

111TH CONGRESS
2D SESSION

H. R. 5116

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

IN THE HOUSE OF REPRESENTATIVES

APRIL 22, 2010

Mr. GORDON of Tennessee introduced the following bill; which was referred to the Committee on Science and Technology, and in addition to the Committee on Education and Labor, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

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,*

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

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

6 (b) TABLE OF CONTENTS.—The table of contents for
7 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.

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.

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.
- 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.

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. 21st century graduate education.
- Sec. 250. Undergraduate Broadening Participation Program.
- Sec. 251. Grand challenges in education research.
- Sec. 252. Research experiences for undergraduates.

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.

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. Bioscience Research Program.
- Sec. 408. TIP Advisory Board.
- Sec. 409. Underrepresented minorities.
- Sec. 410. Cyber security standards and guidelines.
- Sec. 411. 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.

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.

Sec. 631. Short title.

Sec. 632. Energy Innovation Hubs.

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-
22 sessing progress toward the objectives, and that de-
23 scribes—

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

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

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

14 (2) in section 2—

15 (A) in subsection (d)—

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

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

23 “(1) the Program budget, for the previous fiscal
24 year, for each agency that participates in the Pro-
25 gram, including a breakout of spending for the de-

1 velopment and acquisition of research facilities and
2 instrumentation, for each program component area,
3 and for all activities pursuant to subsection
4 (b)(10);” and

5 (B) by inserting at the end the following
6 new subsection:

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

13 (3) by striking section 3(b) and inserting the
14 following new subsection:

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

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

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

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

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

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

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

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

10 “(A) education in formal settings;

11 “(B) education in informal settings;

12 “(C) public outreach; and

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

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

25 (5) in section 4(a)—

1 (A) by striking “or designate”;

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

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

9 (6) in section 4(b)—

10 (A) by striking “or designated” and “or
11 designating”; and

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

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

17 **“SEC. 5. TRIENNIAL EXTERNAL REVIEW OF THE NATIONAL**
18 **NANOTECHNOLOGY PROGRAM.**

19 “(a) IN GENERAL.—The Director of the National
20 Nanotechnology Coordination Office shall enter into an ar-
21 rangement with the National Research Council of the Na-
22 tional Academy of Sciences to conduct a triennial review
23 of the Program. The Director shall ensure that the ar-
24 rangement with the National Research Council is con-
25 cluded in order to allow sufficient time for the reporting

1 requirements of subsection (b) to be satisfied. Each tri-
2 ennial review shall include an evaluation of the—

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

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

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

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

18 “(b) EVALUATION TO BE TRANSMITTED TO CON-
19 GRESS.—The National Research Council shall document
20 the results of each triennial review carried out in accord-
21 ance with subsection (a) in a report that includes any rec-
22 ommendations for ways to improve the Program’s man-
23 agement and coordination processes and for changes to
24 the Program’s objectives, funding priorities, and technical
25 content. Each report shall be submitted to the Director

1 of the National Nanotechnology Coordination Office, who
2 shall transmit it to the Advisory Panel, the Committee on
3 Commerce, Science, and Transportation of the Senate,
4 and the Committee on Science and Technology of the
5 House of Representatives not later than September 30 of
6 every third year, with the first report due September 30,
7 2010.

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

11 “(1) \$500,000 for fiscal year 2010.

12 “(2) \$500,000 for fiscal year 2011.

13 “(3) \$500,000 for fiscal year 2012.”; and

14 (8) in section 10—

15 (A) by amending paragraph (2) to read as
16 follows:

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

23 (B) by adding at the end the following new
24 paragraph:

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

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

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

22 (1) ensuring that a research plan for the envi-
23 ronmental, health, and safety research activities re-
24 quired under subsection (b) is developed, updated,
25 and implemented and that the plan is responsive to

1 the recommendations of the subpanel of the Advi-
2 sory Panel established under section 4(a) of the 21st
3 Century Nanotechnology Research and Development
4 Act (15 U.S.C. 7503(a)), as amended by this sub-
5 title;

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

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

21 (b) RESEARCH PLAN.—

22 (1) IN GENERAL.—The Coordinator for Societal
23 Dimensions of Nanotechnology shall convene and
24 chair a panel comprised of representatives from the
25 agencies funding research activities under the Envi-

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

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

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

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

23 (A) standards related to nomenclature as-
24 sociated with engineered nanoscale materials;

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

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

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

12 (A) specify near-term research objectives
13 and long-term research objectives;

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

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

23 (D) specify the funding allocated to each
24 major objective of the plan and the source of

1 funding by agency for the current fiscal year;
2 and

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

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

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

20 (c) NANOTECHNOLOGY PARTNERSHIPS.—

21 (1) ESTABLISHMENT.—As part of the program
22 authorized by section 9 of the National Science
23 Foundation Authorization Act of 2002, the Director
24 of the National Science Foundation shall provide 1
25 or more grants to establish partnerships as defined

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

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

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

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

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

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

10 (d) UNDERGRADUATE EDUCATION PROGRAMS.—

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

20 (A) development of courses of instruction
21 or modules to existing courses;

22 (B) faculty professional development; and

23 (C) acquisition of equipment and instru-
24 mentation suitable for undergraduate education
25 and research in nanotechnology.

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

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

18 (e) INTERAGENCY WORKING GROUP.—The National
19 Science and Technology Council shall establish under the
20 Nanoscale Science, Engineering, and Technology Sub-
21 committee an Education Working Group to coordinate,
22 prioritize, and plan the educational activities supported
23 under the Program.

24 (f) SOCIETAL DIMENSIONS IN NANOTECHNOLOGY
25 EDUCATION ACTIVITIES.—Activities supported under the

1 Education and Societal Dimensions program component
2 area, or any successor program component area, that in-
3 volve informal, precollege, or undergraduate nanotechnol-
4 ogy education shall include education regarding the envi-
5 ronmental, health and safety, and other societal aspects
6 of nanotechnology.

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

18 (2) The agencies identified in paragraph (1) shall re-
19 quire the entities that operate such nanotechnology re-
20 search facilities to establish and publish procedures, guide-
21 lines, and conditions for the submission and approval of
22 applications for the use of the facilities for the purpose
23 identified in paragraph (1) and shall authorize personnel
24 who operate the facilities to provide necessary technical
25 support to students and teachers.

1 **SEC. 104. TECHNOLOGY TRANSFER.**

2 (a) **PROTOTYPING.**—

3 (1) **ACCESS TO FACILITIES.**—In accordance
4 with section 2(b)(7) of 21st Century Nanotechnology
5 Research and Development Act (15 U.S.C.
6 7501(b)(7)), the agencies supporting nanotechnology
7 research facilities as part of the Program shall pro-
8 vide access to such facilities to companies for the
9 purpose of assisting the companies in the develop-
10 ment of prototypes of nanoscale products, devices, or
11 processes (or products, devices, or processes enabled
12 by nanotechnology) for determining proof of concept.
13 The agencies shall publicize the availability of these
14 facilities and encourage their use by companies as
15 provided for in this section.

16 (2) **PROCEDURES.**—The agencies identified in
17 paragraph (1)—

18 (A) shall establish and publish procedures,
19 guidelines, and conditions for the submission
20 and approval of applications for use of nano-
21 technology facilities;

22 (B) shall publish descriptions of the capa-
23 bilities of facilities available for use under this
24 subsection, including the availability of tech-
25 nical support; and

1 (C) may waive recovery, require full recovery,
2 or require partial recovery of the costs associated
3 with use of the facilities for projects
4 under this subsection.

5 (3) SELECTION AND CRITERIA.—In cases when
6 less than full cost recovery is required pursuant to
7 paragraph (2)(C), projects provided access to nanotechnology
8 facilities in accordance with this subsection shall be selected
9 through a competitive, merit-based process, and the criteria for the
10 selection of such projects shall include at a minimum—

12 (A) the readiness of the project for technology demonstration;

14 (B) evidence of a commitment by the applicant for further
15 development of the project to full commercialization if the proof
16 of concept is established by the prototype; and

18 (C) evidence of the potential for further
19 funding from private sector sources following the successful
20 demonstration of proof of concept.
21 cept.

22 The agencies may give special consideration in selecting
23 projects to applications that are relevant to important national
24 needs or requirements.

1 (b) USE OF EXISTING TECHNOLOGY TRANSFER PRO-
2 GRAMS.—

3 (1) PARTICIPATING AGENCIES.—Each agency
4 participating in the Program shall—

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

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

18 (i) the plan described in section
19 2(c)(7) of the 21st Century Nanotechnol-
20 ogy Research and Development Act (15
21 U.S.C. 7501(c)(7)); and

22 (ii) a report specifying, if the agency
23 administers a Small Business Innovation
24 Research Program and a Small Business
25 Technology Transfer Program—

1 (I) the number of proposals re-
2 ceived for nanotechnology related
3 projects during the current fiscal year
4 and the previous 2 fiscal years;

5 (II) the number of such pro-
6 posals funded in each year;

7 (III) the total number of nano-
8 technology related projects funded and
9 the amount of funding provided for
10 fiscal year 2004 through fiscal year
11 2008; and

12 (IV) a description of the projects
13 identified in accordance with sub-
14 clause (III) which received private sec-
15 tor funding beyond the period of
16 phase II support.

17 (2) NATIONAL INSTITUTE OF STANDARDS AND
18 TECHNOLOGY.—The Director of the National Insti-
19 tute of Standards and Technology in carrying out
20 the requirements of section 28 of the National Insti-
21 tute of Standards and Technology Act (15 U.S.C.
22 278n) shall—

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

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

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

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

22 (B) an assessment of the adequacy of the
23 allocation of resources for nanotechnology re-
24 lated projects supported under the Technology
25 Innovation Program.

1 (c) INDUSTRY LIAISON GROUPS.—An objective of the
2 Program shall be to establish industry liaison groups for
3 all industry sectors that would benefit from applications
4 of nanotechnology. The Nanomanufacturing, Industry Li-
5 aison, and Innovation Working Group of the National
6 Science and Technology Council shall actively pursue es-
7 tablishing such liaison groups.

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

12 “(5) ensuring United States global leadership in
13 the development and application of nanotechnology,
14 including through coordination and leveraging Fed-
15 eral investments with nanotechnology research, de-
16 velopment, and technology transition initiatives sup-
17 ported by the States;”.

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

19 (a) IN GENERAL.—The Program shall include sup-
20 port for nanotechnology research and development activi-
21 ties directed toward application areas that have the poten-
22 tial for significant contributions to national economic com-
23 petitiveness and for other significant societal benefits. The
24 activities supported shall be designed to advance the devel-
25 opment of research discoveries by demonstrating technical

1 solutions to important problems in such areas as nano-
2 electronics, energy efficiency, health care, and water reme-
3 diation and purification. The Advisory Panel shall make
4 recommendations to the Program for candidate research
5 and development areas for support under this section.

6 (b) CHARACTERISTICS.—

7 (1) IN GENERAL.—Research and development
8 activities under this section shall—

9 (A) include projects selected on the basis
10 of applications for support through a competi-
11 tive, merit-based process;

12 (B) involve collaborations among research-
13 ers in academic institutions and industry, and
14 may involve nonprofit research institutions and
15 Federal laboratories, as appropriate;

16 (C) when possible, leverage Federal invest-
17 ments through collaboration with related State
18 initiatives; and

19 (D) include a plan for fostering the trans-
20 fer of research discoveries and the results of
21 technology demonstration activities to industry
22 for commercial development.

23 (2) PROCEDURES.—Determination of the re-
24 quirements for applications under this subsection,
25 review and selection of applications for support, and

1 subsequent funding of projects shall be carried out
2 by a collaboration of no fewer than 2 agencies par-
3 ticipating in the Program. In selecting applications
4 for support, the agencies shall give special consider-
5 ation to projects that include cost sharing from non-
6 Federal sources.

7 (3) INTERDISCIPLINARY RESEARCH CENTERS.—
8 Research and development activities under this sec-
9 tion may be supported through interdisciplinary
10 nanotechnology research centers, as authorized by
11 section 2(b)(4) of the 21st Century Nanotechnology
12 Research and Development Act (15 U.S.C.
13 7501(b)(4)), that are organized to investigate basic
14 research questions and carry out technology dem-
15 onstration activities in areas such as those identified
16 in subsection (a).

17 (c) REPORT.—Reports required under section 2(d) of
18 the 21st Century Nanotechnology Research and Develop-
19 ment Act (15 U.S.C. 7501(d)) shall include a description
20 of research and development areas supported in accord-
21 ance with this section, including the same budget informa-
22 tion as is required for program component areas under
23 paragraphs (1) and (2) of such section 2(d).

