conducting an audit.

20 “(l) FULL FAITH AND CREDIT.—The full faith and
21 credit of the United States is pledged to the payment of
22 all loan guarantees issued under this section with respect
23 to principal and interest.

1 “(m) REGULATIONS.—The Secretary shall issue final
2 regulations before making any loan guarantees under the
3 program. Such regulations shall include—

4 “(1) criteria that the Secretary shall use to de-
5 termine eligibility for loan guarantees under this sec-
6 tion, including—

7 “(A) whether a borrower is a small- or me-
8 dium-sized manufacturer; and

9 “(B) whether a borrower demonstrates
10 that a market exists for the innovative tech-
11 nology product, or the integral component of
12 such product, to be manufactured, as evidenced
13 by written statements of interest from potential
14 purchasers;

15 “(2) criteria that the Secretary shall use to de-
16 termine the amount of any fees charged under sub-
17 section (j), including criteria related to the amount
18 of the obligation;

19 “(3) policies and procedures for selecting and
20 monitoring lenders and loan performance; and

21 “(4) any other policies, procedures, or informa-
22 tion necessary to implement this section.

23 “(n) AUDIT.—

24 “(1) ANNUAL INDEPENDENT AUDITS.—The
25 Secretary shall enter into an arrangement with an

1 independent auditor for annual evaluations of the
2 program under this section.

3 “(2) COMPTROLLER GENERAL REVIEW.—The
4 Comptroller General of the United States shall con-
5 duct a biennial review of the Secretary’s execution of
6 the program under this section.

7 “(3) REPORT.—The results of the independent
8 audit under paragraph (1) and the Comptroller Gen-
9 eral’s review under paragraph (2) shall be provided
10 directly to the Committee on Science and Tech-
11 nology of the House of Representatives and the
12 Committee on Commerce, Science, and Transpor-
13 tation of the Senate.

14 “(o) REPORT TO CONGRESS.—Concurrent with the
15 submission to Congress of the President’s annual budget
16 request in each year after the date of enactment of this
17 section, the Secretary shall transmit to the Committee on
18 Science and Technology of the House of Representatives
19 and the Committee on Commerce, Science, and Transpor-
20 tation of the Senate a report containing a summary of
21 all activities carried out under this section.

22 “(p) COORDINATION AND NONDUPLICATION.—To
23 the maximum extent practicable, the Secretary shall en-
24 sure that the activities carried out under this section are

1 coordinated with, and do not duplicate the efforts of, other
2 loan guarantee programs within the Federal Government.

3 “(q) MEP CENTERS.—The Secretary may use cen-
4 ters established under section 25 of the National Institute
5 of Standards and Technology Act (15 U.S.C. 278k) to
6 provide information about the program established under
7 this section and to conduct outreach to potential bor-
8 rowers, as appropriate.

9 “(r) MINIMIZING RISK.—The Secretary shall promul-
10 gate regulations and policies to carry out this section in
11 accordance with Office of Management and Budget Cir-
12 cular No. A–129, entitled ‘Policies for Federal Credit Pro-
13 grams and Non-Tax Receivables’, as in effect on the date
14 of enactment of this section.

15 “(s) SENSE OF CONGRESS.—It is the sense of Con-
16 gress that no loan guarantee shall be made under this sec-
17 tion unless the borrower agrees to use a federally-approved
18 electronic employment eligibility verification system to
19 verify the employment eligibility of—

20 “(1) all persons hired during the contract term
21 by the borrower to perform employment duties with-
22 in the United States; and

23 “(2) all persons assigned by the borrower to
24 perform work within the United States on the
25 project.

1 “(t) DEFINITIONS.—In this section:

2 “(1) COST.—The term ‘cost’ has the meaning
3 given such term under section 502 of the Federal
4 Credit Reform Act of 1990 (2 U.S.C. 661a).

5 “(2) INNOVATIVE PROCESS.—The term ‘innova-
6 tive process’ means a process that is significantly
7 improved as compared to the process in general use
8 in the commercial marketplace in the United States
9 at the time the loan guarantee is issued.

10 “(3) INNOVATIVE TECHNOLOGY.—The term ‘in-
11 novative technology’ means a technology that is sig-
12 nificantly improved as compared to the technology in
13 general use in the commercial marketplace in the
14 United States at the time the loan guarantee is
15 issued.

16 “(4) LOAN GUARANTEE.—The term ‘loan guar-
17 antee’ has the meaning given such term in section
18 502 of the Federal Credit Reform Act of 1990 (2
19 U.S.C. 661a). The term includes a loan guarantee
20 commitment (as defined in section 502 of such Act
21 (2 U.S.C. 661a)).

22 “(5) OBLIGATION.—The term ‘obligation’
23 means the loan or other debt obligation that is guar-
24 anteed under this section.

1 “(6) PROGRAM.—The term ‘program’ means
2 the loan guarantee program established in sub-
3 section (a).

4 “(u) AUTHORIZATION OF APPROPRIATIONS.—

5 “(1) COST OF LOAN GUARANTEES.—There are
6 authorized to be appropriated \$100,000,000 for each
7 of fiscal years 2011 through 2015 to provide the
8 cost of loan guarantees under this section.

9 “(2) PRINCIPAL AND INTEREST.—There are au-
10 thorized to be appropriated such sums as are nec-
11 essary to carry out subsection (g).”.

12 **SEC. 503. REGIONAL INNOVATION PROGRAM.**

13 The Stevenson-Wydler Technology Innovation Act of
14 1980 (15 U.S.C. 3701 et seq.) is further amended by add-
15 ing after section 25, as added by section 502 of this title,
16 the following new section:

17 **“SEC. 26. REGIONAL INNOVATION PROGRAM.**

18 “(a) ESTABLISHMENT.—The Secretary shall estab-
19 lish a regional innovation program to encourage and sup-
20 port the development of regional innovation strategies, in-
21 cluding regional innovation clusters.

22 “(b) REGIONAL INNOVATION CLUSTER GRANTS.—

23 “(1) IN GENERAL.—As part of the program es-
24 tablished under subsection (a), the Secretary may
25 award grants on a competitive basis to eligible re-

1 cipients for activities relating to the formation and
2 development of regional innovation clusters.

3 “(2) PERMISSIBLE ACTIVITIES.—Grants award-
4 ed under this subsection may be used for activities
5 determined appropriate by the Secretary, including
6 the following:

7 “(A) Feasibility studies.

8 “(B) Planning activities.

9 “(C) Technical assistance.

10 “(D) Developing or strengthening commu-
11 nication and collaboration between and among
12 participants of a regional innovation cluster.

13 “(E) Attracting additional participants to
14 a regional innovation cluster.

15 “(F) Facilitating market development of
16 products and services developed by a regional
17 innovation cluster, including through dem-
18 onstration, deployment, technology transfer,
19 and commercialization activities.

20 “(G) Developing relationships between a
21 regional innovation cluster and entities or clus-
22 ters in other regions.

23 “(H) Interacting with the public and State
24 and local governments to meet the goals of the
25 cluster.

1 “(3) ELIGIBLE RECIPIENT.—For purposes of
2 this subsection, the term ‘eligible recipient’ means
3 any of the following:

4 “(A) A State.

5 “(B) An Indian tribe.

6 “(C) A city or other political subdivision of
7 a State.

8 “(D) An entity that—

9 “(i) is a nonprofit organization, an in-
10 stitution of higher education, a public-pri-
11 vate partnership, a science park, a Federal
12 laboratory, or an economic development or-
13 ganization or similar entity; and

14 “(ii) has an application that is sup-
15 ported by a State or a political subdivision
16 of a State.

17 “(E) A consortium of any of the entities
18 listed in subparagraphs (A) through (D).

19 “(4) APPLICATION.—

20 “(A) IN GENERAL.—An eligible recipient
21 shall submit an application to the Secretary at
22 such time, in such manner, and containing such
23 information and assurances as the Secretary
24 may require.

1 “(B) COMPONENTS.—The application shall
2 include, at a minimum, a description of the re-
3 gional innovation cluster supported by the pro-
4 posed activity, including a description of the fol-
5 lowing:

6 “(i) Whether the regional innovation
7 cluster is supported by the private sector,
8 State and local governments, and other rel-
9 evant stakeholders.

10 “(ii) How the existing participants in
11 the regional innovation cluster will encour-
12 age and solicit participation by all types of
13 entities that might benefit from participa-
14 tion, including newly formed entities and
15 those rival to existing participants.

16 “(iii) The extent to which the regional
17 innovation cluster is likely to stimulate in-
18 novation and have a positive impact on re-
19 gional economic growth and development.

20 “(iv) Whether the participants in the
21 regional innovation cluster have access to,
22 or contribute to, a well-trained workforce.

23 “(v) Whether the participants in the
24 regional innovation cluster are capable of

1 attracting additional funds from non-Fed-
2 eral sources.

3 “(vi) The likelihood that the partici-
4 pants in the regional innovation cluster will
5 be able to sustain activities once grant
6 funds under this subsection have been ex-
7 pended.

8 “(C) SPECIAL CONSIDERATION.—The Sec-
9 retary shall give special consideration to appli-
10 cations from regions that contain communities
11 negatively impacted by trade.

12 “(5) SPECIAL CONSIDERATION.—The Secretary
13 shall give special consideration to an eligible recipi-
14 ent who agrees to collaborate with local workforce
15 investment area boards.

16 “(6) COST SHARE.—The Secretary may not
17 provide more than 50 percent of the total cost of
18 any activity funded under this subsection.

19 “(7) USE AND APPLICATION OF RESEARCH AND
20 INFORMATION PROGRAM.—To the maximum extent
21 practicable, the Secretary shall ensure that activities
22 funded under this subsection use and apply any rel-
23 evant research, best practices, and metrics developed
24 under the program established in subsection (c).

1 “(c) REGIONAL INNOVATION RESEARCH AND INFOR-
2 MATION PROGRAM.—

3 “(1) IN GENERAL.—As part of the program es-
4 tablished under subsection (a), the Secretary shall
5 establish a regional innovation research and infor-
6 mation program to—

7 “(A) gather, analyze, and disseminate in-
8 formation on best practices for regional innova-
9 tion strategies (including regional innovation
10 clusters), including information relating to how
11 innovation, productivity, and economic develop-
12 ment can be maximized through such strategies;

13 “(B) provide technical assistance, including
14 through the development of technical assistance
15 guides, for the development and implementation
16 of regional innovation strategies (including re-
17 gional innovation clusters);

18 “(C) support the development of relevant
19 metrics and measurement standards to evaluate
20 regional innovation strategies (including re-
21 gional innovation clusters), including the extent
22 to which such strategies stimulate innovation,
23 productivity, and economic development; and

1 “(D) collect and make available data on re-
2 gional innovation cluster activity in the United
3 States, including data on—

4 “(i) the size, specialization, and com-
5 petitiveness of regional innovation clusters;

6 “(ii) the regional domestic product
7 contribution, total jobs and earnings by
8 key occupations, establishment size, nature
9 of specialization, patents, Federal research
10 and development spending, and other rel-
11 evant information for regional innovation
12 clusters; and

13 “(iii) supply chain product and service
14 flows within and between regional innova-
15 tion clusters.