1 **SEC. 106. NANOMANUFACTURING RESEARCH.**

2 (a) RESEARCH AREAS.—The Nanomanufacturing
3 program component area, or any successor program com-
4 ponent area, shall include research on—

5 (1) development of instrumentation and tools
6 required for the rapid characterization of nanoscale
7 materials and for monitoring of nanoscale manufac-
8 turing processes; and

9 (2) approaches and techniques for scaling the
10 synthesis of new nanoscale materials to achieve in-
11 dustrial-level production rates.

12 (b) GREEN NANOTECHNOLOGY.—Interdisciplinary
13 research centers supported under the Program in accord-
14 ance with section 2(b)(4) of the 21st Century Nanotech-
15 nology Research and Development Act (15 U.S.C.
16 7501(b)(4)) that are focused on nanomanufacturing re-
17 search and centers established under the authority of sec-
18 tion 105(b)(3) of this subtitle shall include as part of the
19 activities of such centers—

20 (1) research on methods and approaches to de-
21 velop environmentally benign nanoscale products and
22 nanoscale manufacturing processes, taking into con-
23 sideration relevant findings and results of research
24 supported under the Environmental, Health, and
25 Safety program component area, or any successor
26 program component area;

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

3 (3) providing for the education of scientists and
4 engineers through interdisciplinary studies in the
5 principles and techniques for the design and develop-
6 ment of environmentally benign nanoscale products
7 and processes.

8 (c) REVIEW OF NANOMANUFACTURING RESEARCH
9 AND RESEARCH FACILITIES.—

10 (1) PUBLIC MEETING.—Not later than 12
11 months after the date of enactment of this Act, the
12 National Nanotechnology Coordination Office shall
13 sponsor a public meeting, including representation
14 from a wide range of industries engaged in
15 nanoscale manufacturing, to—

16 (A) obtain the views of participants at the
17 meeting on—

18 (i) the relevance and value of the re-
19 search being carried out under the Nano-
20 manufacturing program component area of
21 the Program, or any successor program
22 component area; and

23 (ii) whether the capabilities of nano-
24 technology research facilities supported
25 under the Program are adequate—

1 (I) to meet current and near-
2 term requirements for the fabrication
3 and characterization of nanoscale de-
4 vices and systems; and

5 (II) to provide access to and use
6 of instrumentation and equipment at
7 the facilities, by means of networking
8 technology, to individuals who are at
9 locations remote from the facilities;
10 and

11 (B) receive any recommendations on ways
12 to strengthen the research portfolio supported
13 under the Nanomanufacturing program compo-
14 nent area, or any successor program component
15 area, and on improving the capabilities of nano-
16 technology research facilities supported under
17 the Program.

18 Companies participating in industry liaison groups
19 shall be invited to participate in the meeting. The
20 Coordination Office shall prepare a report docu-
21 menting the findings and recommendations resulting
22 from the meeting.

23 (2) ADVISORY PANEL REVIEW.—The Advisory
24 Panel shall review the Nanomanufacturing program
25 component area of the Program, or any successor

1 program component area, and the capabilities of
2 nanotechnology research facilities supported under
3 the Program to assess—

4 (A) whether the funding for the Nano-
5 manufacturing program component area, or any
6 successor program component area, is adequate
7 and receiving appropriate priority within the
8 overall resources available for the Program;

9 (B) the relevance of the research being
10 supported to the identified needs and require-
11 ments of industry;

12 (C) whether the capabilities of nanotech-
13 nology research facilities supported under the
14 Program are adequate—

15 (i) to meet current and near-term re-
16 quirements for the fabrication and charac-
17 terization of nanoscale devices and sys-
18 tems; and

19 (ii) to provide access to and use of in-
20 strumentation and equipment at the facili-
21 ties, by means of networking technology, to
22 individuals who are at locations remote
23 from the facilities; and

24 (D) the level of funding that would be
25 needed to support—

1 (i) the acquisition of instrumentation,
2 equipment, and networking technology suf-
3 ficient to provide the capabilities at nano-
4 technology research facilities described in
5 subparagraph (C); and

6 (ii) the operation and maintenance of
7 such facilities.

8 In carrying out its assessment, the Advisory Panel
9 shall take into consideration the findings and rec-
10 ommendations from the report required under para-
11 graph (1).

12 (3) REPORT.—Not later than 18 months after
13 the date of enactment of this Act, the Advisory
14 Panel shall submit to the Committee on Commerce,
15 Science, and Transportation of the Senate and the
16 Committee on Science and Technology of the House
17 of Representatives a report on its assessment re-
18 quired under paragraph (2), along with any rec-
19 ommendations and a copy of the report prepared in
20 accordance with paragraph (1).

21 **SEC. 107. DEFINITIONS.**

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

1 **Subtitle B—Networking and Infor-**
2 **mation Technology Research**
3 **and Development**

4 **SEC. 111. SHORT TITLE.**

5 This subtitle may be cited as the “Networking and
6 Information Technology Research and Development Act of
7 2010”.

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

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

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

15 “(1) periodically assess the contents and fund-
16 ing levels of the Program Component Areas and re-
17 structure the Program when warranted, taking into
18 consideration any relevant recommendations of the
19 advisory committee established under subsection (b);
20 and

21 “(2) ensure that the Program includes large-
22 scale, long-term, interdisciplinary research and de-
23 velopment activities, including activities described in
24 section 104.”.

1 (b) DEVELOPMENT OF STRATEGIC PLAN.—Section
2 101 of such Act (15 U.S.C. 5511) is amended further by
3 adding after subsection (d), as added by subsection (a)
4 of this section, the following new subsection:

5 “(e) STRATEGIC PLAN.—

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

16 “(2) CONTENTS.—The strategic plan shall
17 specify near-term and long-term objectives for the
18 Program, the anticipated time frame for achieving
19 the near-term objectives, the metrics to be used for
20 assessing progress toward the objectives, and how
21 the Program will—

22 “(A) foster the transfer of research and
23 development results into new technologies and
24 applications for the benefit of society, including
25 through cooperation and collaborations with

1 networking and information technology re-
2 search, development, and technology transition
3 initiatives supported by the States;

4 “(B) encourage and support mechanisms
5 for interdisciplinary research and development
6 in networking and information technology, in-
7 cluding through collaborations across agencies,
8 across Program Component Areas, with indus-
9 try, with Federal laboratories (as defined in
10 section 4 of the Stevenson-Wydler Technology
11 Innovation Act of 1980 (15 U.S.C. 3703)), and
12 with international organizations;

13 “(C) address long-term challenges of na-
14 tional importance for which solutions require
15 large-scale, long-term, interdisciplinary research
16 and development;

17 “(D) place emphasis on innovative and
18 high-risk projects having the potential for sub-
19 stantial societal returns on the research invest-
20 ment;

21 “(E) strengthen all levels of networking
22 and information technology education and
23 training programs to ensure an adequate, well-
24 trained workforce; and

1 “(F) attract more women and underrep-
2 resented minorities to pursue postsecondary de-
3 grees in networking and information tech-
4 nology.

5 “(3) NATIONAL RESEARCH INFRASTRUCTURE.—The
6 strategic plan developed in accordance with paragraph (1)
7 shall be accompanied by milestones and roadmaps for es-
8 tablishing and maintaining the national research infra-
9 structure required to support the Program, including the
10 roadmap required by subsection (a)(2)(E).

11 “(4) RECOMMENDATIONS.—The entities involved in
12 developing the strategic plan under paragraph (1) shall
13 take into consideration the recommendations—

14 “(A) of the advisory committee established
15 under subsection (b); and

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

19 “(5) REPORT TO CONGRESS.—The Director of the
20 National Coordination Office shall transmit the strategic
21 plan required under paragraph (1) to the advisory com-
22 mittee, the Committee on Commerce, Science, and Trans-
23 portation of the Senate, and the Committee on Science
24 and Technology of the House of Representatives.”.

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

4 (1) by redesignating subparagraphs (E) and
5 (F) as subparagraphs (F) and (G), respectively; and

6 (2) by inserting after subparagraph (D) the fol-
7 lowing new subparagraph:

8 “(E) encourage and monitor the efforts of
9 the agencies participating in the Program to al-
10 locate the level of resources and management
11 attention necessary to ensure that the strategic
12 plan under subsection (e) is developed and exe-
13 cuted effectively and that the objectives of the
14 Program are met;”.

15 (d) ADVISORY COMMITTEE.—Section 101(b)(1) of
16 such Act (15 U.S.C. 5511(b)(1)) is amended by inserting
17 after “an advisory committee on high-performance com-
18 puting,” the following: “in which the co-chairs shall be
19 members of the President’s Council of Advisors on Science
20 and Technology and with the remainder of the com-
21 mittee”.

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

24 (1) in subparagraph (C)—

1 (A) by striking “is submitted,” and insert-
2 ing “is submitted, the levels for the previous
3 fiscal year,”; and

4 (B) by striking “each Program Component
5 Area;” and inserting “each Program Compo-
6 nent Area and research area supported in ac-
7 cordance with section 104;”;

8 (2) in subparagraph (D)—

9 (A) by striking “each Program Component
10 Area,” and inserting “each Program Compo-
11 nent Area and research area supported in ac-
12 cordance with section 104;”;

13 (B) by striking “is submitted,” and insert-
14 ing “is submitted, the levels for the previous
15 fiscal year,”; and

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

17 (3) by redesignating subparagraph (E) as sub-
18 paragraph (G); and

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

21 “(E) include a description of how the ob-
22 jectives for each Program Component Area, and
23 the objectives for activities that involve multiple
24 Program Component Areas, relate to the objec-

1 tives of the Program identified in the strategic
2 plan required under subsection (e);

3 “(F) include—

4 “(i) a description of the funding re-
5 quired by the National Coordination Office
6 to perform the functions specified under
7 section 102(b) for the next fiscal year by
8 category of activity;

9 “(ii) a description of the funding re-
10 quired by such Office to perform the func-
11 tions specified under section 102(b) for the
12 current fiscal year by category of activity;
13 and

14 “(iii) the amount of funding provided
15 for such Office for the current fiscal year
16 by each agency participating in the Pro-
17 gram; and”.

18 (f) DEFINITION.—Section 4 of such Act (15 U.S.C.
19 5503) is amended—

20 (1) by redesignating paragraphs (1) through
21 (7) as paragraphs (2) through (8), respectively;

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

24 “(1) ‘cyber-physical systems’ means physical or
25 engineered systems whose networking and informa-

1 tion technology functions and physical elements are
2 deeply integrated and are actively connected to the
3 physical world through sensors, actuators, or other
4 means to perform monitoring and control func-
5 tions;”;

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

7 (A) by striking “high-performance com-
8 puting” and inserting “networking and infor-
9 mation technology”; and

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

12 (4) in paragraph (6), as so redesignated, by
13 striking “network referred to as” and all that fol-
14 lows through the semicolon and inserting “network,
15 including advanced computer networks of Federal
16 agencies and departments;”; and

17 (5) in paragraph (7), as so redesignated, by
18 striking “National High-Performance Computing
19 Program” and inserting “networking and informa-
20 tion technology research and development program”.

21 **SEC. 113. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL**
22 **IMPORTANCE.**

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

1 **“SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NA-**
2 **TIONAL IMPORTANCE.**

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

17 “(b) CHARACTERISTICS.—

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

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

23 “(B) involve collaborations among re-
24 searchers in institutions of higher education
25 and industry, and may involve nonprofit re-

1 search institutions and Federal laboratories, as
2 appropriate;

3 “(C) when possible, leverage Federal in-
4 vestments through collaboration with related
5 State initiatives; and

6 “(D) include a plan for fostering the trans-
7 fer of research discoveries and the results of
8 technology demonstration activities, including
9 from institutions of higher education and Fed-
10 eral laboratories, to industry for commercial de-
11 velopment.

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

16 “(3) AGENCY COLLABORATION.—If 2 or more
17 agencies identified in section 101(a)(3)(B), or other
18 appropriate agencies, are working on large-scale re-
19 search and development activities in the same area
20 of national importance, then such agencies shall
21 strive to collaborate through joint solicitation and se-
22 lection of applications for support and subsequent
23 funding of projects.

24 “(4) INTERDISCIPLINARY RESEARCH CEN-
25 TERS.—Research and development activities under

1 this section may be supported through interdiscipli-
2 nary research centers that are organized to inves-
3 tigate basic research questions and carry out tech-
4 nology demonstration activities in areas described in
5 subsection (a). Research may be carried out through
6 existing interdisciplinary centers, including those au-
7 thORIZED under section 7024(b)(2) of the America
8 COMPETES Act (Public Law 110–69; 42 U.S.C.
9 1862o–10).”.

10 **SEC. 114. CYBER-PHYSICAL SYSTEMS AND INFORMATION**
11 **MANAGEMENT.**

12 (a) **ADDITIONAL PROGRAM CHARACTERISTICS.**—Sec-
13 tion 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is
14 amended—

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

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

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

21 “(J) provide for increased understanding
22 of the scientific principles of cyber-physical sys-
23 tems and improve the methods available for the
24 design, development, and operation of cyber-

1 physical systems that are characterized by high
2 reliability, safety, and security; and

3 “(K) provide for research and development
4 on human-computer interactions, visualization,
5 and information management.”.

6 (b) TASK FORCE.—Title I of such Act (15 U.S.C.
7 5511) is amended further by adding after section 104, as
8 added by section 113 of this Act, the following new sec-
9 tion:

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

11 “(a) ESTABLISHMENT.—Not later than 180 days
12 after the date of enactment of the Networking and Infor-
13 mation Technology Research and Development Act of
14 2010, the Director of the National Coordination Office es-
15 tablished under section 102 shall convene a task force to
16 explore mechanisms for carrying out collaborative research
17 and development activities for cyber-physical systems, in-
18 cluding the related technologies required to enable these
19 systems, through a consortium or other appropriate entity
20 with participants from institutions of higher education,
21 Federal laboratories, and industry.

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

23 “(1) develop options for a collaborative model
24 and an organizational structure for such entity
25 under which the joint research and development ac-

1 activities could be planned, managed, and conducted
2 effectively, including mechanisms for the allocation
3 of resources among the participants in such entity
4 for support of such activities;

5 “(2) propose a process for developing a re-
6 search and development agenda for such entity, in-
7 cluding objectives and milestones;

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

11 “(4) propose guidelines for assigning intellec-
12 tual property rights and for the transfer of research
13 results to the private sector; and

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

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

23 “(d) REPORT.—Not later than 1 year after the date
24 of enactment of the Networking and Information Tech-
25 nology Research and Development Act of 2010, the Direc-

1 tor of the National Coordination Office shall transmit to
2 the Committee on Commerce, Science, and Transportation
3 of the Senate and the Committee on Science and Tech-
4 nology of the House of Representatives a report describing
5 the findings and recommendations of the task force.”.

6 **SEC. 115. NATIONAL COORDINATION OFFICE.**

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

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

10 “(a) ESTABLISHMENT.—The Director shall establish
11 a National Coordination Office with a Director and full-
12 time staff.

13 “(b) FUNCTIONS.—The National Coordination Office
14 shall—

15 “(1) provide technical and administrative sup-
16 port to—

17 “(A) the agencies participating in planning
18 and implementing the Program, including such
19 support as needed in the development of the
20 strategic plan under section 101(e); and

21 “(B) the advisory committee established
22 under section 101(b);

23 “(2) serve as the primary point of contact on
24 Federal networking and information technology ac-
25 tivities for government organizations, academia, in-

1 industry, professional societies, State computing and
2 networking technology programs, interested citizen
3 groups, and others to exchange technical and pro-
4 grammatic information;

5 “(3) solicit input and recommendations from a
6 wide range of stakeholders during the development
7 of each strategic plan required under section 101(e)
8 through the convening of at least 1 workshop with
9 invitees from academia, industry, Federal labora-
10 tories, and other relevant organizations and institu-
11 tions;

12 “(4) conduct public outreach, including the dis-
13 semination of findings and recommendations of the
14 advisory committee, as appropriate; and

15 “(5) promote access to and early application of
16 the technologies, innovations, and expertise derived
17 from Program activities to agency missions and sys-
18 tems across the Federal Government and to United
19 States industry.

20 “(c) SOURCE OF FUNDING.—

21 “(1) IN GENERAL.—The operation of the Na-
22 tional Coordination Office shall be supported by
23 funds from each agency participating in the Pro-
24 gram.

1 “(2) SPECIFICATIONS.—The portion of the total
2 budget of such Office that is provided by each agen-
3 cy for each fiscal year shall be in the same propor-
4 tion as each such agency’s share of the total budget
5 for the Program for the previous fiscal year, as spec-
6 ified in the report required under section
7 101(a)(3).”.

8 **SEC. 116. IMPROVING NETWORKING AND INFORMATION**
9 **TECHNOLOGY EDUCATION.**

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

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

14 (2) by inserting after paragraph (1) the fol-
15 lowing new paragraph:

16 “(2) the National Science Foundation shall use
17 its existing programs, in collaboration with other
18 agencies, as appropriate, to improve the teaching
19 and learning of networking and information tech-
20 nology at all levels of education and to increase par-
21 ticipation in networking and information technology
22 fields, including by women and underrepresented mi-
23 norities;”.

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

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

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

7 (2) in paragraph (1), in the matter preceding
8 subparagraph (A), by striking “high-performance
9 computing” and inserting “networking and informa-
10 tion technology”;

11 (3) in subparagraphs (A) and (F) of paragraph
12 (1), by striking “high-performance computing” each
13 place it appears and inserting “networking and in-
14 formation technology”; and

15 (4) in paragraph (2)—

16 (A) by striking “high-performance com-
17 puting and” and inserting “networking and in-
18 formation technology and”; and

19 (B) by striking “high-performance com-
20 puting network” and inserting “networking and
21 information technology”.

22 (b) TITLE I.—The heading of title I of such Act (15
23 U.S.C. 5511) is amended by striking “**HIGH-PER-**
24 **FORMANCE COMPUTING**” and inserting “**NET-**
25 **WORKING AND INFORMATION TECH-**
26 **NOLOGY**”.

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

3 (1) in the section heading, by striking “**HIGH-**
4 **PERFORMANCE COMPUTING**” and inserting
5 “**NETWORKING AND INFORMATION TECH-**
6 **NOLOGY RESEARCH AND DEVELOPMENT**”;

7 (2) in subsection (a)—

8 (A) in the subsection heading, by striking
9 “**NATIONAL HIGH-PERFORMANCE COMPUTING**”
10 and inserting “**NETWORKING AND INFORMA-**
11 **TION TECHNOLOGY RESEARCH AND DEVELOP-**
12 **MENT**”;

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

14 (i) in the matter preceding subpara-
15 graph (A), by striking “**National High-Per-**
16 **formance Computing Program**” and insert-
17 ing “**networking and information tech-**
18 **nology research and development pro-**
19 **gram**”;

20 (ii) in subparagraph (A), by striking
21 “**high-performance computing, including**
22 **networking**” and inserting “**networking**
23 **and information technology**”; and

24 (iii) in subparagraphs (B), (C), and
25 (G), by striking “**high-performance**” each

1 place it appears and inserting “high-end”;
2 and
3 (C) in paragraph (2) of such subsection—
4 (i) in subparagraphs (A) and (C)—
5 (I) by striking “high-performance
6 computing” each place it appears and
7 inserting “networking and information
8 technology”; and
9 (II) by striking “development,
10 networking,” each place it appears
11 and inserting “development,”; and
12 (ii) in subparagraphs (F) and (G), as
13 redesignated by section 112(e)(1) of this
14 Act, by striking “high-performance” each
15 place it appears and inserting “high-end”;
16 (3) in subsection (b)(1), in the matter pre-
17 ceding subparagraph (A), by striking “high-perform-
18 ance computing” both places it appears and insert-
19 ing “networking and information technology”; and
20 (4) in subsection (c)(1)(A), by striking “high-
21 performance computing” and inserting “networking
22 and information technology”.

23 (d) SECTION 201.—Section 201(a)(1) of such Act
24 (15 U.S.C. 5521(a)(1)) is amended by striking “high-per-
25 formance computing” and all that follows through “net-

1 working;” and inserting “networking and information re-
2 search and development;”.

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

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

11 (g) SECTION 204.—Section 204(a)(1) of such Act
12 (15 U.S.C. 5524(a)(1)) is amended—

13 (1) in subparagraph (A), by striking “high-per-
14 formance computing systems and networks” and in-
15 serting “networking and information technology sys-
16 tems and capabilities”; and

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

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

23 (i) SECTION 206.—Section 206(a) of such Act (15
24 U.S.C. 5526(a)) is amended by striking “computational

1 research” and inserting “networking and information
2 technology research”.

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

5 (1) in the section heading, by striking “**HIGH-**
6 **PERFORMANCE COMPUTING**” and inserting
7 “**NETWORKING AND INFORMATION TECH-**
8 **NOLOGY**”; and

9 (2) in subsection (a)—

10 (A) in paragraph (1), by striking “High-
11 performance computing and associated” and in-
12 serting “Networking and information”;

13 (B) in paragraph (2), by striking “high-
14 performance computing” and inserting “net-
15 working and information technologies”;

16 (C) in paragraph (4), by striking “high-
17 performance computers and associated” and in-
18 serting “networking and information”; and

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

22 **Subtitle C—Other OSTP Provisions**

23 **SEC. 121. FEDERAL SCIENTIFIC COLLECTIONS.**

24 (a) MANAGEMENT OF SCIENTIFIC COLLECTIONS.—

25 The Office of Science and Technology Policy, in consulta-

1 tion with relevant Federal agencies, shall ensure the devel-
2 opment of formal policies for the management and use of
3 Federal scientific collections to improve the quality, orga-
4 nization, access, including online access, and long-term
5 preservation of such collections for the benefit of the sci-
6 entific enterprise.

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

13 (c) CLEARINGHOUSE.—The Office of Science and
14 Technology Policy, in consultation with relevant Federal
15 agencies, shall ensure the development of an online clear-
16 inghouse for information on the contents of and access
17 to Federal scientific collections.

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

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

22 (A) conduct a review of the research value
23 of the collection; and

1 (B) consult with researchers who have
2 used the collection, and other potentially inter-
3 ested parties, concerning—

4 (i) the collection's value for research
5 purposes; and

6 (ii) possible additional educational
7 uses for the collection; and

8 (2) include procedures for Federal agencies to
9 transfer scientific collections they no longer need to
10 researchers at institutions or other entities qualified
11 to manage the collections.

12 (e) COST PROJECTIONS.—The Office of Science and
13 Technology Policy, in consultation with relevant Federal
14 agencies, shall develop a common set of methodologies to
15 be used by Federal agencies for the assessment and pro-
16 jection of costs associated with the management and pres-
17 ervation of their scientific collections.

18 **SEC. 122. COORDINATION OF MANUFACTURING RESEARCH**

19 **AND DEVELOPMENT.**

20 (a) INTERAGENCY COMMITTEE.—The Director of the
21 Office of Science and Technology Policy shall establish or
22 designate an interagency committee under the National
23 Science and Technology Council with the responsibility for
24 planning and coordinating Federal programs and activities
25 in manufacturing research and development.

1 (b) RESPONSIBILITIES OF COMMITTEE.—The inter-
2 agency committee established or designated under sub-
3 section (a) shall—

4 (1) coordinate the manufacturing research and
5 development programs and activities of the Federal
6 agencies;

7 (2) establish goals and priorities for manufac-
8 turing research and development that will strengthen
9 United States manufacturing; and

10 (3) develop and update every 5 years thereafter
11 a strategic plan to guide Federal programs and ac-
12 tivities in support of manufacturing research and de-
13 velopment, which shall—

14 (A) specify and prioritize near-term and
15 long-term research and development objectives,
16 the anticipated time frame for achieving the ob-
17 jectives, and the metrics for use in assessing
18 progress toward the objectives;

19 (B) specify the role of each Federal agency
20 in carrying out or sponsoring research and de-
21 velopment to meet the objectives of the stra-
22 tegic plan; and

23 (C) describe how the Federal agencies sup-
24 porting manufacturing research and develop-
25 ment will foster the transfer of research and de-

1 development results into new manufacturing tech-
2 nologies, processes, and products for the benefit
3 of society and the national interest.

4 (c) RECOMMENDATIONS.—In the development of the
5 strategic plan required under subsection (b)(3), the Direc-
6 tor of the Office of Science and Technology Policy, work-
7 ing through the interagency committee, shall take into
8 consideration the recommendations of a wide range of
9 stakeholders, including representatives from diverse man-
10 ufacturing companies, academia, and other relevant orga-
11 nizations and institutions.