16 “(2) RESEARCH GRANTS.—The Secretary may
17 award research grants on a competitive basis to sup-
18 port and further the goals of the program estab-
19 lished under this subsection.

20 “(3) DISSEMINATION OF INFORMATION.—Data
21 and analysis compiled by the Secretary under the
22 program established in this subsection shall be made
23 available to other Federal agencies, State and local
24 governments, and nonprofit and for-profit entities.

1 “(4) CLUSTER GRANT PROGRAM.—The Sec-
2 retary shall incorporate data and analysis relating to
3 any regional innovation cluster supported by a grant
4 under subsection (b) into the program established
5 under this subsection.

6 “(d) INTERAGENCY COORDINATION.—

7 “(1) IN GENERAL.—To the maximum extent
8 practicable, the Secretary shall ensure that the ac-
9 tivities carried out under this section are coordinated
10 with, and do not duplicate the efforts of, other pro-
11 grams at the Department of Commerce or other
12 Federal agencies.

13 “(2) COLLABORATION.—

14 “(A) IN GENERAL.—The Secretary shall
15 explore and pursue collaboration with other
16 Federal agencies, including through multi-
17 agency funding opportunities, on regional inno-
18 vation strategies.

19 “(B) SMALL BUSINESSES.—The Secretary
20 shall ensure that such collaboration with Fed-
21 eral agencies prioritizes the needs and chal-
22 lenges of small businesses.

23 “(e) EVALUATION.—

24 “(1) IN GENERAL.—Not later than 4 years
25 after the date of enactment of this section, the Sec-

1 retary shall enter into a contract with an inde-
2 pendent entity, such as the National Academy of
3 Sciences, to conduct an evaluation of the program
4 established under subsection (a).

5 “(2) REQUIREMENTS.—The evaluation shall in-
6 clude—

7 “(A) whether such program is achieving its
8 goals;

9 “(B) any recommendations for how such
10 program may be improved; and

11 “(C) a recommendation as to whether such
12 program should be continued or terminated.

13 “(f) DEFINITIONS.—In this section:

14 “(1) REGIONAL INNOVATION CLUSTER.—The
15 term ‘regional innovation cluster’ means a geo-
16 graphically bounded network of similar, synergistic,
17 or complementary entities that—

18 “(A) are engaged in or with a particular
19 industry sector;

20 “(B) have active channels for business
21 transactions and communication;

22 “(C) share specialized infrastructure, labor
23 markets, and services; and

1 “(D) leverage the region’s unique competi-
2 tive strengths to stimulate innovation and cre-
3 ate jobs.

4 “(2) STATE.—The term ‘State’ means one of
5 the several States, the District of Columbia, the
6 Commonwealth of Puerto Rico, the Virgin Islands,
7 Guam, American Samoa, the Commonwealth of the
8 Northern Mariana Islands, or any other territory or
9 possession of the United States.

10 “(g) AUTHORIZATION OF APPROPRIATIONS.—There
11 are authorized to be appropriated such sums as are nec-
12 essary for each of fiscal years 2011 through 2015 to carry
13 out this section, including such sums as are necessary to
14 carry out the evaluation required under subsection (e).”.

15 **SEC. 504. CLEAN ENERGY CONSORTIUM.**

16 (a) PURPOSE.—The Secretary shall carry out a pro-
17 gram to establish a Clean Energy Consortium to enhance
18 the Nation’s economic, environmental, and energy security
19 by promoting commercial application of clean energy tech-
20 nology and ensuring that the United States maintains a
21 technological lead in the development and commercial ap-
22 plication of state-of-the-art energy technologies. To
23 achieve these purposes the program shall leverage the ex-
24 pertise and resources of the university and private re-
25 search communities, industry, venture capital, national

1 laboratories, and other participants in energy innovation
2 to support collaborative, cross-disciplinary research and
3 development in areas not being served by the private sec-
4 tor in order to develop and accelerate the commercial ap-
5 plication of innovative clean energy technologies.

6 (b) DEFINITIONS.—For purposes of this section:

7 (1) CLEAN ENERGY TECHNOLOGY.—The term
8 “clean energy technology” means a technology
9 that—

10 (A) produces energy from solar, wind, geo-
11 thermal, biomass, tidal, wave, ocean, and other
12 renewable energy resources (as such term is de-
13 fined in section 610 of the Public Utility Regu-
14 latory Policies Act of 1978);

15 (B) more efficiently transmits, distributes,
16 or stores energy;

17 (C) enhances energy efficiency for build-
18 ings and industry, including combined heat and
19 power;

20 (D) enables the development of a Smart
21 Grid (as described in section 1301 of the En-
22 ergy Independence and Security Act of 2007
23 (42 U.S.C. 17381)), including integration of re-
24 newable energy resources and distributed gen-

1 eration, demand response, demand side man-
2 agement, and systems analysis;

3 (E) produces an advanced or sustainable
4 material with energy or energy efficiency appli-
5 cations; or

6 (F) improves energy efficiency for trans-
7 portation, including electric vehicles.

8 (2) CLUSTER.—The term “cluster” means a
9 network of entities directly involved in the research,
10 development, finance, and commercial application of
11 clean energy technologies whose geographic prox-
12 imity facilitates utilization and sharing of skilled
13 human resources, infrastructure, research facilities,
14 educational and training institutions, venture cap-
15 ital, and input suppliers.

16 (3) CONSORTIUM.—The term “Consortium”
17 means a Clean Energy Consortium established in ac-
18 cordance with this section.

19 (4) PROJECT.—The term “project” means an
20 activity with respect to which a Consortium provides
21 support under subsection (e).

22 (5) QUALIFYING ENTITY.—The term “quali-
23 fying entity” means each of the following:

24 (A) A research university.

1 (B) A State or Federal institution with a
2 focus on the advancement of clean energy tech-
3 nologies.

4 (C) A nongovernmental organization with
5 research or technology transfer expertise in
6 clean energy technology development.

7 (6) SECRETARY.—The term “Secretary” means
8 the Secretary of Energy.

9 (7) TECHNOLOGY DEVELOPMENT FOCUS.—The
10 term “technology development focus” means the
11 unique clean energy technology or technologies in
12 which a Consortium specializes.

13 (8) TRANSLATIONAL RESEARCH.—The term
14 “translational research” means coordination of basic
15 or applied research with technical applications to en-
16 able promising discoveries or inventions to achieve
17 commercial application of energy technology.

18 (c) ROLE OF THE SECRETARY.—The Secretary
19 shall—

20 (1) have ultimate responsibility for, and over-
21 sight of, all aspects of the program under this sec-
22 tion;

23 (2) select a recipient of a grant for the estab-
24 lishment and operation of a Consortium through a
25 competitive selection process;

1 (3) coordinate the innovation activities of the
2 Consortium with those occurring through other De-
3 partment of Energy entities, including the National
4 Laboratories, the Advanced Research Projects Agen-
5 cy—Energy, Energy Innovation Hubs, and Energy
6 Frontier Research Collaborations, and within indus-
7 try, including by annually—

8 (A) issuing guidance regarding national
9 energy research and development priorities and
10 strategic objectives; and

11 (B) convening a conference of staff of the
12 Department of Energy and representatives from
13 such other entities to share research results,
14 program plans, and opportunities for collabora-
15 tion.

16 (d) ENTITIES ELIGIBLE FOR SUPPORT.—A consor-
17 tium shall be eligible to receive support under this section
18 if—

19 (1) it is composed of—

20 (A) 2 research universities with a com-
21 bined annual research budget of \$500,000,000;
22 and

23 (B) 1 or more additional qualifying enti-
24 ties;

1 (2) its members have established a binding
2 agreement that documents—

3 (A) the structure of the partnership agree-
4 ment;

5 (B) a governance and management struc-
6 ture to enable cost-effective implementation of
7 the program;

8 (C) a conflicts of interest policy consistent
9 with subsection (e)(1)(B);

10 (D) an accounting structure that meets the
11 requirements of the Department of Energy and
12 can be audited under subsection (f)(4); and

13 (E) that it has an External Advisory Com-
14 mittee consistent with subsection (e)(3);

15 (3) it receives funding from States, consortium
16 participants, or other non-Federal sources, to be
17 used to support project awards pursuant to sub-
18 section (e);

19 (4) it is part of an existing cluster or dem-
20 onstrates high potential to develop a new cluster;
21 and

22 (5) it operates as a nonprofit organization.

23 (e) CLEAN ENERGY CONSORTIUM.—

24 (1) ROLE.—The Consortium shall support
25 translational research activities leading to commer-

1 cial application of clean energy technologies, in ac-
2 cordance with the purposes of this section, through
3 issuance of awards to projects managed by quali-
4 fying entities and other entities meeting the Consor-
5 tium’s project criteria, including national labora-
6 tories. The Consortium shall—

7 (A) develop and make available to the pub-
8 lic through the Department of Energy’s Web
9 site proposed plans, programs, project selection
10 criteria, and terms for individual project awards
11 under this subsection;

12 (B) establish conflict of interest proce-
13 dures, consistent with those of the Department
14 of Energy, to ensure that employees and des-
15 ignees for Consortium activities who are in deci-
16 sionmaking capacities disclose all material con-
17 flicts of interest, including financial, organiza-
18 tional, and personal conflicts of interest;

19 (C) establish policies—

20 (i) to prevent resources provided to
21 the Consortium from being used to dis-
22 place private sector investment otherwise
23 likely to occur, including investment from
24 private sector entities that are members of
25 the Consortium;

1 (ii) to facilitate the participation of
2 private entities that invest in clean energy
3 technologies to perform due diligence on
4 award proposals, to participate in the
5 award review process, and to provide guid-
6 ance to projects supported by the Consor-
7 tium; and

8 (iii) to facilitate the participation of
9 parties with a demonstrated history of
10 commercial application of clean energy
11 technologies in the development of Consor-
12 tium projects;

13 (D) oversee project solicitations, review
14 proposed projects, and select projects for
15 awards; and

16 (E) monitor project implementation.

17 (2) DISTRIBUTION OF AWARDS.—The Consor-
18 tium, with prior approval of the Secretary, shall dis-
19 tribute awards under this subsection to support
20 clean energy technology projects conducting
21 translational research, provided that at least 50 per-
22 cent of such support shall be provided to projects re-
23 lated to the Consortium’s clean energy technology
24 development focus. Upon approval by the Secretary,
25 all remaining funds shall be available to support any

1 clean energy technology projects conducting
2 translational research.

3 (3) EXTERNAL ADVISORY COMMITTEE.—

4 (A) IN GENERAL.—The Consortium shall
5 establish an External Advisory Committee, the
6 members of which shall have extensive and rel-
7 evant scientific, technical, industry, financial, or
8 research management expertise. The External
9 Advisory Committee shall review the Consor-
10 tium’s proposed plans, programs, project selec-
11 tion criteria, and projects and shall ensure that
12 projects selected for awards meet the conflict of
13 interest policies of the Consortium. External
14 Advisory Committee members other than those
15 representing Consortium members shall serve
16 for no more than 3 years. All External Advisory
17 Committee members shall comply with the Con-
18 sortium’s conflict of interest policies and proce-
19 dures.