12 (d) REPORT TO CONGRESS.—Not later than 1 year
13 after the date of enactment of this Act, the Director of
14 the Office of Science and Technology Policy shall transmit
15 the strategic plan developed under subsection (b)(3) to the
16 Committee on Commerce, Science, and Transportation of
17 the Senate, and the Committee on Science and Technology
18 of the House of Representatives, and shall transmit subse-
19 quent updates to those committees when completed.

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

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

1 (b) ESTABLISHMENT.—The Director of the Office of
2 Science and Technology Policy shall establish a working
3 group under the National Science and Technology Council
4 with the responsibility to coordinate Federal science agen-
5 cy policies related to the dissemination and long-term
6 stewardship of the results of unclassified research, includ-
7 ing digital data and peer-reviewed scholarly publications,
8 supported wholly or in part by funding from the Federal
9 science agencies.

10 (c) REQUIREMENTS.—The Director, acting through
11 the working group established under subsection (b), shall
12 ensure that, in developing any policies related to public
13 access to the results of federally funded research, Federal
14 science agencies collaborate to develop policies that—

15 (1) develop or designate uniform standards for
16 research data, the structure of full text and
17 metadata, navigation tools, and other applications to
18 achieve interoperability across Federal science agen-
19 cies, across science and engineering disciplines, and
20 between research data and scholarly publications,
21 taking into account existing consensus standards, in-
22 cluding international standards;

23 (2) foster innovation in the research and edu-
24 cational use of scholarly publications;

1 (3) address the need for long-term preservation
2 and stewardship of all forms of digital research data,
3 including by supporting research on tools and sys-
4 tems required to ensure preservation and steward-
5 ship;

6 (4) take into account comparable policies in
7 other countries; and

8 (5) take into account research data that ad-
9 vance collective understanding and knowledge in
10 some science and engineering disciplines but are not
11 necessarily published in scholarly journals.

12 (d) **STAKEHOLDER INPUT.**—In developing any poli-
13 cies related to public access to the results of federally
14 funded research, the Director, acting through the working
15 group established under subsection (b), shall solicit input
16 and recommendations from and collaborate with non-Fed-
17 eral stakeholders, including universities, nonprofit and for-
18 profit publishers, libraries, and other organizations and in-
19 stitutions with a stake in long term preservation and ac-
20 cess to the results of federally funded research, including
21 relevant international organizations.

22 (e) **EXCLUSIONS.**—Federal policies developed under
23 this section shall not apply to—

24 (1) research progress reports presented at pro-
25 fessional meetings or conferences;

1 (2) laboratory notes, preliminary data analyses,
2 notes of the author, phone logs, or other information
3 used to produce scholarly publications except for the
4 data reported in the publications;

5 (3) classified research, or research resulting in
6 works that generate revenue or royalties for authors
7 (such as books) or patentable discoveries, to the ex-
8 tent necessary to protect a copyright or patent; or

9 (4) original research papers that are rejected by
10 scholarly journals.

11 (f) PATENT OR COPYRIGHT LAW.—Nothing in this
12 section shall be construed to affect any right under the
13 provisions of title 17 or 35, United States Code.

14 (g) REPORT TO CONGRESS.—Not later than 1 year
15 after the date of enactment of this Act, the Director of
16 the Office of Science and Technology Policy shall transmit
17 a report to Congress describing the status of any Federal
18 science agency policies related to public access to the re-
19 sults of federally funded research, including a description
20 of the extent to which the policies meet the requirements
21 in subsection (c), and a description of how the Federal
22 science agencies will continue to work toward achieving
23 any of the requirements in subsection (c) that are not yet
24 achieved at the time of the report.

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 \$8,219,670,000 for
15 fiscal year 2011.

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

18 (A) \$6,600,000,000 shall be made avail-
19 able for research and related activities;

20 (B) \$1,104,000,000 shall be made avail-
21 able 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 \$8,932,080,000 for
10 fiscal year 2012.

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

13 (A) \$7,128,000,000 shall be made avail-
14 able for research and related activities;

15 (B) \$1,192,320,000 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) \$356,400,000 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 \$9,555,160,000 for
4 fiscal year 2013.

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

7 (A) \$7,626,960,000 shall be made avail-
8 able for research and related activities;

9 (B) \$1,275,780,000 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) \$381,350,000 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 \$10,112,940,000 for
23 fiscal year 2014.

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

1 (A) \$8,084,580,000 shall be made avail-
2 able for research and related activities;

3 (B) \$1,352,330,000 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) \$404,230,000 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 \$10,704,180,000 for
17 fiscal year 2015.

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

20 (A) \$8,569,650,000 shall be made avail-
21 able for research and related activities;

22 (B) \$1,433,470,000 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) \$428,480,000 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) support the education and training of re-
2 searchers in the use of large-scale, nationally rep-
3 resentative data sets.

4 (c) STATISTICAL REPORTS.—The Director or the Na-
5 tional Science Board, acting through the Center, shall
6 issue regular, and as necessary, special statistical reports
7 on topics related to the national and international science
8 and engineering enterprise such as the biennial report re-
9 quired by section 4 (j)(1) of the National Science Founda-
10 tion Act of 1950 (42 U.S.C. 1863(j)(1)) on indicators of
11 the state of science and engineering in the United States.

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.**

16 The Director shall carry out a program to award
17 merit-reviewed, competitive grants to institutions of higher
18 education to support fundamental research leading to
19 transformative advances in manufacturing technologies,
20 processes, and enterprises that will support United States
21 manufacturing through improved performance, produc-
22 tivity, sustainability, and competitiveness. Research areas
23 may include—

24 (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 **SEC. 224. STRENGTHENING INSTITUTIONAL RESEARCH**

11 **PARTNERSHIPS.**

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

24 (b) INSTITUTIONS.—The institutions referred to in
25 subsection (a) are institutions of higher education that are

1 among the 100 institutions receiving, over the 3-year pe-
2 riod immediately preceding the awarding of grants, the
3 highest amount of research funding from the Foundation.

4 **SEC. 225. NATIONAL SCIENCE BOARD REPORT ON MID-**
5 **SCALE INSTRUMENTATION.**

6 (a) MID-SCALE RESEARCH INSTRUMENTATION
7 NEEDS.—The National Science Board shall evaluate the
8 needs, across all disciplines supported by the Foundation,
9 for mid-scale research instrumentation that falls between
10 the instruments funded by the Major Research Instrumen-
11 tation program and the very large projects funded by the
12 Major Research Equipment and Facilities Construction
13 program.

14 (b) REPORT ON MID-SCALE RESEARCH INSTRUMEN-
15 TATION PROGRAM.—Not later than 1 year after the date
16 of enactment of this Act, the National Science Board shall
17 submit to Congress a report on mid-scale research instru-
18 mentation at the Foundation. At a minimum, this report
19 shall include—

20 (1) the findings from the Board's evaluation of
21 instrumentation needs required under subsection (a),
22 including a description of differences across dis-
23 ciplines and Foundation research directorates;

24 (2) a recommendation or recommendations re-
25 garding how the Foundation should set priorities for

1 mid-scale instrumentation across disciplines and
2 Foundation research directorates;

3 (3) a recommendation or recommendations re-
4 garding the appropriateness of expanding existing
5 programs, including the Major Research Instrumen-
6 tation program or the Major Research Equipment
7 and Facilities Construction program, to support
8 more instrumentation at the mid-scale;

9 (4) a recommendation or recommendations re-
10 garding the need for and appropriateness of a new,
11 Foundation-wide program or initiative in support of
12 mid-scale instrumentation, including any rec-
13 ommendations regarding the administration of and
14 budget for such a program or initiative and the ap-
15 propriate scope of instruments to be funded under
16 such a program or initiative; and

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

20 **SEC. 226. SENSE OF CONGRESS ON OVERALL SUPPORT FOR**
21 **RESEARCH INFRASTRUCTURE AT THE FOUN-**
22 **DATION.**

23 It is the sense of Congress that the Foundation
24 should strive to keep the percentage of the Foundation
25 budget devoted to research infrastructure in the range of

1 24 to 27 percent, as recommended in the 2003 National
2 Science Board report entitled “Science and Engineering
3 Infrastructure for the 21st Century”.

4 **SEC. 227. PARTNERSHIPS FOR INNOVATION.**

5 (a) IN GENERAL.—The Director shall carry out a
6 program to award merit-reviewed, competitive grants to
7 institutions of higher education to establish and to expand
8 partnerships that promote innovation and increase the
9 economic and social impact of research by developing tools
10 and resources to connect new scientific discoveries to prac-
11 tical uses.

12 (b) PARTNERSHIPS.—

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

16 (A) includes at least one private sector en-
17 tity; and

18 (B) may include other institutions of high-
19 er education, public sector institutions, and pri-
20 vate sector entities.

21 (2) PRIORITY.—In selecting grant recipients
22 under this section, the Director shall give priority to
23 partnerships that include one or more institutions of
24 higher education that are among the 100 institu-
25 tions receiving, over the 3-year period immediately

1 preceding the awarding of grants, the highest
2 amount of research funding from the Foundation
3 and at least one of the following:

4 (A) A minority serving institution.

5 (B) A primarily undergraduate institution.

6 (C) A 2-year college.

7 (c) PROGRAM.—Proposals funded under this section
8 shall seek to—

9 (1) increase the economic or social impact of
10 the most promising research at the institution or in-
11 stitutions of higher education that are members of
12 the partnership through knowledge transfer or com-
13 mercialization;

14 (2) increase the engagement of faculty and stu-
15 dents across multiple disciplines and departments,
16 including faculty and students in schools of business
17 and other appropriate non-STEM fields and dis-
18 ciplines in knowledge transfer activities;

19 (3) enhance education and mentoring of stu-
20 dents and faculty in innovation and entrepreneur-
21 ship through networks, courses, and development of
22 best practices and curricula;

23 (4) strengthen the culture of the institution or
24 institutions of higher education to undertake and

1 participate in activities related to innovation and
2 leading to economic or social impact;

3 (5) broaden the participation of all types of in-
4 stitutions of higher education in activities to meet
5 STEM workforce needs and promote innovation and
6 knowledge transfer; and

7 (6) build lasting partnerships with local and re-
8 gional businesses, local and State governments, and
9 other relevant entities.

10 (d) ADDITIONAL CRITERIA.—In selecting grant re-
11 cipients under this section, the Director shall also consider
12 the extent to which the applicants are able to demonstrate
13 evidence of institutional support for, and commitment
14 to—

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

17 (2) expansion to a university-wide program if
18 the initial proposal is not for a university-wide pro-
19 gram; and

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

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

1 **SEC. 228. PRIZE AWARDS.**

2 (a) IN GENERAL.—The Director shall carry out a
3 pilot program to award innovation inducement cash prizes
4 in any area of research supported by the Foundation. The
5 Director may carry out a program of cash prizes only in
6 conformity with this section.

7 (b) TOPICS.—In identifying topics for prize competi-
8 tions under this section, the Director shall—

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

11 (2) give priority to high-risk, high-reward re-
12 search challenges and to problems whose solution
13 could improve the economic competitiveness of the
14 United States; and

15 (3) give consideration to the extent to which the
16 topics have the potential to raise public awareness
17 about federally sponsored research.

18 (c) TYPES OF CONTESTS.—The Director shall con-
19 sider all categories of innovation inducement prizes, in-
20 cluding—

21 (1) contests in which the award is to the first
22 team or individual who accomplishes a stated objec-
23 tive; and

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

1 (d) ADVERTISING AND ANNOUNCEMENT.—

2 (1) ADVERTISING AND SOLICITATION OF COM-
3 PETITORS.—The Director shall widely advertise
4 prize competitions to encourage broad participation,
5 including by individuals, institutions of higher edu-
6 cation, nonprofit organizations, and businesses.

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

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

21 (e) FUNDING.—

22 (1) FUNDING SOURCES.—Prizes under this sec-
23 tion shall consist of Federal appropriated funds and
24 any funds raised pursuant to donations authorized
25 under section 11(f) of the National Science Founda-

1 tion Act of 1950 (42 U.S.C. 1870(f)) for specific
2 prize competitions.

3 (2) ANNOUNCEMENT OF PRIZES.—The Director
4 may not issue a notice as required by subsection
5 (d)(2) until all of the funds needed to pay out the
6 announced amount of the prize have been appro-
7 priated or committed in writing by another entity
8 pursuant to paragraph (1).