20 (B) MEMBERS.—The External Advisory
21 Committee shall consist of—

22 (i) 5 members selected by the Consor-
23 tium’s research universities;

24 (ii) 2 members selected by the Consor-
25 tium’s other qualifying entities;

1 (iii) 2 members selected at large by
2 other External Advisory Committee mem-
3 bers to represent the entrepreneur and
4 venture capital communities; and

5 (iv) 1 member appointed by the Sec-
6 retary.

7 (4) CONFLICT OF INTEREST.—The Secretary
8 may disqualify an application or revoke funds dis-
9 tributed to the Consortium if the Secretary discovers
10 a failure to comply with conflict of interest proce-
11 dures established under paragraph (1)(B).

12 (f) GRANT.—

13 (1) IN GENERAL.—The Secretary shall make a
14 grant under this section in accordance with section
15 989 of the Energy Policy Act of 2005 (42 U.S.C.
16 16353). The Secretary shall award the grant, on a
17 competitive basis, to 1 regional Consortium, for a
18 term of 3 years.

19 (2) AMOUNT.—A grant under this subsection
20 shall be in an amount not greater than \$10,000,000
21 per fiscal year over the 3 years of the term of the
22 grant.

23 (3) USE.—The grant distributed under this sec-
24 tion shall be used exclusively to support project
25 awards pursuant to subsection (e)(1) and (2), pro-

1 vided that the Consortium may use not more than
2 10 percent of the amount of such grant for its ad-
3 ministrative expenses related to making such
4 awards. The grant made under this section shall not
5 be used for construction of new buildings or facili-
6 ties, and construction of new buildings or facilities
7 shall not be considered as part of the non-Federal
8 share of a cost sharing agreement under this section.

9 (4) AUDIT.—The Consortium shall conduct, in
10 accordance with such requirements as the Secretary
11 may prescribe, an annual audit to determine the ex-
12 tent to which a grant distributed to the Consortium
13 under this subsection, and awards under subsection
14 (e), have been utilized in a manner consistent with
15 this section. The auditor shall transmit a report of
16 the results of the audit to the Secretary and to the
17 Government Accountability Office. The Secretary
18 shall include such report in an annual report to Con-
19 gress, along with a plan to remedy any deficiencies
20 cited in the report. The Government Accountability
21 Office may review such audits as appropriate and
22 shall have full access to the books, records, and per-
23 sonnel of the Consortium to ensure that the grant
24 distributed to the Consortium under this subsection,

1 and awards made under subsection (e), have been
2 utilized in a manner consistent with this section.

3 (5) REVOCATION OF AWARDS.—The Secretary
4 shall have authority to review awards made under
5 this subsection and to revoke such awards if the Sec-
6 retary determines that the Consortium has used the
7 award in a manner not consistent with the require-
8 ments of this section.

9 **TITLE VI—DEPARTMENT OF** 10 **ENERGY**

11 **Subtitle A—Office of Science**

12 **SEC. 601. SHORT TITLE.**

13 This subtitle may be cited as the “Department of En-
14 ergy Office of Science Authorization Act of 2010”.

15 **SEC. 602. DEFINITIONS.**

16 Except as otherwise provided, in this subtitle:

17 (1) DEPARTMENT.—The term “Department”
18 means the Department of Energy.

19 (2) DIRECTOR.—The term “Director” means
20 the Director of the Office of Science.

21 (3) OFFICE OF SCIENCE.—The term “Office of
22 Science” means the Department of Energy Office of
23 Science.

24 (4) SECRETARY.—The term “Secretary” means
25 the Secretary of Energy.

1 **SEC. 603. MISSION OF THE OFFICE OF SCIENCE.**

2 (a) MISSION.—The mission of the Office of Science
3 shall be the delivery of scientific discoveries, capabilities,
4 and major scientific tools to transform the understanding
5 of nature and to advance the energy, economic, and na-
6 tional security of the United States.

7 (b) DUTIES.—In support of this mission, the Sec-
8 retary shall carry out, through the Office of Science, pro-
9 grams on basic energy sciences, biological and environ-
10 mental research, advanced scientific computing research,
11 fusion energy sciences, high energy physics, and nuclear
12 physics through activities focused on—

13 (1) Science for Discovery to unravel nature’s
14 mysteries through the study of subatomic particles,
15 atoms, and molecules that make up the materials of
16 our everyday world to DNA, proteins, cells, and en-
17 tire biological systems;

18 (2) Science for National Need by—

19 (A) advancing a clean energy agenda
20 through research on energy production, storage,
21 transmission, efficiency, and use; and

22 (B) advancing our understanding of the
23 Earth’s climate through research in atmos-
24 pheric and environmental sciences and climate
25 change; and

1 (3) National Scientific User Facilities to deliver
2 the 21st century tools of science, engineering, and
3 technology and provide the Nation's researchers with
4 the most advanced tools of modern science including
5 accelerators, colliders, supercomputers, light sources
6 and neutron sources, and facilities for studying the
7 nanoworld.

8 (c) SUPPORTING ACTIVITIES.—The activities de-
9 scribed in subsection (b) shall include providing for rel-
10 evant facilities and infrastructure, analysis, coordination,
11 and education and outreach activities.

12 (d) USER FACILITIES.—The Director shall carry out
13 the construction, operation, and maintenance of user fa-
14 cilities to support the activities described in subsection (b).
15 As practicable, these facilities shall serve the needs of the
16 Department, industry, the academic community, and other
17 relevant entities for the purposes of advancing the mis-
18 sions of the Department.

19 (e) OTHER AUTHORIZED ACTIVITIES.—In addition to
20 the activities authorized under this subtitle, the Office of
21 Science shall carry out such other activities it is author-
22 ized or required to carry out by law.

23 (f) COORDINATION AND JOINT ACTIVITIES.—The
24 Department's Under Secretary for Science shall ensure
25 the coordination of activities under this subtitle with the

1 other activities of the Department, and shall support joint
2 activities among the programs of the Department.

3 (g) DOMESTICALLY SOURCED HARDWARE.—

4 (1) PLAN.—The Director shall develop a plan
5 to increase the percentage of domestically sourced
6 hardware for planned and ongoing projects of the
7 Office of Science. In developing this plan, the Direc-
8 tor shall—

9 (A) give consideration to technologies that
10 the United States does not currently have the
11 capacity to manufacture and to procurement ac-
12 tivities that can strengthen United States high-
13 technology competitiveness broadly;

14 (B) seek opportunities to engage and part-
15 ner with domestic manufacturers; and

16 (C) annually assess levels of domestically
17 available goods relevant to planned and ongoing
18 projects of the Office of Science.

19 (2) INTERNATIONAL AGREEMENTS.—This sub-
20 section shall be applied in a manner consistent with
21 United States obligations under international agree-
22 ments.

23 (3) REPORT TO CONGRESS.—Not later than 1
24 year after the date of enactment of this Act, the Di-
25 rector shall transmit the plan developed under this

1 subsection to the Committee on Energy and Natural
2 Resources of the Senate and the Committee on
3 Science and Technology of the House of Representa-
4 tives, and shall transmit any appropriate updates to
5 those committees.

6 (h) MERIT-REVIEWED STUDY.—As part of the Presi-
7 dent’s annual budget request, the Secretary shall include
8 a detailed summary of the degree to which current re-
9 search activities are competitive and merit-reviewed, in-
10 cluding a list of activities that would have been undertaken
11 in the absence of Congressionally-directed projects and an
12 analysis of the effects of increasing the proportion of com-
13 petitive, merit-reviewed activities on the strategic objec-
14 tives of the Office of Science.

15 **SEC. 604. BASIC ENERGY SCIENCES PROGRAM.**

16 (a) PROGRAM.—As part of the activities authorized
17 under section 603, the Director shall carry out a program
18 in basic energy sciences, including materials sciences and
19 engineering, chemical sciences, physical biosciences, and
20 geosciences, for the purpose of providing the scientific
21 foundations for new energy technologies.

22 (b) BASIC ENERGY SCIENCES USER FACILITIES.—
23 (1) IN GENERAL.—The Director shall carry out
24 a program for the construction, operation, and main-
25 tenance of national user facilities to support the pro-

1 gram under this section. As practicable, these facili-
2 ties shall serve the needs of the Department, indus-
3 try, the academic community, and other relevant en-
4 tities to create and examine new materials and
5 chemical processes for the purposes of advancing
6 new energy technologies and improving the competi-
7 tiveness of the United States. These facilities shall
8 include—

9 (A) x-ray light sources;

10 (B) neutron sources;

11 (C) electron beam microcharacterization
12 centers;

13 (D) nanoscale science research centers;

14 and

15 (E) other facilities the Director considers
16 appropriate, consistent with section 603(d).

17 (2) FACILITY CONSTRUCTION AND UP-
18 GRADES.—Consistent with the Office of Science’s
19 project management practices, the Director shall
20 support construction of—

21 (A) the National Synchrotron Light Source

22 II;

23 (B) a Second Target Station at the Spall-
24 ation Neutron Source; and

1 (C) an upgrade of the Advanced Photon
2 Source to improve brightness and performance.

3 (c) ENERGY FRONTIER RESEARCH CENTERS.—

4 (1) IN GENERAL.—The Director shall carry out
5 a grant program to provide awards, on a competi-
6 tive, merit-reviewed basis, to multi-institutional col-
7 laborations or other appropriate entities to conduct
8 fundamental and use-inspired energy research to ac-
9 celerate scientific breakthroughs related to needs
10 identified in—

11 (A) the Grand Challenges report of the De-
12 partment’s Basic Energy Sciences Advisory
13 Committee;

14 (B) the Basic Energy Sciences Basic Re-
15 search Needs workshop reports;

16 (C) energy-related Grand Challenges for
17 Engineering, as described by the National
18 Academy of Engineering; or

19 (D) other relevant reports identified by the
20 Director.

21 (2) COLLABORATIONS.—A collaboration receiv-
22 ing a grant under this subsection may include mul-
23 tiple types of institutions and private sector entities.

24 (3) SELECTION AND DURATION.—

1 (A) IN GENERAL.—A collaboration under
2 this subsection shall be selected for a period of
3 5 years.

4 (B) REAPPLICATION.—After the end of the
5 period described in subparagraph (A), a grantee
6 may reapply for selection for a second period of
7 5 years on a competitive, merit-reviewed basis.

8 (4) NO FUNDING FOR CONSTRUCTION.—No
9 funding provided pursuant to this subsection may be
10 used for the construction of new buildings or facili-
11 ties.

12 (d) ACCELERATOR RESEARCH AND DEVELOP-
13 MENT.—The Director shall carry out research and devel-
14 opment on advanced accelerator technologies relevant to
15 the development of Basic Energy Sciences user facilities,
16 in consultation with the Office of Science’s High Energy
17 Physics and Nuclear Physics programs.