9 (f) ELIGIBILITY.—To be eligible to win a prize under
10 this section, an individual or entity—

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

13 (2) in the case of a private entity, shall be in-
14 corporated in and maintain a primary place of busi-
15 ness in the United States, and in the case of an in-
16 dividual, whether participating singly or in a group,
17 shall be a United States citizen or national, or an
18 alien lawfully admitted to the United States for per-
19 manent residence; and

20 (3) shall not be a Federal entity, a Federal em-
21 ployee acting within the scope of his or her employ-
22 ment, or a person employed at a Federal laboratory
23 acting within the scope of his or her employment.

24 (g) AWARDS.—

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

4 (2) SIZE OF AWARD.—The Director may deter-
5 mine the amount of each prize award based on the
6 prize topic, but no award shall be less than
7 \$1,000,000 or greater than \$3,000,000.

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

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

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

20 (i) INTELLECTUAL PROPERTY.—The Federal Gov-
21 ernment shall not, by virtue of offering or awarding a
22 prize under this section, be entitled to any intellectual
23 property rights derived as a consequence of, or in direct
24 relation to, the participation by a registered participant
25 in a competition authorized by this section. This sub-

1 section shall not be construed to prevent the Federal Gov-
2 ernment from negotiating a license for the use of intellec-
3 tual property developed for a prize competition under this
4 section.

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

10 (k) NONSUBSTITUTION.—Any programs created
11 under this section shall not be considered a substitute for
12 Federal research and development programs.

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

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

1 (2) any recommendations regarding changes to,
2 the termination of, or continuation of the pilot pro-
3 gram;

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

7 (4) an analysis of whether public awareness of
8 innovation or of the goal of the particular prize or
9 prizes is enhanced;

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

14 (6) an analysis of the extent to which private
15 funds are being used to support registered partici-
16 pants.

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

22 (n) AUTHORIZATION OF APPROPRIATIONS.—

23 (1) IN GENERAL.—

24 (A) AWARDS.—There are authorized to be
25 appropriated to the Director for the period en-

1 compassing fiscal years 2011 through 2013
2 \$12,000,000 for carrying out this section.

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

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

19 **Subtitle C—STEM Education and** 20 **Workforce Training**

21 **SEC. 241. GRADUATE STUDENT SUPPORT.**

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

23 (1) the Integrative Graduate Education and Re-
24 search Traineeship program is an important pro-
25 gram for training the next generation of scientists

1 and engineers in team-based interdisciplinary re-
2 search and problem solving, and for providing them
3 with the many additional skills, such as communica-
4 tion skills, needed to thrive in diverse STEM ca-
5 reers; and

6 (2) the Integrative Graduate Education and Re-
7 search Traineeship program is no less valuable to
8 the preparation and support of graduate students
9 than the Foundation's Graduate Research Fellow-
10 ship program.

11 (b) EQUAL TREATMENT OF IGERT AND GRF.—Be-
12 ginning in fiscal year 2011, the Director shall increase or,
13 if necessary, decrease funding for the Foundation's Inte-
14 grative Graduate Education and Research Traineeship
15 program (or any program by which it is replaced) at least
16 at the same rate as it increases or decreases funding for
17 the Graduate Research Fellowship program.

18 (c) SUPPORT FOR GRADUATE STUDENT RESEARCH
19 FROM THE RESEARCH ACCOUNT.—For each of the fiscal
20 years 2011 through 2015, at least 50 percent of the total
21 Foundation funds allocated to the Integrative Graduate
22 Education and Research Traineeship program and the
23 Graduate Research Fellowship program shall come from
24 funds appropriated for Research and Related Activities.

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

4 (1) by inserting “(a)” before “The Foundation
5 is authorized”; and

6 (2) by adding at the end the following new sub-
7 section:

8 “(b) The Director shall establish for each year the
9 amount to be awarded for scholarships and fellowships
10 under this section for that year. Each such scholarship
11 and fellowship shall include a cost of education allowance
12 of \$12,000, subject to any restrictions on the use of cost
13 of education allowance as determined by the Director.”.

14 **SEC. 242. POSTDOCTORAL FELLOWSHIP IN STEM EDU-**
15 **CATION RESEARCH.**

16 (a) IN GENERAL.—The Director shall establish
17 postdoctoral fellowships in STEM education research to
18 provide recent doctoral degree graduates in STEM fields
19 with the necessary skills to assume leadership roles in
20 STEM education research, program development, and
21 evaluation in our Nation’s diverse educational institutions.

22 (b) AWARDS.—

23 (1) DURATION.—Fellowships may be awarded
24 under this section for a period of up to 24 months
25 in duration, renewable for an additional 12 months.

1 The Director shall establish criteria for eligibility for
2 renewal of the fellowship.

3 (2) STIPEND.—The Director shall determine
4 the amount of the award for a fellowship, which
5 shall include a stipend and a research allowance, and
6 may include an educational allowance.

7 (3) LOCATION.—A fellowship shall be awarded
8 for research at any institution of higher education
9 that offers degrees in fields supported by the Foun-
10 dation, or at any institution or organization that the
11 Director determines is eligible for education research
12 grants from the Foundation.

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

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

20 (1) learning processes and progressions;

21 (2) knowledge transfer, including curriculum
22 development;

23 (3) uses of technology as teaching and learning
24 tools;

25 (4) integrating STEM fields; and

1 (5) assessment of student learning and program
2 evaluation.

3 (d) **ELIGIBILITY.**—To be eligible for a fellowship
4 under this section, an individual must—

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

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

11 **SEC. 243. ROBERT NOYCE TEACHER SCHOLARSHIP PRO-**
12 **GRAM.**

13 (a) **SECTION 10 AMENDMENTS.**—Section 10 of the
14 National Science Foundation Authorization Act of 2002
15 (42 U.S.C. 1862n–1) is amended—

16 (1) in subsection (c)(4), by striking “Service re-
17 quired under this paragraph shall be performed in a
18 high-need local educational agency.”; and

19 (2) in subsection (e), by adding at the end a
20 new paragraph as follows:

21 “(5) **EXCEPTION.**—The period of service obliga-
22 tion under paragraph (4) shall be reduced by 1 year
23 for scholarship recipients whose service is performed
24 in a high-need local educational agency. The Direc-
25 tor shall establish and maintain a central clearing-

1 house of information on teaching opportunities avail-
2 able in high-need local educational agencies through-
3 out the United States, which shall be made available
4 to individuals having a service obligation under this
5 section.”.

6 (b) SECTION 10A AMENDMENTS.—Section 10A of
7 the National Science Foundation Authorization Act of
8 2002 (42 U.S.C. 1862n–1a) is amended in subsection
9 (h)(1) by striking “50” and inserting “30”.

10 **SEC. 244. INSTITUTIONS SERVING PERSONS WITH DISABIL-**
11 **ITIES.**

12 For the purposes of the activities and programs sup-
13 ported by the Foundation, institutions of higher education
14 chartered to serve large numbers of students with disabil-
15 ities, including Gallaudet University, Landmark College,
16 and the National Technical Institute for the Deaf, shall
17 be designated as minority-serving institutions.

18 **SEC. 245. INSTITUTIONAL INTEGRATION.**

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

1 projects within and among institutions of higher education
2 in an innovative and sustainable manner.

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

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

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

13 (3) seamless transitions from one educational
14 level to another; and

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

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

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

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

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

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

13 **SEC. 246. POSTDOCTORAL RESEARCH FELLOWSHIPS.**

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

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

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

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

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

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

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

18 (1) proposals for interdisciplinary research; or

19 (2) proposals for high-risk, high-reward re-
20 search.

21 (e) ADDITIONAL CONSIDERATIONS.—In evaluating
22 applications for fellowships under this section, the Direc-
23 tor shall give consideration to the goal of promoting the
24 participation of individuals identified in section 33 or 34

1 of the Science and Engineering Equal Opportunities Act
2 (42 U.S.C. 1885a or 1885b).

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

7 **SEC. 247. BROADENING PARTICIPATION TRAINING AND**
8 **OUTREACH.**

9 The Director shall provide education and training—

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

15 (2) to Foundation staff on related outreach ap-
16 proaches.

17 **SEC. 248. TRANSFORMING UNDERGRADUATE EDUCATION**
18 **IN STEM.**

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

22 **“SEC. 17. TRANSFORMING UNDERGRADUATE EDUCATION**
23 **IN STEM.**

24 “(a) IN GENERAL.—The Director shall award grants,
25 on a competitive, merit-reviewed basis, to institutions of

1 higher education to reform undergraduate STEM edu-
2 cation for the purpose of increasing the number and qual-
3 ity of students studying toward and completing bacca-
4 laurate degrees in STEM and improving the STEM
5 learning outcomes for all undergraduate students, includ-
6 ing through—

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

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

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

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

1 “(2) expansion of undergraduate STEM re-
2 search opportunities to include interdisciplinary re-
3 search opportunities and research opportunities in
4 industry, at Federal labs, and at international re-
5 search institutions or research sites;

6 “(3) implementation or expansion of bridge, co-
7 hort, tutoring, or mentoring programs proven to en-
8 hance student recruitment or persistence to degree
9 completion in STEM, including programs that ad-
10 dress student transition from two-year to four-year
11 institutions;

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

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

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

24 “(7) support for graduate students and
25 postdoctoral fellows to participate in instructional or

1 assessment activities at primarily undergraduate in-
2 stitutions; and

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

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

16 “(d) SELECTION PROCESS.—

17 “(1) APPLICATIONS.—An institution of higher
18 education seeking a grant under this section shall
19 submit an application to the Director at such time,
20 in such manner, and containing such information as
21 the Director may require. The application shall in-
22 clude, at a minimum—

23 “(A) a description of the proposed reform
24 effort;

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

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

17 “(D) a description of existing or planned
18 institutional policies and practices regarding
19 faculty hiring, promotion, tenure, and teaching
20 assignment that reward faculty contributions to
21 undergraduate STEM education; and

22 “(E) a description of the plans for assess-
23 ment and evaluation of the proposed reform ac-
24 tivities, including evidence of participation by

1 individuals with experience in assessment and
2 evaluation of teaching and learning programs.

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

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

13 “(B) the degree to which the proposed re-
14 form will contribute to change in institutional
15 culture and policy such that a greater value is
16 placed on faculty engagement in undergraduate
17 education;

18 “(C) the likelihood that the institution will
19 sustain or expand the reform beyond the period
20 of the grant; and

21 “(D) the degree to which scholarly assess-
22 ment and evaluation plans are included in the
23 design of the reform effort, including the degree
24 to which such assessment and evaluation con-

1 tribute to the systematic accumulation of
2 knowledge on STEM education.

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

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

14 **SEC. 249. 21ST CENTURY GRADUATE EDUCATION.**

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

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

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

4 (2) expansion of graduate STEM research op-
5 portunities to include interdisciplinary research op-
6 portunities and research opportunities in industry,
7 at Federal laboratories, and at international re-
8 search institutions or research sites;

9 (3) development and implementation of future
10 faculty training programs focused on improved in-
11 struction, mentoring, assessment of student learn-
12 ing, and support of undergraduate STEM students;

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

19 (5) creation, improvement, or expansion of in-
20 novative graduate programs such as science master’s
21 degree programs;

22 (6) development and implementation of semi-
23 nars, workshops, and other professional development
24 activities that increase the ability of graduate stu-

1 dents to engage in innovation, technology transfer,
2 and entrepreneurship;

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

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

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

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

23 (d) SELECTION PROCESS.—

24 (1) APPLICATIONS.—An institution of higher
25 education seeking a grant under this section shall

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

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

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

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

19 (D) a description of the plans for assess-
20 ment and evaluation of the grant proposed re-
21 form activities.

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

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

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

13 (C) the likelihood that the institution will
14 sustain or expand the reform beyond the period
15 of the grant; and

16 (D) the degree to which scholarly assess-
17 ment and evaluation plans are included in the
18 design of the reform effort.

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

21 **SEC. 250. UNDERGRADUATE BROADENING PARTICIPATION**
22 **PROGRAM.**

23 (a) UNDERGRADUATE BROADENING PARTICIPATION
24 PROGRAM.—The Foundation shall continue to support the
25 Historically Black Colleges and Universities Under-

1 graduate Program, the Louis Stokes Alliances for Minor-
2 ity Participation Program, and the Tribal Colleges and
3 Universities Program as separate programs at least
4 through September 30, 2011.

5 (b) PLAN.—Prior to any realignment or consolidation
6 of the programs described in subsection (a), the Director
7 shall develop a plan clarifying the objectives and rationale
8 for such changes. The plan shall include a description of
9 how such changes would result in—

10 (1) meeting or strengthening the common goal
11 of the separate programs to increase the number of
12 individuals from underrepresented groups attaining
13 undergraduate STEM degrees; and

14 (2) addressing the unique needs of the different
15 types of minority serving institutions and underrep-
16 resented groups currently provided for by the sepa-
17 rate programs.

18 (c) RECOMMENDATIONS.—In the development of the
19 plan required under subsection (b), the Director shall at
20 a minimum—

21 (1) consider the recommendations and findings
22 of the National Academy of Sciences report required
23 by section 7032 of the America COMPETES Act
24 (Public Law 110–69); and

1 (2) solicit recommendations and feedback from
2 a wide range of stakeholders, including representa-
3 tives from minority serving institutions, other insti-
4 tutions of higher education, and other entities with
5 expertise on effective mechanisms to increase the re-
6 cruitment and retention of members of underrep-
7 resented groups in STEM fields, and the attainment
8 of STEM degrees by underrepresented groups.

9 (d) APPROVAL BY CONGRESS.—The plan developed
10 under this section shall be transmitted to Congress at least
11 3 months prior to the implementation of any realignment
12 or consolidation of the programs described in subsection
13 (a).

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

15 (a) IN GENERAL.—The Director and the Secretary
16 of Education shall collaborate in—

17 (1) identifying, prioritizing, and developing
18 strategies to address grand challenges in research
19 and development on the teaching and learning of
20 STEM at the pre-K–12 level, in formal and informal
21 settings, for diverse learning populations, including
22 individuals identified in section 33 or 34 of the
23 Science and Engineering Equal Opportunities Act
24 (42 U.S.C. 1885a or 1885b); and

1 (2) ensuring the dissemination of the results of
2 such research and development.

3 (b) STAKEHOLDER INPUT.—In identifying the grand
4 challenges required in subsection (a), the Director and the
5 Secretary shall—

6 (1) take into consideration critical research
7 gaps identified in existing reports, including reports
8 by the National Academies, on the teaching and
9 learning of STEM at the pre-K–12 level in formal
10 and informal settings; and

11 (2) solicit input from a wide range of stake-
12 holders, including local and State education officials,
13 STEM teachers, STEM education researchers, sci-
14 entific and engineering societies, STEM faculty at
15 institutions of higher education, informal STEM
16 education providers, businesses with a large STEM
17 workforce, and other stakeholders in the teaching
18 and learning of STEM at the pre-K–12 level, and
19 may enter into an arrangement with the National
20 Research Council for these purposes.

21 (c) TOPICS TO CONSIDER.—In identifying the grand
22 challenges required in subsection (a), the Director and the
23 Secretary shall, at a minimum, consider the following top-
24 ics:

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

4 (2) Research that utilizes a systems approach
5 to identifying challenges and opportunities to im-
6 prove the teaching and learning of STEM, including
7 development of model systems that support improved
8 teaching and learning of STEM across entire school
9 districts and States, and encompassing and inte-
10 grating the teaching and learning of STEM in for-
11 mal and informal venues, and in K–12 schools and
12 institutions of higher education.

13 (3) Research to understand what makes a
14 STEM teacher effective and STEM teacher profes-
15 sional development effective, including development
16 of tools and methodologies to measure STEM teach-
17 er effectiveness.

18 (4) Research and development on cyber-enabled
19 tools and programs and television-based tools and
20 programs for learning and teaching STEM, includ-
21 ing development of tools and methodologies for as-
22 sessing cyber- and television-enabled teaching and
23 learning.

24 (5) Research and development on STEM teach-
25 ing and learning in informal environments, including

1 development of tools and methodologies for assessing
2 STEM teaching and learning in informal environ-
3 ments.

4 (6) Research and development on how inte-
5 grating engineering with mathematics and science
6 education may—

7 (A) improve student learning of mathe-
8 matics and science;

9 (B) increase student interest and persist-
10 ence in STEM; or

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

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

17 (1) the grand challenges identified pursuant to
18 this section;

19 (2) the role of each agency in supporting re-
20 search and development activities to address the
21 grand challenges;

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

24 (4) plans for periodically updating the grand
25 challenges;

1 (5) how the agencies will disseminate the re-
2 sults of research and development activities carried
3 out under this section to STEM education practi-
4 tioners, to other Federal agencies that support
5 STEM programs and activities, and to non-Federal
6 funders of STEM education; and

7 (6) how the agencies will support implementa-
8 tion of best practices identified by the research and
9 development activities.

10 **SEC. 252. RESEARCH EXPERIENCES FOR UNDERGRADU-**
11 **ATES.**

12 (a) **RESEARCH SITES.**—The Director shall award
13 grants, on a merit-reviewed, competitive basis, to institu-
14 tions of higher education, nonprofit organizations, or con-
15 sortia of such institutions and organizations, for sites des-
16 igned by the Director to provide research experiences for
17 10 or more undergraduate STEM students. The Director
18 shall ensure that—

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

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

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

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

12 (5) mentors and students are supported with
13 appropriate salary or stipends; and

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

18 (b) INCLUSION OF UNDERGRADUATES IN STANDARD
19 RESEARCH GRANTS.—The Director shall require that
20 every recipient of a research grant from the Foundation
21 proposing to include 1 or more undergraduate students
22 in carrying out the research under the grant shall request
23 support, including stipend support, for such under-
24 graduate students as part of the research proposal itself
25 rather than as a supplement to the research proposal, un-

1 less such undergraduate participation was not foreseeable
2 at the time of the original proposal.

3 **TITLE III—STEM EDUCATION**

4 **SEC. 301. COORDINATION OF FEDERAL STEM EDUCATION.**

5 (a) **SHORT TITLE.**—This section may be cited as the
6 “STEM Education Coordination Act of 2010”.

7 (b) **DEFINITION.**—In this section, the term “STEM”
8 means science, technology, engineering, and mathematics.

9 (c) **ESTABLISHMENT.**—The Director of the Office of
10 Science and Technology Policy shall establish a committee
11 under the National Science and Technology Council with
12 the responsibility to coordinate Federal programs and ac-
13 tivities in support of STEM education, including at the
14 National Science Foundation, the Department of Energy,
15 the National Aeronautics and Space Administration, the
16 National Oceanic and Atmospheric Administration, the
17 Department of Education, and all other Federal agencies
18 that have programs and activities in support of STEM
19 education.

20 (d) **RESPONSIBILITIES OF THE COMMITTEE.**—The
21 committee established under subsection (c) shall—

22 (1) coordinate the STEM education activities
23 and programs of the Federal agencies;

1 (2) develop, implement through the partici-
2 pating agencies, and update once every 5 years a 5-
3 year STEM education strategic plan, which shall—

4 (A) specify and prioritize annual and long-
5 term objectives;

6 (B) specify the common metrics that will
7 be used to assess progress toward achieving the
8 objectives;

9 (C) describe the approaches that will be
10 taken by each participating agency to assess the
11 effectiveness of its STEM education programs
12 and activities; and

13 (D) with respect to subparagraph (A), de-
14 scribe the role of each agency in supporting
15 programs and activities designed to achieve the
16 objectives; and

17 (3) establish, periodically update, and maintain
18 an inventory of federally sponsored STEM education
19 programs and activities, including documentation of
20 assessments of the effectiveness of such programs
21 and activities and rates of participation by underrep-
22 resented minorities in such programs and activities.

23 (e) RESPONSIBILITIES OF OSTP.—The Director of
24 the Office of Science and Technology Policy shall encour-
25 age and monitor the efforts of the participating agencies

1 to ensure that the strategic plan under subsection (d)(2)
2 is developed and executed effectively and that the objec-
3 tives of the strategic plan are met.

4 (f) REPORT.—The Director of the Office of Science
5 and Technology Policy shall transmit a report annually to
6 Congress at the time of the President’s budget request de-
7 scribing the plan required under subsection (d)(2). The
8 annual report shall include—

9 (1) a description of the STEM education pro-
10 grams and activities for the previous and current fis-
11 cal years, and the proposed programs and activities
12 under the President’s budget request, of each par-
13 ticipating Federal agency;

14 (2) the levels of funding for each participating
15 Federal agency for the programs and activities de-
16 scribed under paragraph (1) for the previous fiscal
17 year and under the President’s budget request;

18 (3) except for the initial annual report, a de-
19 scription of the progress made in carrying out the
20 implementation plan, including a description of the
21 outcome of any program assessments completed in
22 the previous year, and any changes made to that
23 plan since the previous annual report; and

24 (4) a description of how the participating Fed-
25 eral agencies will disseminate information about fed-

1 erally supported resources for STEM education
2 practitioners, including teacher professional develop-
3 ment programs, to States and to STEM education
4 practitioners, including to teachers and administra-
5 tors in high-need schools, as defined in section 200
6 of the Higher Education Act of 1965 (20 U.S.C.
7 1021).

8 **SEC. 302. ADVISORY COMMITTEE ON STEM EDUCATION.**

9 (a) IN GENERAL.—The President shall establish or
10 designate an advisory committee on science, technology,
11 engineering, and mathematics (STEM) education.

12 (b) MEMBERSHIP.—The advisory committee estab-
13 lished or designated by the President under subsection (a)
14 shall be chaired by at least 2 members of the President’s
15 Council of Advisors on Science and Technology, with the
16 remaining advisory committee membership consisting of
17 non-Federal members who are specially qualified to pro-
18 vide the President with advice and information on STEM
19 education. Membership of the advisory committee, at a
20 minimum, shall include individuals from the following cat-
21 egories of individuals and organizations:

22 (1) STEM educator professional associations.

23 (2) Organizations that provide informal STEM
24 education activities.

25 (3) Institutions of higher education.

1 (4) Scientific and engineering professional soci-
2 eties.

3 (5) Business and industry associations.

4 (6) Foundations that fund STEM education ac-
5 tivities.

6 (c) RESPONSIBILITIES.—The responsibilities of the
7 advisory committee shall include—

8 (1) soliciting input from teachers, administra-
9 tors, local education agencies, States, and other pub-
10 lic and private STEM education stakeholder groups
11 for the purpose of informing the Federal agencies
12 that support STEM education programs on the
13 STEM education needs of States and school dis-
14 tricts;

15 (2) soliciting input from all STEM education
16 stakeholder groups regarding STEM education pro-
17 grams, including STEM education research pro-
18 grams, supported by Federal agencies;

19 (3) providing advice to the Federal agencies
20 that support STEM education programs on how
21 their programs can be better aligned with the needs
22 of States and school districts as identified in para-
23 graph (1), consistent with the mission of each agen-
24 cy; and

1 (4) offering guidance to the President on cur-
2 rent STEM education activities, research findings,
3 and best practices, with the purpose of increasing
4 connectivity between public and private STEM edu-
5 cation efforts.

6 **SEC. 303. STEM EDUCATION AT THE DEPARTMENT OF EN-**
7 **ERGY.**

8 (a) DEFINITIONS.—Section 5002 of the America
9 COMPETES Act (42 U.S.C. 16531) is amended—

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

12 (2) by inserting after paragraph (1) the fol-
13 lowing new paragraph:

14 “(2) ENERGY SYSTEMS SCIENCE AND ENGI-
15 NEERING.—The term ‘energy systems science and
16 engineering’ means—

17 “(A) nuclear science and engineering, in-
18 cluding—

19 “(i) nuclear engineering;

20 “(ii) nuclear chemistry;

21 “(iii) radiochemistry; and

22 “(iv) health physics;

23 “(B) hydrocarbon system science and engi-
24 neering, including—

- 1 “(i) petroleum or reservoir engineer-
2 ing;
3 “(ii) environmental geoscience;
4 “(iii) petrophysics;
5 “(iv) geophysics;
6 “(v) geochemistry;
7 “(vi) petroleum geology;
8 “(vii) ocean engineering; and
9 “(viii) environmental engineering;
10 “(C) energy efficiency and renewable en-
11 ergy technology systems science and engineer-
12 ing, including with respect to—
13 “(i) solar technology systems;
14 “(ii) wind technology systems;
15 “(iii) buildings technology systems;
16 “(iv) transportation technology sys-
17 tems;
18 “(v) hydropower systems; and
19 “(vi) geothermal systems; and
20 “(D) energy storage and distribution sys-
21 tems science and engineering, including with re-
22 spect to—
23 “(i) energy storage; and
24 “(ii) energy delivery.”.