18 **SEC. 605. BIOLOGICAL AND ENVIRONMENTAL RESEARCH**
19 **PROGRAM.**

20 (a) IN GENERAL.—As part of the activities author-
21 ized under section 603, and coordinated with the activities
22 authorized in section 604, the Director shall carry out a
23 program of research, development, and demonstration in
24 the areas of biological systems science and climate and en-

1 vironmental science to support the energy and environ-
2 mental missions of the Department.

3 (b) BIOLOGICAL SYSTEMS SCIENCE ACTIVITIES.—

4 (1) ACTIVITIES.—As part of the activities au-
5 thORIZED under subsection (a), the Director shall
6 carry out research, development, and demonstration
7 activities in fundamental, structural, computational,
8 and systems biology to increase systems-level under-
9 standing of complex biological systems, which shall
10 include activities to—

11 (A) accelerate breakthroughs and new
12 knowledge that will enable cost-effective sus-
13 tainable production of—

14 (i) biomass-based liquid transpor-
15 tation fuels, including hydrogen;

16 (ii) bioenergy; and

17 (iii) biobased products,

18 that support the energy and environmental mis-
19 sions of the Department;

20 (B) improve understanding of the global
21 carbon cycle, including processes for removing
22 carbon dioxide from the atmosphere, through
23 photosynthesis and other biological processes,
24 for sequestration and storage; and

1 (C) understand the biological mechanisms
2 used to destroy, immobilize, or remove contami-
3 nants from subsurface environments.

4 (2) RESEARCH PLAN.—

5 (A) REQUIREMENT.—Not later than 1
6 year after the date of enactment of this Act, the
7 Director shall prepare and transmit to Congress
8 a research plan describing how the activities au-
9 thorized under this subsection will be under-
10 taken.

11 (B) UTILIZATION OF EXISTING PLAN.—In
12 developing the plan in subparagraph (A), the
13 Director may utilize an existing research plan
14 and update such plan to incorporate the activi-
15 ties identified in paragraph (1).

16 (C) UPDATES.—Not later than 3 years
17 after the initial report under this paragraph,
18 and at least once every 3 years thereafter, the
19 Director shall update the research plan and
20 transmit it to Congress.

21 (3) BIOENERGY RESEARCH CENTERS.—

22 (A) IN GENERAL.—In carrying out the ac-
23 tivities under paragraph (1), the Director shall
24 support at least 3 bioenergy research centers to
25 accelerate basic biological research, develop-

1 ment, demonstration, and commercial applica-
2 tion of biomass-based liquid transportation
3 fuels, bioenergy, and biobased products that
4 support the energy and environmental missions
5 of the Department and are produced from a va-
6 riety of regionally diverse feedstocks.

7 (B) GEOGRAPHIC DISTRIBUTION.—The Di-
8 rector shall ensure that the bioenergy research
9 centers under this paragraph are established in
10 geographically diverse locations.

11 (C) SELECTION AND DURATION.—A center
12 established under subparagraph (A) shall be se-
13 lected on a competitive, merit-reviewed basis for
14 a period of 5 years beginning on the date of es-
15 tablishment of that center. A center already in
16 existence on the date of enactment of this Act
17 may continue to receive support for a period of
18 5 years beginning on the date of establishment
19 of that center.

20 (4) ENABLING SYNTHETIC BIOLOGY PLAN.—

21 (A) IN GENERAL.—The Secretary, in con-
22 sultation with other relevant Federal agencies,
23 the academic community, research-based non-
24 profit entities, and the private sector, shall de-
25 velop a comprehensive plan for federally sup-

1 ported research and development activities that
2 will support the energy and environmental mis-
3 sions of the Department and enable a competi-
4 tive synthetic biology industry in the United
5 States.

6 (B) PLAN.—The plan developed under sub-
7 paragraph (A) shall assess the need to create a
8 database for synthetic biology information, the
9 need and process for developing standards for
10 biological parts, components and systems, and
11 the need for a federally funded facility that en-
12 ables the discovery, design, development, pro-
13 duction, and systematic use of parts, compo-
14 nents, and systems created through synthetic
15 biology. The plan shall describe the role of the
16 Federal Government in meeting these needs.

17 (C) SUBMISSION TO CONGRESS.—The Sec-
18 retary shall transmit the plan developed under
19 subparagraph (A) to the Congress not later
20 than 9 months after the date of enactment of
21 this Act.

22 (5) COMPUTATIONAL BIOLOGY AND SYSTEMS
23 BIOLOGY KNOWLEDGEBASE.—As part of the activi-
24 ties described in paragraph (1), the Director, in col-
25 laboration with the Advanced Scientific Computing

1 Research program described in section 606, shall
2 carry out research in computational biology, acquire
3 or otherwise ensure the availability of hardware for
4 biology-specific computation, and establish and
5 maintain an open virtual database and information
6 management system to centrally integrate systems
7 biology data, analytical software, and computational
8 modeling tools that will allow data sharing and free
9 information exchange within the scientific commu-
10 nity.

11 (6) PROHIBITION ON BIOMEDICAL AND HUMAN
12 CELL AND HUMAN SUBJECT RESEARCH.—

13 (A) NO BIOMEDICAL RESEARCH.—In car-
14 rying out activities under subsection (b), the
15 Secretary shall not conduct biomedical research.

16 (B) LIMITATIONS.—Nothing in subsection
17 (b) shall authorize the Secretary to conduct any
18 research or demonstrations—

19 (i) on human cells or human subjects;

20 or

21 (ii) designed to have direct application
22 with respect to human cells or human sub-
23 jects.

24 (C) INFORMATION SHARING.—Nothing in
25 this paragraph shall restrict the Department

1 from sharing information, including research
2 findings, research methodologies, models, or
3 any other information, with any Federal agen-
4 cy.

5 (7) REPEAL.—Section 977 of the Energy Policy
6 Act of 2005 (42 U.S.C. 16317) is repealed.

7 (c) CLIMATE AND ENVIRONMENTAL SCIENCES AC-
8 TIVITIES.—

9 (1) IN GENERAL.—As part of the activities au-
10 thorized under subsection (a), the Director shall
11 carry out climate and environmental science re-
12 search, which shall include activities to—

13 (A) understand, observe, and model the re-
14 sponse of the Earth’s atmosphere and bio-
15 sphere, including oceans and the Great Lakes,
16 to increased concentrations of greenhouse gas
17 emissions, and any associated changes in cli-
18 mate;

19 (B) understand the processes for seques-
20 tration, destruction, immobilization, or removal
21 of, and understand the movement of, contami-
22 nants and carbon in subsurface environments,
23 including at facilities of the Department; and

24 (C) inform potential mitigation and adap-
25 tation options for increased concentrations of

1 greenhouse gas emissions and any associated
2 changes in climate.

3 (2) SUBSURFACE BIOGEOCHEMISTRY RE-
4 SEARCH.—

5 (A) IN GENERAL.—As part of the activities
6 described in paragraph (1), the Director shall
7 carry out research to advance a fundamental
8 understanding of coupled physical, chemical,
9 and biological processes for controlling the
10 movement of sequestered carbon and subsurface
11 environmental contaminants, including field ob-
12 servations of subsurface microorganisms and
13 field-scale subsurface research.

14 (B) COORDINATION.—

15 (i) DIRECTOR.—The Director shall
16 carry out activities under this paragraph in
17 accordance with priorities established by
18 the Department's Under Secretary for
19 Science to support and accelerate the de-
20 contamination of relevant facilities man-
21 aged by the Department.

22 (ii) UNDER SECRETARY FOR
23 SCIENCE.—The Department's Under Sec-
24 retary for Science shall ensure the coordi-
25 nation of the activities of the Department,

1 including activities under this paragraph,
2 to support and accelerate the decontamina-
3 tion of relevant facilities managed by the
4 Department.

5 (3) NEXT-GENERATION ECOSYSTEM-CLIMATE
6 EXPERIMENT.—

7 (A) IN GENERAL.—As part of the activities
8 described in paragraph (1), the Director, in col-
9 laboration with other relevant agencies that are
10 participants in the United States Global
11 Change Research Program, shall carry out the
12 selection and development of a next-generation
13 ecosystem-climate change experiment to under-
14 stand the impact and feedbacks of increased
15 temperature and elevated carbon levels on eco-
16 systems.

17 (B) REPORT.—Not later than 1 year after
18 the date of enactment of this Act, the Director
19 shall transmit to the Congress a report con-
20 taining—

21 (i) an identification of the location or
22 locations that have been selected for the
23 experiment described in subparagraph (A);

24 (ii) a description of the need for addi-
25 tional experiments; and

1 (iii) an associated research plan.

2 (4) AMERIFLUX NETWORK COORDINATION AND
3 RESEARCH.—As part of the activities described in
4 paragraph (1), the Director shall carry out research
5 and coordinate the AmeriFlux Network to directly
6 observe and understand the exchange of greenhouse
7 gases, water vapor, and heat energy within terres-
8 trial ecosystems and the response of those systems
9 to climate change and other dynamic terrestrial
10 landscape changes. The Director, in collaboration
11 with other relevant Federal agencies, shall—

12 (A) identify opportunities to incorporate
13 innovative and emerging observation tech-
14 nologies and practices into the existing Net-
15 work;

16 (B) conduct research to determine the
17 need for increased greenhouse gas observation
18 Network facilities across North America to
19 meet future mitigation and adaptation needs of
20 the United States; and

21 (C) examine how the technologies and
22 practices described in subparagraph (A), and
23 increased coordination among scientific commu-
24 nities through the Network, have the potential
25 to help characterize terrestrial baseline green-

1 house gas emission sources and sinks in the
2 United States and internationally.

3 (5) CLIMATE AND EARTH MODELING.—As part
4 of the activities described in paragraph (1), the Di-
5 rector, in collaboration with the Advanced Scientific
6 Computing Research program described in section
7 606, shall carry out research to develop, evaluate,
8 and use high-resolution regional climate, global cli-
9 mate, Earth, and predictive models to inform deci-
10 sions on reducing the impacts of changing climate.

11 (6) INTEGRATED ASSESSMENT RESEARCH.—As
12 part of the activities described in paragraph (1), the
13 Director shall carry out research into options for
14 mitigation of and adaptation to climate change
15 through multiscale models of the entire climate sys-
16 tem. Such modeling shall include human processes
17 and greenhouse gas emissions, land use, and inter-
18 action among human and Earth systems.

19 (7) COORDINATION.—The Director shall coordi-
20 nate activities under this subsection with other Of-
21 fice of Science activities and with the United States
22 Global Change Research Program.

23 (d) USER FACILITIES AND ANCILLARY EQUIP-
24 MENT.—

1 (1) IN GENERAL.—The Director shall carry out
2 a program for the construction, operation, and main-
3 tenance of user facilities to support the program
4 under this section. As practicable, these facilities
5 shall serve the needs of the Department, industry,
6 the academic community, and other relevant entities.