1 (b) SCIENCE, TECHNOLOGY, ENGINEERING, AND
2 MATHEMATICS EDUCATION PROGRAMS.—Subpart B of
3 the Department of Energy Science Education Enhance-
4 ment Act (42 U.S.C. 7381g et seq.) is amended—

5 (1) in section 3170—

6 (A) by amending paragraph (1) to read as
7 follows:

8 “(1) DIRECTOR.—The term ‘Director’ means
9 the Director of STEM Education appointed or des-
10 ignated under section 3171(c)(1).”;

11 (B) by redesignating paragraph (2) as
12 paragraph (3);

13 (C) by inserting after paragraph (1) the
14 following new paragraph:

15 “(2) ENERGY SYSTEMS SCIENCE AND ENGI-
16 NEERING.—The term ‘energy systems science and
17 engineering’ means—

18 “(A) nuclear science and engineering, in-
19 cluding—

20 “(i) nuclear engineering;

21 “(ii) nuclear chemistry;

22 “(iii) radiochemistry; and

23 “(iv) health physics;

24 “(B) hydrocarbon system science and engi-
25 neering, including—

- 1 “(i) petroleum or reservoir engineer-
2 ing;
3 “(ii) environmental geoscience;
4 “(iii) petrophysics;
5 “(iv) geophysics;
6 “(v) geochemistry;
7 “(vi) petroleum geology;
8 “(vii) ocean engineering; and
9 “(viii) environmental engineering;
10 “(C) energy efficiency and renewable en-
11 ergy technology systems science and engineer-
12 ing, including with respect to—
13 “(i) solar technology systems;
14 “(ii) wind technology systems;
15 “(iii) buildings technology systems;
16 “(iv) transportation technology sys-
17 tems;
18 “(v) hydropower systems; and
19 “(vi) geothermal systems; and
20 “(D) energy storage and distribution sys-
21 tems science and engineering, including with re-
22 spect to—
23 “(i) energy storage; and
24 “(ii) energy delivery.”; and

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

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

5 (2) by striking chapters 1, 2, 3, 4, and 6;

6 (3) by inserting after section 3170 the following
7 new chapter:

8 **“CHAPTER 1—STEM EDUCATION**

9 **“SEC. 3171. STEM EDUCATION.**

10 “(a) IN GENERAL.—The Secretary of Energy shall
11 develop, conduct, support, promote, and coordinate formal
12 and informal educational activities at all levels that lever-
13 age the Department’s unique content expertise and facili-
14 ties to contribute to improving STEM education at all lev-
15 els in the United States, and to enhance awareness and
16 understanding of STEM, including energy sciences,
17 among the general public, with consideration given to the
18 goal of promoting the participation of individuals from
19 underrepresented groups in the STEM fields.

20 “(b) PROGRAMS.—The Secretary shall carry out evi-
21 dence-based programs designed to increase student inter-
22 est and participation, improve public literacy and support,
23 and improve the teaching and learning of energy systems
24 science and engineering and other STEM disciplines sup-

1 ported by the Department. Programs authorized under
2 this subsection may include—

3 “(1) informal educational programming de-
4 signed to excite and inspire students and the general
5 public about energy systems science and engineering
6 and other STEM disciplines supported by the De-
7 partment, while strengthening their content knowl-
8 edge in these fields;

9 “(2) teacher training and professional develop-
10 ment opportunities for pre-service and in-service ele-
11 mentary and secondary teachers designed to increase
12 the content knowledge of teachers in energy systems
13 science and engineering and other STEM disciplines
14 supported by the Department, including through
15 hands-on research experiences;

16 “(3) research opportunities for secondary school
17 students, including internships at the National Lab-
18 oratories, that provide secondary school students
19 with hands-on research experiences as well as expo-
20 sure to working scientists;

21 “(4) research opportunities at the National
22 Laboratories for undergraduate and graduate stu-
23 dents pursuing degrees in energy systems science
24 and engineering and other STEM disciplines sup-
25 ported by the Department; and

1 “(5) competitive scholarships, fellowships, and
2 traineeships for undergraduate and graduate stu-
3 dents in energy systems science and engineering and
4 other STEM disciplines supported by the Depart-
5 ment.

6 “(c) ORGANIZATION OF STEM EDUCATION PRO-
7 GRAMS.—

8 “(1) DIRECTOR OF STEM EDUCATION.—The
9 Secretary shall appoint or designate a Director of
10 STEM Education, who shall have the principal re-
11 sponsibility to oversee and coordinate all programs
12 and activities of the Department in support of
13 STEM education, including energy systems science
14 and engineering education, across all functions of
15 the Department.

16 “(2) QUALIFICATIONS.—The Director shall be
17 an individual, who by reason of professional back-
18 ground and experience, is specially qualified to ad-
19 vise the Secretary on all matters pertaining to
20 STEM education, including energy systems science
21 and engineering education, at the Department.

22 “(3) DUTIES.—The Director shall—

23 “(A) oversee and coordinate all programs
24 in support of STEM education, including en-

1 energy systems science and engineering education,
2 across all functions of the Department;

3 “(B) represent the Department as the
4 principal interagency liaison for all STEM edu-
5 cation programs, unless otherwise represented
6 by the Secretary, the Under Secretary for
7 Science, or the Under Secretary for Energy;

8 “(C) prepare the annual budget and advise
9 the Under Secretary for Science and the Under
10 Secretary for Energy on all budgetary issues for
11 STEM education, including energy systems
12 science and engineering education, relative to
13 the programs of the Department;

14 “(D) establish, periodically update, and
15 maintain a publicly accessible online inventory
16 of STEM education programs and activities, in-
17 cluding energy systems science and engineering
18 education programs and activities;

19 “(E) develop, implement, and update the
20 Department of Energy STEM education stra-
21 tegic plan, as required by subsection (d);

22 “(F) increase, to the maximum extent
23 practicable, the participation and advancement
24 of women and underrepresented minorities at
25 every level of STEM education, including en-

1 energy systems science and engineering education;
2 and

3 “(G) perform such other matters relating
4 to STEM education as are required by the Sec-
5 retary, the Under Secretary for Science, or the
6 Under Secretary for Energy.

7 “(d) DEPARTMENT OF ENERGY STEM EDUCATION
8 STRATEGIC PLAN.—The Director of STEM education ap-
9 pointed or designated under subsection (c)(1) shall de-
10 velop, implement, and update once every 3 years a 3-year
11 STEM education strategic plan for the Department, which
12 shall—

13 “(1) identify and prioritize annual and long-
14 term STEM education goals and objectives for the
15 Department that are aligned with the overall goals
16 of the National Science and Technology Council
17 Committee on STEM Education Strategic plan;

18 “(2) describe the role of each program or activ-
19 ity of the Department in contributing to the goals
20 and objectives identified under paragraph (1);

21 “(3) specify the metrics that will be used to as-
22 sess progress toward achieving those goals and ob-
23 jectives; and

1 “(4) describe the approaches that will be taken
2 to assess the effectiveness of each STEM education
3 program and activity supported by the Department.

4 “(e) OUTREACH TO STUDENTS FROM UNDERREP-
5 RESENTED GROUPS.—In carrying out a program author-
6 ized under this section, the Secretary shall give consider-
7 ation to the goal of promoting the participation of individ-
8 uals identified in section 33 or 34 of the Science and Engi-
9 neering Equal Opportunities Act (42 U.S.C. 1885a or
10 1885b).

11 “(f) CONSULTATION AND PARTNERSHIP WITH
12 OTHER AGENCIES.—In carrying out the programs and ac-
13 tivities authorized under this section, the Secretary shall—

14 “(1) consult with the Secretary of Education
15 and the Director of the National Science Foundation
16 regarding activities designed to improve elementary
17 and secondary STEM education; and

18 “(2) consult and partner with the Director of
19 the National Science Foundation in carrying out
20 programs under this section designed to build capac-
21 ity in STEM education at the undergraduate and
22 graduate level, including by supporting excellent pro-
23 posals in energy systems science and engineering
24 that are submitted for funding to the Foundation’s
25 Advanced Technological Education Program.”; and

1 (4) in section 3191—

2 (A) in subsection (a)—

3 (i) by striking “web-based”; and

4 (ii) by inserting “and project-based
5 learning opportunities” after “laboratory
6 experiments”;

7 (B) in subsection (b)(1), by striking “the
8 science of energy” and inserting “energy sys-
9 tems science and engineering”; and

10 (C) by striking subsection (d).

11 (c) ENERGY APPLIED SCIENCE TALENT EXPANSION

12 PROGRAM FOR INSTITUTIONS OF HIGHER EDUCATION.—

13 Strike sections 5004 and 5005 of the America COM-

14 PETES Act (42 U.S.C. 16532 and 16533) and insert the

15 following new section:

16 **“SEC. 5004. ENERGY APPLIED SCIENCE TALENT EXPANSION**

17 **PROGRAM FOR INSTITUTIONS OF HIGHER**

18 **EDUCATION.**

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

20 “(1) to address the decline in the number of
21 and resources available to energy systems science
22 and engineering programs at institutions of higher
23 education, including community colleges; and

24 “(2) to increase the number of graduates with
25 degrees in energy systems science and engineering,

1 an area of strategic importance to the economic
2 competitiveness and energy security of the United
3 States.

4 “(b) ESTABLISHMENT.—The Secretary shall award
5 grants, on a competitive, merit-reviewed basis, to institu-
6 tions of higher education to implement or expand the en-
7 ergy systems science and engineering educational and
8 technical training capabilities of the institution, and to
9 provide merit-based financial support for master’s and
10 doctoral level students pursuing courses of study and re-
11 search in energy systems sciences and engineering.

12 “(c) USE OF FUNDS.—An institution of higher edu-
13 cation that receives a grant under this section may use
14 the grant to—

15 “(1) provide traineeships, including stipends
16 and cost of education allowances, to master’s and
17 doctoral students;

18 “(2) develop or expand multidisciplinary or
19 interdisciplinary courses or programs;

20 “(3) recruit and retain new faculty;

21 “(4) develop or improve core and specialized
22 course content;

23 “(5) encourage interdisciplinary and multidisci-
24 plinary research collaborations;

1 “(6) support outreach efforts to recruit stu-
2 dents; and

3 “(7) pursue opportunities for collaboration with
4 industry and National Laboratories.

5 “(d) CRITERIA.—Criteria for awarding a grant under
6 this section shall be based on—

7 “(1) the potential to attract new students to the
8 program;

9 “(2) academic rigor; and

10 “(3) the ability to offer hands-on education and
11 training opportunities for graduate students in the
12 emerging areas of energy systems science and engi-
13 neering.

14 “(e) PRIORITY.—The Secretary shall give priority to
15 proposals that involve active partnerships with a National
16 Laboratory or other energy systems science and engineer-
17 ing related entity, as determined by the Secretary.

18 “(f) DURATION AND AMOUNT.—

19 “(1) DURATION.—A grant under this section
20 may be for up to 5 years in duration.

21 “(2) AMOUNT.—An institution of higher edu-
22 cation that receives a grant under this section shall
23 be eligible for up to \$1,000,000 for each year of the
24 grant period.

1 “(g) AUTHORIZATION OF APPROPRIATIONS.—There
2 are authorized to be appropriated to the Secretary to carry
3 out this section—

4 “(1) \$30,000,000 for fiscal year 2011;

5 “(2) \$32,000,000 for fiscal year 2012;

6 “(3) \$36,000,000 for fiscal year 2013;

7 “(4) \$38,000,000 for fiscal year 2014; and

8 “(5) \$40,000,000 for fiscal year 2015.”.

9 (d) DEPARTMENT OF ENERGY EARLY CAREER
10 AWARDS FOR SCIENCE, ENGINEERING, AND MATHE-
11 MATICS RESEARCHERS.—Section 5006 of the America
12 COMPETES Act (42 U.S.C. 16534) is amended—

13 (1) in subsection (a), by striking “Director of
14 the Office” and all that follows through “shall
15 carry” and inserting “Secretary shall carry”;

16 (2) in subsection (b)(1)—

17 (A) in subparagraph (A), by inserting “per
18 year” after “\$80,000”; and

19 (B) in subparagraph (B), by striking
20 “\$125,000” and inserting “\$500,000 per year”;

21 (3) in subsection (c)(1), by striking “, as deter-
22 mined by the Director”;

23 (4) in subsections (c)(2), (e), (f), and (g), by
24 striking “Director” each place it appears and insert-
25 ing “Secretary”;

1 (5) in subsection (d), by striking “merit-re-
2 viewed” and inserting “merit-based, peer reviewed”;
3 and

4 (6) in subsection (h)—

5 (A) by striking “, acting through the Di-
6 rector,”; and

7 (B) by striking “\$25,000,000 for each fis-
8 cal years 2008 through 2010” and inserting
9 “such sums as are necessary”.