7 (2) INCLUDED FUNCTIONS.—User facilities de-
8 scribed in paragraph (1) shall include facilities which
9 carry out—

10 (A) genome sequencing and analysis of
11 plants, microbes, and microbial communities
12 using high throughput tools, technologies, and
13 comparative analysis;

14 (B) molecular level research in biological,
15 chemical, environmental, and subsurface
16 sciences, including synthesis, dynamic prop-
17 erties, and interactions among natural and en-
18 gineered materials; and

19 (C) measurement of cloud and aerosol
20 properties used for examining atmospheric proc-
21 esses and evaluating climate model perform-
22 ance, including ground stations at various loca-
23 tions, mobile resources, and aerial vehicles.

1 **SEC. 606. ADVANCED SCIENTIFIC COMPUTING RESEARCH**
2 **PROGRAM.**

3 (a) IN GENERAL.—As part of the activities author-
4 ized under section 603, the Director shall carry out a re-
5 search, development, demonstration, and commercial ap-
6 plication program to advance computational and net-
7 working capabilities to analyze, model, simulate, and pre-
8 dict complex phenomena relevant to the development of
9 new energy technologies and the competitiveness of the
10 United States.

11 (b) COORDINATION.—

12 (1) DIRECTOR.—The Director shall carry out
13 activities under this section in accordance with prior-
14 ities established by the Department's Under Sec-
15 retary for Science to determine and meet the com-
16 putational and networking research and facility
17 needs of the Office of Science and all other relevant
18 energy technology and energy efficiency programs
19 within the Department.

20 (2) UNDER SECRETARY FOR SCIENCE.—The
21 Department's Under Secretary for Science shall en-
22 sure the coordination of the activities of the Depart-
23 ment, including activities under this section, to de-
24 termine and meet the computational and networking
25 research and facility needs of the Office of Science

1 and all other relevant energy technology and energy
2 efficiency programs within the Department.

3 (c) RESEARCH TO SUPPORT ENERGY APPLICA-
4 TIONS.—As part of the activities authorized under sub-
5 section (a), the program shall support research in high-
6 performance computing and networking relevant to energy
7 applications, including both basic and applied energy re-
8 search programs carried out by the Secretary.

9 (d) REPORTS.—

10 (1) ADVANCED COMPUTING FOR ENERGY APPLI-
11 CATIONS.—Not later than one year after the date of
12 enactment of this Act, the Secretary shall transmit
13 to the Congress a plan to integrate and leverage the
14 expertise and capabilities of the program described
15 in subsection (a), as well as other relevant computa-
16 tional and networking research programs and re-
17 sources supported by the Federal Government, to
18 advance the missions of the Department’s applied
19 energy and energy efficiency programs, including the
20 development of smart grid technologies.

21 (2) EXASCALE COMPUTING.—At least 18
22 months prior to the initiation of construction or in-
23 stallation of any exascale-class computing facility,
24 the Secretary shall transmit a plan to the Congress
25 detailing—

1 (A) the proposed facility's cost projections
2 and capabilities to significantly accelerate the
3 development of new energy technologies;

4 (B) technical risks and challenges that
5 must be overcome to achieve successful comple-
6 tion and operation of the facility; and

7 (C) an assessment of the scientific and
8 technological advances expected from such a fa-
9 cility relative to those expected from a com-
10 parable investment in expanded research and
11 applications at terascale-class and petascale-
12 class computing facilities.

13 (e) APPLIED MATHEMATICS AND SOFTWARE DEVEL-
14 OPMENT FOR HIGH-END COMPUTING SYSTEMS.—The Di-
15 rector shall carry out activities to develop, test, and sup-
16 port mathematics, models, and algorithms for complex
17 systems, as well as programming environments, tools, lan-
18 guages, and operating systems for high-end computing
19 systems (as defined in section 2 of the Department of En-
20 ergy High-End Computing Revitalization Act of 2004 (15
21 U.S.C. 5541)).

22 (f) HIGH-END COMPUTING FACILITIES.—The Direc-
23 tor shall—

24 (1) provide for sustained access by the public
25 and private research community in the United

1 States to high-end computing systems, including ac-
2 cess to the National Energy Research Scientific
3 Computing Center and to Leadership Systems (as
4 defined in section 2 of the Department of Energy
5 High-End Computing Revitalization Act of 2004 (15
6 U.S.C. 5541));

7 (2) provide technical support for users of such
8 systems; and

9 (3) conduct research and development on next-
10 generation computing architectures and platforms to
11 support the missions of the Department.

12 (g) OUTREACH.—The Secretary shall conduct out-
13 reach programs and may form partnerships to increase the
14 use of and access to high-performance computing mod-
15 eling and simulation capabilities by industry, including
16 manufacturers.

17 **SEC. 607. FUSION ENERGY RESEARCH PROGRAM.**

18 (a) PROGRAM.—As part of the activities authorized
19 under section 603, the Director shall carry out a fusion
20 energy sciences research and enabling technology develop-
21 ment program to effectively address the scientific and en-
22 gineering challenges to building a cost-competitive fusion
23 power plant and a competitive fusion power industry in
24 the United States. As part of this program, the Director
25 shall carry out research activities to expand the funda-

1 mental understanding of plasmas and matter at very high
2 temperatures and densities.

3 (b) ITER.—The Director shall coordinate and carry
4 out the responsibilities of the United States with respect
5 to the ITER international fusion project pursuant to the
6 Agreement on the Establishment of the ITER Inter-
7 national Fusion Energy Organization for the Joint Imple-
8 mentation of the ITER Project.

9 (c) IDENTIFICATION OF PRIORITIES.—Not later than
10 18 months after the date of enactment of this Act, the
11 Secretary shall transmit to the Congress a report on the
12 Department's proposed research and development activi-
13 ties in magnetic fusion over the 10 years following the date
14 of enactment of this Act under four realistic budget sce-
15 narios. The report shall—

16 (1) identify specific areas of fusion energy re-
17 search and enabling technology development in
18 which the United States can and should establish or
19 solidify a lead in the global fusion energy develop-
20 ment effort; and

21 (2) identify priorities for initiation of facility
22 construction and facility decommissioning under
23 each of those scenarios.

24 (d) FUSION MATERIALS RESEARCH AND DEVELOP-
25 MENT.—The Director, in coordination with the Assistant

1 Secretary for Nuclear Energy of the Department, shall
2 carry out research and development activities to identify,
3 characterize, and create materials that can endure the
4 neutron, plasma, and heat fluxes expected in a commercial
5 fusion power plant. As part of the activities authorized
6 under subsection (c), the Secretary shall—

7 (1) provide an assessment of the need for a fa-
8 cility or facilities that can examine and test potential
9 fusion and next generation fission materials and
10 other enabling technologies relevant to the develop-
11 ment of commercial fusion power plants; and

12 (2) provide an assessment of whether a single
13 new facility that substantially addresses magnetic
14 fusion, inertial fusion, and next generation fission
15 materials research needs is feasible, in conjunction
16 with the expected capabilities of facilities operational
17 as of the date of enactment of this Act.

18 (e) ENABLING TECHNOLOGY DEVELOPMENT.—The
19 Secretary shall carry out activities to develop technologies
20 necessary to enable the reliable, sustainable, safe, and eco-
21 nomically competitive operation of a commercial fusion
22 power plant.

23 (f) FUSION SIMULATION PROJECT.—In collaboration
24 with the Office of Science’s Advanced Scientific Com-
25 puting Research program described in section 606, the Di-

1 rector shall carry out a computational project to advance
2 the capability of fusion researchers to accurately simulate
3 an entire fusion energy system.

4 (g) **INERTIAL FUSION ENERGY RESEARCH AND DE-**
5 **VELOPMENT PROGRAM.**—The Secretary shall carry out a
6 program of research and technology development in iner-
7 tial fusion for energy applications, including ion beam and
8 laser fusion. Not later than 180 days after the release of
9 a report from the National Academies on inertial fusion
10 energy research, the Secretary shall transmit to Congress
11 a report describing the Department’s plan to incorporate
12 any relevant recommendations from the National Acad-
13 emies’ report into this program.

14 **SEC. 608. HIGH ENERGY PHYSICS PROGRAM.**

15 (a) **PROGRAM.**—As part of the activities authorized
16 under section 603, the Director shall carry out a research
17 program on the elementary constituents of matter and en-
18 ergy and the nature of space and time.

19 (b) **NEUTRINO RESEARCH.**—As part of the program
20 described in subsection (a), the Director shall carry out
21 research activities on rare decay processes and the nature
22 of the neutrino, which may—

23 (1) include collaborations with the National
24 Science Foundation on relevant projects; and

1 (2) utilize components of existing accelerator
2 facilities to produce neutrino beams of sufficient in-
3 tensity to explore research priorities identified by the
4 High Energy Physics Advisory Panel or the National
5 Academy of Sciences.

6 (c) DARK ENERGY AND DARK MATTER RE-
7 SEARCH.—As part of the program described in subsection
8 (a), the Director shall carry out research activities on the
9 nature of dark energy and dark matter. These activities
10 shall be consistent with research priorities identified by
11 the High Energy Physics Advisory Panel or the National
12 Academy of Sciences, and may include—

13 (1) the development of space-based and land-
14 based facilities and experiments; and

15 (2) collaborations with the National Aeronautics
16 and Space Administration, the National Science
17 Foundation, or international collaborations on rel-
18 evant research projects.

19 (d) ACCELERATOR RESEARCH AND DEVELOP-
20 MENT.—The Director shall carry out research and devel-
21 opment in advanced accelerator concepts and technologies
22 to reduce the necessary scope and cost for the next genera-
23 tion of particle accelerators.

24 (e) INTERNATIONAL COLLABORATION.—The Direc-
25 tor, as practicable and in coordination with other appro-

1 p r i a t e F e d e r a l a g e n c i e s a s n e c e s s a r y , s h a l l e n s u r e t h e a c -
2 c e s s o f U n i t e d S t a t e s r e s e a r c h e r s t o t h e m o s t a d v a n c e d
3 a c c e l e r a t o r f a c i l i t i e s a n d r e s e a r c h c a p a b i l i t i e s i n t h e w o r l d ,
4 i n c l u d i n g t h e L a r g e H a d r o n C o l l i d e r .

5 **SEC. 609. NUCLEAR PHYSICS PROGRAM.**

6 (a) PROGRAM.—As part of the activities authorized
7 u n d e r s e c t i o n 6 0 3 , t h e D i r e c t o r s h a l l c a r r y o u t a r e s e a r c h
8 p r o g r a m , a n d s u p p o r t r e l e v a n t f a c i l i t i e s , t o d i s c o v e r a n d
9 u n d e r s t a n d v a r i o u s f o r m s o f n u c l e a r m a t t e r .

10 (b) FACILITY CONSTRUCTION AND UPGRADES.—
11 C o n s i s t e n t w i t h t h e O f f i c e o f S c i e n c e ' s p r o j e c t m a n a g e -
12 m e n t p r a c t i c e s , t h e D i r e c t o r s h a l l c a r r y o u t —

13 (1) an upgrade of the Continuous Electron
14 B e a m A c c e l e r a t o r F a c i l i t y t o a 1 2 g i g a e l e c t r o n v o l t
15 b e a m o f e l e c t r o n s ; a n d

16 (2) construction of the Facility for Rare Isotope
17 B e a m s .

18 (c) ISOTOPE DEVELOPMENT AND PRODUCTION FOR
19 R E S E A R C H A P P L I C A T I O N S . — T h e D i r e c t o r s h a l l c a r r y o u t
20 a p r o g r a m f o r t h e p r o d u c t i o n o f i s o t o p e s , i n c l u d i n g t h e
21 d e v e l o p m e n t o f t e c h n i q u e s t o p r o d u c e i s o t o p e s , t h a t t h e
22 S e c r e t a r y d e t e r m i n e s a r e n e e d e d f o r r e s e a r c h , e x c l u d i n g
23 m e d i c a l r e s e a r c h . I n m a k i n g t h i s d e t e r m i n a t i o n , t h e S e c -
24 r e t a r y s h a l l c o n s i d e r a n y r e l e v a n t r e c o m m e n d a t i o n s m a d e
25 b y F e d e r a l a d v i s o r y c o m m i t t e e s , t h e N a t i o n a l A c a d e m i e s ,

1 and interagency working groups in which the Department
2 participates.

3 **SEC. 610. SCIENCE LABORATORIES INFRASTRUCTURE PRO-**
4 **GRAM.**

5 (a) PROGRAM.—The Director shall carry out a pro-
6 gram to improve the safety, efficiency, and mission readi-
7 ness of infrastructure at Office of Science laboratories.
8 The program shall include projects to—

9 (1) renovate or replace space that does not
10 meet research needs;

11 (2) replace facilities that are no longer cost ef-
12 fective to renovate or operate;

13 (3) modernize utility systems to prevent failures
14 and ensure efficiency;

15 (4) remove excess facilities to allow safe and ef-
16 ficient operations; and

17 (5) construct modern facilities to conduct ad-
18 vanced research in controlled environmental condi-
19 tions.

20 (b) MINOR CONSTRUCTION PROJECTS.—

21 (1) AUTHORITY.—Using operation and mainte-
22 nance funds or facilities and infrastructure funds
23 authorized by law, the Secretary may carry out
24 minor construction projects with respect to labora-
25 tories administered by the Office of Science.

1 (2) ANNUAL REPORT.—The Secretary shall
2 submit to Congress, as part of the annual budget
3 submission of the Department, a report on each ex-
4 ercise of the authority under subsection (a) during
5 the preceding fiscal year. Each report shall include
6 a summary of maintenance and infrastructure needs
7 and associated funding requirements at each of the
8 laboratories, including the amount of both planned
9 and deferred infrastructure spending at each labora-
10 tory. Each report shall provide a brief description of
11 each minor construction project covered by the re-
12 port.

13 (3) COST VARIATION REPORTS.—If, at any time
14 during the construction of any minor construction
15 project, the estimated cost of the project is revised
16 and the revised cost of the project exceeds the minor
17 construction threshold, the Secretary shall imme-
18 diately submit to Congress a report explaining the
19 reasons for the cost variation.

20 (4) DEFINITIONS.—In this section—

21 (A) the term “minor construction project”
22 means any plant project not specifically author-
23 ized by law for which the approved total esti-
24 mated cost does not exceed the minor construc-
25 tion threshold; and

1 (B) the term “minor construction thresh-
2 old” means \$10,000,000, with such amount to
3 be adjusted by the Secretary in accordance with
4 the Engineering News-Record Construction
5 Cost Index, or an appropriate alternative index
6 as determined by the Secretary, once every five
7 years after the date of enactment of this Act.

8 (5) NONAPPLICABILITY.—Sections 4703 and
9 4704 of the Atomic Energy Defense Act (50 U.S.C.
10 2743 and 2744) shall not apply to laboratories ad-
11 ministered by the Office of Science.

12 **SEC. 611. AUTHORIZATION OF APPROPRIATIONS.**

13 There are authorized to be appropriated to the Sec-
14 retary for the activities of the Office of Science—

15 (1) \$5,247,000,000 for fiscal year 2011, of
16 which—

17 (A) \$1,875,000,000 shall be for Basic En-
18 ergy Sciences activities under section 604;

19 (B) \$667,000,000 shall be for Biological
20 and Environmental Research activities under
21 section 605; and

22 (C) \$466,000,000 shall be for Advanced
23 Scientific Computing Research activities under
24 section 606;

1 (2) \$5,614,000,000 for fiscal year 2012, of
2 which—

3 (A) \$2,025,000,000 shall be for Basic En-
4 ergy Sciences activities under section 604;

5 (B) \$720,000,000 shall be for Biological
6 and Environmental Research activities under
7 section 605; and

8 (C) \$503,000,000 shall be for Advanced
9 Scientific Computing Research activities under
10 section 606;

11 (3) \$6,007,000,000 for fiscal year 2013, of
12 which—

13 (A) \$2,187,000,000 shall be for Basic En-
14 ergy Sciences activities under section 604;

15 (B) \$778,000,000 shall be for Biological
16 and Environmental Research activities under
17 section 605; and

18 (C) \$544,000,000 shall be for Advanced
19 Scientific Computing Research activities under
20 section 606;

21 (4) \$6,428,000,000 for fiscal year 2014, of
22 which—

23 (A) \$2,362,000,000 shall be for Basic En-
24 ergy Sciences activities under section 604;

1 (B) \$840,000,000 shall be for Biological
2 and Environmental Research activities under
3 section 605; and

4 (C) \$587,000,000 shall be for Advanced
5 Scientific Computing Research activities under
6 section 606; and

7 (5) \$6,878,000,000 for fiscal year 2015, of
8 which—

9 (A) \$2,551,000,000 shall be for Basic En-
10 ergy Sciences activities under section 604;

11 (B) \$907,000,000 shall be for Biological
12 and Environmental Research activities under
13 section 605; and

14 (C) \$634,000,000 shall be for Advanced
15 Scientific Computing Research activities under
16 section 606.

17 **Subtitle B—Advanced Research**
18 **Projects Agency-Energy**

19 **SEC. 621. SHORT TITLE.**

20 This subtitle may be cited as the “ARPA-E Reau-
21 thorization Act of 2010”.

22 **SEC. 622. ARPA-E AMENDMENTS.**

23 Section 5012 of the America COMPETES Act (42
24 U.S.C. 16538) is amended—

25 (1) in subsection (c)(2)—

1 (A) in subparagraph (A), by inserting
2 “and applied” after “advances in fundamental”;

3 (B) by striking “and” at the end of sub-
4 paragraph (B);

5 (C) by striking the period at the end of
6 subparagraph (C) and inserting “; and”; and

7 (D) by adding at the end the following new
8 subparagraph:

9 “(D) promoting the commercial application
10 of advanced energy technologies.”;

11 (2) in subsection (e)(3), by amending subpara-
12 graph (C) to read as follows:

13 “(C) research and development of ad-
14 vanced manufacturing process and technologies
15 for the domestic manufacturing of novel energy
16 technologies; and”;

17 (3) in subsection (e)—

18 (A) by striking “and” at the end of para-
19 graph (3)(D);

20 (B) by striking the period at the end of
21 paragraph (4) and inserting “; and”; and

22 (C) by adding at the end the following new
23 paragraph:

24 “(5) pursuant to subsection (e)(2)(C)—

1 “(A) ensuring that applications for funding
2 disclose the extent of current and prior efforts,
3 including monetary investments as appropriate,
4 in pursuit of the technology area for which
5 funding is being requested;

6 “(B) adopting measures to ensure that, in
7 making awards, program managers adhere to
8 the objectives in subsection (c)(2)(C); and

9 “(C) providing as part of the annual report
10 required by subsection (h)(1) a summary of the
11 instances of and reasons for ARPA-E funding
12 projects in technology areas already being un-
13 dertaken by industry.”;

14 (4) by redesignating subsections (f) through
15 (m) as subsections (g), (h), (i), (j), (l), (m), (n), and
16 (o), respectively;

17 (5) by inserting after subsection (e) the fol-
18 lowing new subsection:

19 “(f) AWARDS.—In carrying out this section, the Di-
20 rector may initiate and execute awards in the form of
21 grants, contracts, cooperative agreements, cash prizes,
22 and other transactions. The Director shall make awards
23 designed to overcome the long-term and high-risk barriers
24 relating to the goals and means set forth in subsection
25 (c) and facilitate submissions, where possible by small

1 businesses and entrepreneurs, pursuant to announcements
2 published not less frequently than annually, of funding op-
3 portunities for—

4 “(1) specific areas of technological innovation;
5 and

6 “(2) broadly defined areas of science and tech-
7 nology,

8 to remain open for periods of one year.”;

9 (6) in subsection (g), as so redesignated by
10 paragraph (4) of this section—

11 (A) by redesignating paragraphs (1) and
12 (2) as paragraphs (2) and (3), respectively;

13 (B) by inserting before paragraph (2), as
14 so redesignated by subparagraph (A) of this
15 paragraph, the following new paragraph:

16 “(1) IN GENERAL.—The Director shall establish
17 and maintain within ARPA-E a staff with sufficient
18 qualifications and expertise to enable ARPA-E to
19 carry out its responsibilities under this section in
20 conjunction with the operations of the rest of the
21 Department.”;

22 (C) in paragraph (2)(A), as so redesi-
23 gnated by subparagraph (A) of this paragraph—

1 (i) in the paragraph heading, by strik-
2 ing “PROGRAM MANAGERS” and inserting
3 “PROGRAM DIRECTORS”;

4 (ii) by striking “program managers”
5 and inserting “program directors”; and

6 (iii) by striking “each of”.

7 (D) in paragraph (2)(B), as so redesign-
8 nated by subparagraph (A) of this paragraph—

9 (i) by striking “program manager”
10 and inserting “program director”;

11 (ii) in clause (iv), by striking “, with
12 advice under subsection (j) as appro-
13 priate,”;

14 (iii) by redesignating clauses (v) and
15 (vi) as clauses (vi) and (viii), respectively;

16 (iv) by inserting after clause (iv) the
17 following new clause:

18 “(v) identifying innovative cost-shar-
19 ing arrangements for ARPA-E projects, in-
20 cluding through use of the authority under
21 section 988(b)(3) of the Energy Policy Act
22 of 2005 (42 U.S.C. 16352(b)(3));”;

23 (v) in clause (vi), as so redesignated
24 by clause (iii) of this subparagraph, by

1 striking “; and” and inserting a semicolon;
2 and

3 (vi) by inserting after clause (vi), as
4 so redesignated by clause (iii) of this sub-
5 paragraph, the following new clause:

6 “(vii) identifying mechanisms for com-
7 mercial application of successful energy
8 technology development projects, including
9 through establishment of partnerships be-
10 tween awardees and commercial entities;
11 and”;

12 (E) in paragraph (2)(C), as so redesign-
13 ated by subparagraph (A) of this paragraph,
14 by inserting “up to” after “shall be”;

15 (F) in paragraph (3)(B), as so redesign-
16 ated by subparagraph (A) of this paragraph,
17 by striking “not less than 70, and not more
18 than 120,” and inserting “not more than 120”;
19 and

20 (G) by adding at the end the following new
21 paragraph:

22 “(4) FELLOWSHIPS.—The Director is author-
23 ized to select exceptional early-career and senior sci-
24 entific, legal, business, and technical personnel to
25 serve as fellows to work at ARPA-E for terms not

1 to exceed two years. Responsibilities of fellows may
2 include—

3 “(A) supporting program directors in pro-
4 gram creation, design, implementation, and
5 management;

6 “(B) exploring technical fields for future
7 ARPA-E program areas;

8 “(C) assisting the Director in the creation
9 of the strategic vision for ARPA-E referred to
10 in subsection (h)(2);

11 “(D) preparing energy technology and eco-
12 nomic analyses; and

13 “(E) any other appropriate responsibilities
14 identified by the Director.”;

15 (7) in subsection (h)(2), as so redesignated by
16 paragraph (4) of this section—

17 (A) by striking “2008” and inserting
18 “2010”; and

19 (B) by striking “2011” and inserting
20 “2013”;

21 (8) by amending subsection (j), as so redesign-
22 ated by paragraph (4) of this section, to read as
23 follows:

24 “(j) FEDERAL DEMONSTRATION OF TECH-
25 NOLOGIES.—The Director shall seek opportunities to part-

1 ner with purchasing and procurement programs of Federal
2 agencies to demonstrate energy technologies resulting
3 from activities funded through ARPA-E.”;

4 (9) by inserting after such subsection (j) the
5 following new subsection:

6 “(k) EVENTS.—

7 “(1) The Director is authorized to convene, or-
8 ganize, and sponsor events that further the objec-
9 tives of ARPA-E, including events that assemble
10 awardees, the most promising applicants for ARPA-
11 E funding, and a broad range of ARPA-E stake-
12 holders (which may include members of relevant sci-
13 entific research and academic communities, govern-
14 ment officials, financial institutions, private inves-
15 tors, entrepreneurs, and other private entities), for
16 the purposes of—

17 “(A) demonstrating projects of ARPA-E
18 awardees;

19 “(B) demonstrating projects of finalists for
20 ARPA-E awards and other energy technology
21 projects;

22 “(C) facilitating discussion of the commer-
23 cial application of energy technologies developed
24 under ARPA-E and other government-spon-
25 sored research and development programs; or

1 “(D) such other purposes as the Director
2 considers appropriate.

3 “(2) Funding for activities described in para-
4 graph (1) shall be provided as part of the technology
5 transfer and outreach activities authorized under
6 subsection (o)(4)(B).”;

7 (10) in subsection (m)(1), as so redesignated by
8 paragraph (4) of this section, by striking “4 years”
9 and inserting “6 years”;

10 (11) in subsection (m)(2)(B), as so redesign-
11 ated by paragraph (4) of this section, by inserting
12 “, and how those lessons may apply to the operation
13 of other programs within the Department of En-
14 ergy” after “ARPA-E”;

15 (12) by amending subsection (o)(2), as so re-
16 designated by paragraph (4) of this section, to read
17 as follows:

18 “(2) AUTHORIZATION OF APPROPRIATIONS.—
19 Subject to paragraph (4), there are authorized to be
20 appropriated to the Director for deposit in the
21 Fund, without fiscal year limitation—

22 “(A) \$300,000,000 for fiscal year 2011;

23 “(B) \$450,000,000 for fiscal year 2012;

24 “(C) \$600,000,000 for fiscal year 2013;

1 “(D) \$800,000,000 for fiscal year 2014;

2 and

3 “(E) \$1,000,000,000 for fiscal year

4 2015.”;

5 (13) in subsection (o), as so redesignated by
6 paragraph (4) of this section, by—

7 (A) striking paragraph (4); and

8 (B) redesignating paragraph (5) as para-
9 graph (4); and

10 (14) in subsection (o)(4)(B), as so redesignated
11 by paragraphs (4) and (13)(B) of this subsection—

12 (A) by striking “2.5 percent” and inserting
13 “5 percent”; and

14 (B) by inserting “, consistent with the goal
15 described in subsection (c)(2)(D) and within the
16 responsibilities of program directors as specified
17 in subsection (g)(2)(B)(vii)” after “outreach ac-
18 tivities”.

19 **Subtitle C—Energy Innovation** 20 **Hubs**

21 **SEC. 631. SHORT TITLE.**

22 This subtitle may be cited as the “Energy Innovation
23 Hubs Authorization Act of 2010”.

24 **SEC. 632. ENERGY INNOVATION HUBS.**

25 (a) ESTABLISHMENT OF PROGRAM.—

1 (1) IN GENERAL.—The Secretary of Energy
2 shall carry out a program to enhance the Nation’s
3 economic, environmental, and energy security by
4 making grants to consortia for establishing and op-
5 erating Energy Innovation Hubs to conduct and
6 support, whenever practicable at one centralized lo-
7 cation, multidisciplinary, collaborative research, de-
8 velopment, demonstration, and commercial applica-
9 tion of advanced energy technologies in areas not
10 being served by the private sector.

11 (2) TECHNOLOGY DEVELOPMENT FOCUS.—The
12 Secretary shall designate for each Hub a unique ad-
13 vanced energy technology development focus.

14 (3) COORDINATION.—The Secretary shall en-
15 sure the coordination of, and avoid unnecessary du-
16 plication of, the activities of Hubs with those of
17 other Department of Energy research entities, in-
18 cluding the National Laboratories, the Advanced Re-
19 search Projects Agency—Energy, and Energy Fron-
20 tier Research Centers, and within industry. Such co-
21 ordination shall include convening and consulting
22 with representatives of staff of the Department of
23 Energy, representatives from Hubs and the quali-
24 fying entities that are members of the consortia op-
25 erating the Hubs, and representatives of such other

1 entities as the Secretary considers appropriate, to
2 share research results, program plans, and opportu-
3 nities for collaboration.

4 (4) ADMINISTRATION.—The Secretary shall ad-
5 minister this section with respect to each Hub
6 through the Department program office appropriate
7 to administer the subject matter of the technology
8 development focus assigned under paragraph (2) for
9 the Hub.

10 (b) CONSORTIA.—

11 (1) ELIGIBILITY.—To be eligible to receive a
12 grant under this section for the establishment and
13 operation of a Hub, a consortium shall—

14 (A) be composed of no fewer than 2 quali-
15 fying entities;

16 (B) operate subject to a binding agreement
17 entered into by its members that documents—

18 (i) the proposed partnership agree-
19 ment, including the governance and man-
20 agement structure of the Hub;

21 (ii) measures to enable cost-effective
22 implementation of the program under this
23 section;

1 (iii) a proposed budget, including fi-
2 nancial contributions from non-Federal
3 sources;

4 (iv) conflict of interest procedures
5 consistent with subsection (d)(3), all
6 known material conflicts of interest, and
7 corresponding mitigation plans;

8 (v) an accounting structure that en-
9 ables the Secretary to ensure that the con-
10 sortium has complied with the require-
11 ments of this section; and

12 (vi) an external advisory committee
13 consistent with subsection (d)(2); and

14 (C) operate as a nonprofit organization.

15 (2) APPLICATION.—A consortium seeking to es-
16 tablish and operate a Hub under this section, acting
17 through a prime applicant, shall transmit to the Sec-
18 retary an application at such time, in such form,
19 and accompanied by such information as the Sec-
20 retary shall require, including a detailed description
21 of the elements of the consortium agreement re-
22 quired under paragraph (1)(B). If the consortium
23 members will not be located at one centralized loca-
24 tion, such application shall include a communica-

1 tions plan that ensures close coordination and inte-
2 gration of the Hub's activities.

3 (c) SELECTION AND SCHEDULE.—The Secretary
4 shall select consortia for grants for the establishment and
5 operation of Hubs through competitive selection processes.
6 In selecting consortia, the Secretary shall consider the in-
7 formation a consortium must disclose according to sub-
8 section (b), as well as any existing facilities a consortium
9 will provide for Hub activities. Grants made to a Hub shall
10 be for a period not to exceed 5 years, after which the grant
11 may be renewed, subject to a competitive selection process.

12 (d) HUB OPERATIONS.—

13 (1) IN GENERAL.—Hubs shall conduct or pro-
14 vide for multidisciplinary, collaborative research, de-
15 velopment, demonstration, and commercial applica-
16 tion of advanced energy technologies within the tech-
17 nology development focus designated for the Hub by
18 the Secretary under subsection (a)(2). Each Hub
19 shall—

20 (A) encourage collaboration and commu-
21 nication among the member qualifying entities
22 of the consortium and awardees by conducting
23 activities whenever practicable at one central-
24 ized location;

1 (B) develop and publish on the Depart-
2 ment of Energy’s website proposed plans and
3 programs;

4 (C) submit an annual report to the Sec-
5 retary summarizing the Hub’s activities, includ-
6 ing detailing organizational expenditures, listing
7 external advisory committee members, and de-
8 scribing each project undertaken by the Hub;
9 and

10 (D) monitor project implementation and
11 coordination.

12 (2) EXTERNAL ADVISORY COMMITTEE.—Each
13 Hub shall establish an external advisory committee,
14 the membership of which shall have sufficient exper-
15 tise to advise and provide guidance on scientific,
16 technical, industry, financial, and research manage-
17 ment matters.

18 (3) CONFLICTS OF INTEREST.—

19 (A) PROCEDURES.—Hubs shall establish
20 conflict of interest procedures, consistent with
21 those of the Department of Energy, to ensure
22 that employees and consortia designees for Hub
23 activities who are in decisionmaking capacities
24 disclose all material conflicts of interest, includ-

1 ing financial, organizational, and personal con-
2 flicts of interest.

3 (B) DISQUALIFICATION AND REVOCA-
4 TION.—The Secretary may disqualify an appli-
5 cation or revoke funds distributed to a Hub if
6 the Secretary discovers a failure to comply with
7 conflict of interest procedures established under
8 subparagraph (A).

9 (e) PROHIBITION ON CONSTRUCTION.—

10 (1) IN GENERAL.—No funds provided pursuant
11 to this section may be used for construction of new
12 buildings or facilities for Hubs. Construction of new
13 buildings or facilities shall not be considered as part
14 of the non-Federal share of a Hub cost-sharing
15 agreement.

16 (2) TEST BED AND RENOVATION EXCEPTION.—
17 Nothing in this subsection shall prohibit the use of
18 funds provided pursuant to this section, or non-Fed-
19 eral cost share funds, for the construction of a test
20 bed or renovations to existing buildings or facilities
21 for the purposes of research if the Oversight Board
22 determines that the test bed or renovations are lim-
23 ited to a scope and scale necessary for the research
24 to be conducted.

1 (f) OVERSIGHT BOARD.—The Secretary shall estab-
2 lish and maintain within the Department an Oversight
3 Board to oversee the progress of Hubs.

4 (g) PRIORITY CONSIDERATION.—The Secretary shall
5 give priority consideration to applications in which 1 or
6 more of the institutions under subsection (b)(1)(A) are
7 1890 Land Grant Institutions (as defined in section 2 of
8 the Agricultural Research, Extension, and Education Re-
9 form Act of 1998 (7 U.S.C. 7061)), Predominantly Black
10 Institutions (as defined in section 318 of the Higher Edu-
11 cation Act of 1965 (20 U.S.C. 1059e)), Tribal Colleges
12 or Universities (as defined in section 316(b) of the Higher
13 Education Act of 1965 (20 U.S.C. 1059c(b)), or Hispanic
14 Serving Institutions (as defined in section 318 of the
15 Higher Education Act of 1965 (20 U.S.C. 1059e)).

16 (h) DEFINITIONS.—For purposes of this section:

17 (1) ADVANCED ENERGY TECHNOLOGY.—The
18 term “advanced energy technology” means an inno-
19 vative technology—

20 (A) that produces energy from solar, wind,
21 geothermal, biomass, tidal, wave, ocean, or
22 other renewable energy resources;

23 (B) that produces nuclear energy;

24 (C) for carbon capture and sequestration;

1 (D) that enables advanced vehicles, vehicle
2 components, and related technologies that re-
3 sult in significant energy savings;

4 (E) that generates, transmits, distributes,
5 utilizes, or stores energy more efficiently than
6 conventional technologies, including through
7 Smart Grid technologies; or

8 (F) that enhances the energy independence
9 and security of the United States by enabling
10 improved or expanded supply and production of
11 domestic energy resources, including coal, oil,
12 and natural gas.

13 (2) HUB.—The term “Hub” means an Energy
14 Innovation Hub established in accordance with this
15 section.

16 (3) INSTITUTION OF HIGHER EDUCATION.—The
17 term “institution of higher education” has the
18 meaning given that term in section 101(a) of the
19 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

20 (4) QUALIFYING ENTITY.—The term “quali-
21 fying entity” means—

22 (A) an institution of higher education;

23 (B) an appropriate State or Federal entity,
24 including the Department of Energy Federally
25 Funded Research and Development Centers;

1 (C) a nongovernmental organization with
2 expertise in advanced energy technology re-
3 search, development, demonstration, or com-
4 mercial application; or

5 (D) any other relevant entity the Secretary
6 considers appropriate.

7 (5) SECRETARY.—The term “Secretary” means
8 the Secretary of Energy.

9 (i) AUTHORIZATION OF APPROPRIATIONS.—There
10 are authorized to be appropriated to the Secretary to carry
11 out this section—

12 (1) \$110,000,000 for fiscal year 2011;

13 (2) \$135,000,000 for fiscal year 2012;

14 (3) \$195,000,000 for fiscal year 2013;

15 (4) \$210,000,000 for fiscal year 2014; and

16 (5) \$210,000,000 for fiscal year 2015.

17 **Subtitle D—Cooperative Research**
18 **and Development Fund**

19 **SEC. 641. SHORT TITLE.**

20 This subtitle may be cited as the “Cooperative Re-
21 search and Development Fund Authorization Act of
22 2010”.

1 **SEC. 642. COOPERATIVE RESEARCH AND DEVELOPMENT**
2 **FUND.**

3 (a) **IN GENERAL.**—The Secretary of Energy shall
4 make funds available to Department of Energy National
5 Laboratories for the Federal share of cooperative research
6 and development agreements. The Secretary of Energy
7 shall determine the apportionment of such funds to each
8 Department of Energy National Laboratory and shall en-
9 sure that special consideration is given to small business
10 firms and consortia involving small business firms in the
11 selection process for which cooperative research and devel-
12 opment agreements will receive such funds.

13 (b) **REPORTING.**—Each year the Secretary shall sub-
14 mit to Congress a report that describes how funds were
15 expended under this subtitle.

16 (c) **AUTHORIZATION OF APPROPRIATIONS.**—There
17 are authorized to be appropriated to the Secretary such
18 sums as are necessary to carry out this section each fiscal
19 year. No funds allocated for this section shall come from
20 funds allocated for the Office of Science.

21 **Subtitle E—Technology Transfer**
22 **Database**

23 **SEC. 651. TECHNOLOGY TRANSFER DATABASE.**

24 To support the commercial application of new energy
25 technologies development by the Department of Energy,
26 the Secretary of Energy may establish an online database

1 of technologies, capabilities, and resources available to the
2 public at the National Laboratories.

3 **TITLE VII—MISCELLANEOUS**

4 **SEC. 701. SENSE OF CONGRESS.**

5 It is the sense of Congress that, among the programs
6 and activities authorized in this Act, those that correspond
7 to the recommendations of the National Academy of
8 Sciences' 2005 report entitled "Rising Above the Gath-
9 ering Storm" remain critical to maintaining long-term
10 United States economic competitiveness, and accordingly
11 shall receive funding priority.

12 **SEC. 702. PERSONS WITH DISABILITIES.**

13 For the purposes of the activities and programs sup-
14 ported by this Act and the amendments made by this
15 Act—

16 (1) institutions of higher education chartered to
17 serve large numbers of students with disabilities, in-
18 cluding Gallaudet University, Landmark College,
19 and the National Technical Institute for the Deaf,
20 and institutions of higher education offering science,
21 technology, engineering, and mathematics research
22 and education activities and programs that serve
23 veterans with disabilities, shall receive special consid-
24 eration in the review of any proposals by these insti-
25 tutions for funding under the research and edu-

1 cation programs authorized in this Act to ensure
2 that institutions of higher education chartered to or
3 serving persons with disabilities benefit from such
4 research and education activities and programs; and
5 (2) agencies with respect to which appropria-
6 tions are authorized under this Act shall also con-
7 duct outreach to veterans with disabilities pursuing
8 studies in science, technology, engineering, and
9 mathematics to ensure that such veterans are aware
10 of and benefit from the research and education ac-
11 tivities and programs authorized by this Act.

12 **SEC. 703. VETERANS AND SERVICE MEMBERS.**

13 In awarding scholarships and fellowships under this
14 Act, an institution of higher education shall give pref-
15 erence to applications from veterans and service members,
16 including those who have received or will receive the Af-
17 ghanistan Campaign Medal or the Iraq Campaign Medal
18 as authorized by Public Law 108–234 (10 U.S.C. 1121
19 note; 118 Stat. 655) and Executive Order No. 13363.

20 **SEC. 704. BUDGETARY EFFECTS.**

21 The budgetary effects of this Act, for the purpose of
22 complying with the Statutory Pay-As-You-Go Act of 2010,
23 shall be determined by reference to the latest statement
24 titled “Budgetary Effects of PAYGO Legislation” for this
25 Act, submitted for printing in the Congressional Record

1 by the Chairman of the House Budget Committee, pro-
2 vided that such statement has been submitted prior to the
3 vote on passage.

4 **SEC. 705. LIMITATION.**

5 No funds authorized under this Act shall be used for
6 the employment of, or shall be received by, any individual
7 who has been convicted of, or pleaded guilty to, a crime
8 of child molestation, rape, or any other form of sexual as-
9 sault.

10 **SEC. 706. PROHIBITION ON LOBBYING.**

11 Nothing in this Act shall be construed to supercede
12 section 1913 of title 18, United States Code.

13 **SEC. 707. INFORMATION REQUESTS BY LABOR ORGANIZA-**
14 **TIONS.**

15 (a) **ELIGIBILITY FOR FUNDS.**—Notwithstanding any
16 other provision of this Act, a public institution of higher
17 education that employs employees who are represented by
18 a labor organization and perform work on an activity or
19 program supported by this Act or an amendment made
20 by this Act shall be eligible to receive funding for facilities
21 and administrative costs for any activity or program sup-
22 ported by this Act or the amendments made by this Act
23 only if the institution maintains a policy that meets the
24 requirements set forth in subsection (b).

1 (b) REQUIREMENTS.—A policy described under sub-
2 section (a) shall require that the institution provide, within
3 15 days of receipt of a request by a labor organization
4 representing the employees of the institution described in
5 subsection (a), any information which the labor organiza-
6 tion has a lawful right to obtain under applicable labor
7 laws. Such a policy shall provide that, on a case-by-case
8 basis, such 15 days may be extended to a longer time pe-
9 riod by mutual agreement of the labor organization and
10 the institution.

11 (c) FAILURE TO COMPLY WITH POLICY.—

12 (1) COMPLAINT OF NONCOMPLIANCE.—In the
13 case of an institution of higher education that does
14 not provide information requested by a labor organi-
15 zation in compliance with the requirements of a pol-
16 icy described in subsections (a) and (b), the labor or-
17 ganization may file a complaint of noncompliance
18 with the head of the agency overseeing any activity
19 or program supported by this Act or the amend-
20 ments made by this Act for which the institution is
21 receiving funds.

22 (2) NOTIFICATION TO INSTITUTION.—Upon re-
23 ceiving such a complaint, the head of such agency
24 shall notify the institution of the complaint and pro-
25 vide the institution an additional 30 days to provide

1 the requested information to the labor organization
2 or otherwise explain why the complaint of non-com-
3 pliance is not valid.

4 (3) AGENCY ACTION.—If the information has
5 not been provided by the institution at the conclu-
6 sion of such 30 day period and the head of such
7 agency determines the complaint to be valid, the
8 head of such agency shall suspend payment of any
9 funds for facilities and administrative costs that
10 would otherwise be available to such institution for
11 all activities and programs supported by this Act
12 and the amendments made by this Act until such
13 time as the requested information has been provided
14 by the institution.

15 (d) DEFINITIONS.—For purposes of this section—

16 (1) the term “institution of higher education”
17 has the meaning given such term in section 101(a)
18 of the Higher Education Act of 1965 (20 U.S.C.
19 1001(a)), except that such term does not include a
20 private institution of higher education; and

21 (2) the term “facilities and administrative
22 costs” means facilities and administrative (F&A)
23 costs as defined in the Office of Management and
24 Budget Revised Circular A-21 (Cost Principles for

1 Educational Institutions, published in the Federal
2 Register on May 10, 2004).

3 (e) **EFFECTIVE DATE.**—This section shall take effect
4 on January 1, 2011.

5 **SEC. 708. LIMITATION.**

6 No funds authorized to be appropriated by this Act
7 or the amendments made by this Act may be used to pur-
8 chase gift items, knickknacks, souvenirs, trinkets, or other
9 items without direct educational value.

10 **SEC. 709. NO SALARIES FOR VIEWING PORNOGRAPHY.**

11 None of the funds authorized under this Act may be
12 used to pay the salary of any individual who has been offi-
13 cially disciplined for violations of subpart G of the Stand-
14 ards of Ethical Conduct for Employees of the Executive
15 Branch for viewing, downloading, or exchanging pornog-
16 raphy, including child pornography, on a Federal Govern-
17 ment computer or while performing official Federal Gov-
18 ernment duties.

19 **SEC. 710. INELIGIBILITY FOR AWARDS OR GRANTS.**

20 None of the funds authorized under this Act shall be
21 available to make awards to or provide grants for an insti-
22 tution of higher education under this Act if that institu-
23 tion is prevented from receiving funds for contracts or

- 1 grants for education under section 983 of title 10, United
- 2 States Code.

Passed the House of Representatives May 28, 2010.

Attest: LORRAINE C. MILLER,
Clerk.