10 (e) PROTECTING AMERICA’S COMPETITIVE EDGE
11 (PACE) GRADUATE FELLOWSHIP PROGRAM.—Section
12 5009 of the America COMPETES Act (42 U.S.C. 16536)
13 is amended—

14 (1) in subsections (a) and (b), by inserting
15 “master’s or” before “doctoral”;

16 (2) in subsection (c)—

17 (A) in paragraph (1), by striking “involv-
18 ing written and oral interviews, that will result
19 in a wide distribution of awards throughout the
20 United States,”; and

21 (B) in paragraph (2)(B)(iv), by striking
22 “verbal and”;

23 (3) in subsection (d)(1)(B)(i), by inserting
24 “partial or full” before “graduate tuition”; and

25 (4) by striking subsection (f).

1 (f) REPEAL.—Section 3164 of the Department of En-
2 ergy Science Education Enhancement Act (42 U.S.C.
3 7381a) is repealed.

4 **TITLE IV—NATIONAL INSTITUTE**
5 **OF STANDARDS AND TECH-**
6 **NOLOGY**

7 **SEC. 401. SHORT TITLE.**

8 This title may be cited as the “National Institute of
9 Standards and Technology Authorization Act of 2010”.

10 **SEC. 402. AUTHORIZATION OF APPROPRIATIONS.**

11 (a) FISCAL YEAR 2011.—

12 (1) IN GENERAL.—There are authorized to be
13 appropriated to the Secretary of Commerce
14 \$1,012,100,000 for the National Institute of Stand-
15 ards and Technology for fiscal year 2011.

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

18 (A) \$620,000,000 shall be authorized for
19 scientific and technical research and services
20 laboratory activities;

21 (B) \$125,000,000 shall be authorized for
22 the construction and maintenance of facilities;
23 and

1 (C) \$267,100,000 shall be authorized for
2 industrial technology services activities, of
3 which—

4 (i) \$116,000,000 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) \$141,100,000 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) \$10,000,000 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 (b) FISCAL YEAR 2012.—

19 (1) IN GENERAL.—There are authorized to be
20 appropriated to the Secretary of Commerce
21 \$1,035,400,000 for the National Institute of Stand-
22 ards and Technology for fiscal year 2012.

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

1 (A) \$657,200,000 shall be authorized for
2 scientific and technical research and services
3 laboratory activities;

4 (B) \$85,000,000 shall be authorized for
5 the construction and maintenance of facilities;
6 and

7 (C) \$293,200,000 shall be authorized for
8 industrial technology services activities, of
9 which—

10 (i) \$132,000,000 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) \$150,900,000 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) \$10,300,000 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).

24 (c) FISCAL YEAR 2013.—

1 (1) IN GENERAL.—There are authorized to be
2 appropriated to the Secretary of Commerce
3 \$1,137,809,000 for the National Institute of Stand-
4 ards and Technology for fiscal year 2013.

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

7 (A) \$696,700,000 shall be authorized for
8 scientific and technical research and services
9 laboratory activities;

10 (B) \$122,000,000 shall be authorized for
11 the construction and maintenance of facilities;
12 and

13 (C) \$319,109,000 shall be authorized for
14 industrial technology services activities, of
15 which—

16 (i) \$147,000,000 shall be authorized
17 for the Technology Innovation Program
18 under section 28 of the National Institute
19 of Standards and Technology Act (15
20 U.S.C. 278n);

21 (ii) \$161,500,000 shall be authorized
22 for the Manufacturing Extension Partner-
23 ship program under sections 25 and 26 of
24 such Act (15 U.S.C. 278k and 278l); and

1 (iii) \$10,609,000 shall be authorized
2 for the Malcolm Baldrige National Quality
3 Award program under section 17 of the
4 Stevenson-Wydler Technology Innovation
5 Act of 1980 (15 U.S.C. 3711a).

6 (d) FISCAL YEAR 2014.—

7 (1) IN GENERAL.—There are authorized to be
8 appropriated to the Secretary of Commerce
9 \$1,188,277,000 for the National Institute of Stand-
10 ards and Technology for fiscal year 2014.

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

13 (A) \$738,500,000 shall be authorized for
14 scientific and technical research and services
15 laboratory activities;

16 (B) \$124,000,000 shall be authorized for
17 the construction and maintenance of facilities;
18 and

19 (C) \$325,727,000 shall be authorized for
20 industrial technology services activities, of
21 which—

22 (i) \$142,000,000 shall be authorized
23 for the Technology Innovation Program
24 under section 28 of the National Institute

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

3 (ii) \$172,800,000 shall be authorized
4 for the Manufacturing Extension Partner-
5 ship program under sections 25 and 26 of
6 such Act (15 U.S.C. 278k and 278l); and

7 (iii) \$10,927,000 shall be authorized
8 for the Malcolm Baldrige National Quality
9 Award program under section 17 of the
10 Stevenson-Wydler Technology Innovation
11 Act of 1980 (15 U.S.C. 3711a).

12 (e) FISCAL YEAR 2015.—

13 (1) IN GENERAL.—There are authorized to be
14 appropriated to the Secretary of Commerce
15 \$1,255,955,000 for the National Institute of Stand-
16 ards and Technology for fiscal year 2015.

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

19 (A) \$782,800,000 shall be authorized for
20 scientific and technical research and services
21 laboratory activities;

22 (B) \$133,000,000 shall be authorized for
23 the construction and maintenance of facilities;
24 and

1 (C) \$340,155,000 shall be authorized for
2 industrial technology services activities, of
3 which—

4 (i) \$144,000,000 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) \$184,900,000 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) \$11,255,000 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 **SEC. 403. UNDER SECRETARY OF COMMERCE FOR STAND-**
19 **ARDS AND TECHNOLOGY.**

20 (a) IN GENERAL.—Section 5 of the Stevenson-
21 Wydler Technology Innovation Act of 1980 (15 U.S.C.
22 3704) is amended—

23 (1) in the heading, by striking “**EXPERI-**
24 **MENTAL PROGRAM TO STIMULATE COMPETI-**
25 **TIVE**” and inserting “**STANDARDS AND**”;

1 (2) in the heading in subsection (a), by striking
2 “PROGRAM ESTABLISHMENT” and inserting “ES-
3 TABLISHMENT OF EXPERIMENTAL PROGRAM TO
4 STIMULATE COMPETITIVE TECHNOLOGY”;

5 (3) by redesignating subsections (a) through (c)
6 as subsections (b) through (d), respectively; and

7 (4) by inserting before subsection (b), as so re-
8 designated, the following:

9 “(a) UNDER SECRETARY OF COMMERCE FOR STAND-
10 ARDS AND TECHNOLOGY.—

11 “(1) ESTABLISHMENT.—There shall be in the
12 Department of Commerce an Under Secretary of
13 Commerce for Standards and Technology who shall
14 serve as the Director of the National Institute of
15 Standards and Technology and perform such duties
16 as provided for in the National Institute of Stand-
17 ards and Technology Act (15 U.S.C. 271 et seq.)
18 and as the Secretary shall prescribe.

19 “(2) APPOINTMENT.—The Under Secretary of
20 Commerce for Standards and Technology shall be
21 appointed by the President by and with the advice
22 and consent of the Senate and shall be compensated
23 at the rate now or hereafter provided for level III of
24 the Executive Schedule Pay Rates (5 U.S.C. 5314).

1 “(3) APPLICABILITY.—The individual serving
2 on the date of enactment of the National Institute
3 of Standards and Technology Authorization Act of
4 2010 as the Director of the National Institute of
5 Standards and Technology shall also serve as the
6 Under Secretary of Commerce for Standards and
7 Technology until such time as a successor is ap-
8 pointed under paragraph (2).”.

9 (b) CONFORMING AMENDMENTS.—

10 (1) STEVENSON-WYDLER.—Subsection (c) of
11 section 5 of such Act (15 U.S.C. 3704), as redesign-
12 ated in subsection (a)(3), is amended to read as
13 follows:

14 “(c) COORDINATION.—To the extent practicable, in
15 carrying out subsection (b), the Secretary shall coordinate
16 the program established under such subsection with other
17 programs of the Department of Commerce.”.

18 (2) TITLE 5, UNITED STATES CODE.—

19 (A) LEVEL III.—Section 5314 of title 5,
20 United States Code, is amended by inserting
21 before the item “Associate Attorney General”
22 the following:

23 “Under Secretary of Commerce for Standards
24 and Technology, the incumbent of which also serves

1 as Director of the National Institute of Standards
2 and Technology.”.

3 (B) LEVEL IV.—Section 5315 of title 5,
4 United States Code, is amended by striking
5 “Director, National Institute of Standards and
6 Technology, Department of Commerce.”.

7 (3) NIST ACT.—Section 5 of the National In-
8 stitute of Standards and Technology Act (15 U.S.C.
9 274) is amended by striking the following: “The Di-
10 rector shall be compensated at the rate in effect for
11 level IV of the Executive Schedule under section
12 5315 of title 5, United States Code.”.

13 **SEC. 404. REORGANIZATION OF NIST LABORATORIES.**

14 (a) ORGANIZATION.—The Director shall reorganize
15 the scientific and technical research and services labora-
16 tory program into the following operational units:

17 (1) The Physical Measurement Laboratory,
18 whose mission is to realize and disseminate the na-
19 tional standards for length, mass, time and fre-
20 quency, electricity, temperature, force, and radiation
21 by activities including fundamental research in
22 measurement science, the provision of measurement
23 services and standards, and the provision of testing
24 facilities resources for use by the Federal Govern-
25 ment.

1 (2) The Information Technology Laboratory,
2 whose mission is to develop and disseminate stand-
3 ards, measurements, and testing capabilities for
4 interoperability, security, usability, and reliability of
5 information technologies, including cyber security
6 standards and guidelines for Federal agencies,
7 United States industry, and the public, through fun-
8 damental and applied research in computer science,
9 mathematics, and statistics.

10 (3) The Engineering Laboratory, whose mission
11 is to develop and disseminate advanced manufac-
12 turing and construction technologies to the United
13 States manufacturing and construction industries
14 through activities including measurement science re-
15 search, performance metrics, tools for engineering
16 applications, promotion of green infrastructure, and
17 energy efficiency measurements and standards.

18 (4) The Material Measurement Laboratory,
19 whose mission is to serve as the national reference
20 laboratory in biological, chemical, and material
21 sciences and engineering through activities including
22 fundamental research in the composition, structure,
23 and properties of biological and environmental mate-
24 rials and processes, the development of certified ref-
25 erence materials and critically evaluated data, and

1 other programs to assure measurement quality in
2 materials and biotechnology fields.

3 (5) The Center for Nanoscale Science and
4 Technology, a national shared-use facility for
5 nanoscale fabrication and measurement, whose mis-
6 sion is to develop innovative nanoscale measurement
7 and fabrication capabilities to support researchers
8 from industry, institutions of higher education, the
9 National Institute of Standards and Technology, and
10 other Federal agencies in nanoscale technology from
11 discovery to production.

12 (6) The NIST Center for Neutron Research, a
13 national shared-use facility, whose mission is to pro-
14 vide neutron-based measurement capabilities to re-
15 searchers from industry, institutions of higher edu-
16 cation, the National Institute of Standards and
17 Technology, and other Federal agencies in support
18 of materials research, nondestructive evaluation,
19 neutron imaging, chemical analysis, neutron stand-
20 ards, dosimetry, and radiation metrology.

21 (b) REVISION.—

22 (1) IN GENERAL.—Subsequent to the reorga-
23 nization required under subsection (a), the Director
24 may revise the organization of the scientific and
25 technical research and services laboratory program.

1 (2) REPORT TO CONGRESS.—Any revision to
2 the organization of such program under paragraph
3 (1) shall be submitted in a report to the Committee
4 on Science and Technology of the House of Rep-
5 resentatives and the Committee on Commerce,
6 Science, and Transportation of the Senate at least
7 60 days before the effective date of such revision.

8 **SEC. 405. FEDERAL GOVERNMENT STANDARDS AND CON-**
9 **FORMITY ASSESSMENT COORDINATION.**

10 (a) COORDINATION.—Section 2(b) of the National In-
11 stitute of Standards and Technology Act (15 U.S.C.
12 272(b)) is amended—

13 (1) in paragraph (12), by striking “and” after
14 the semicolon;

15 (2) in paragraph (13), by striking the period at
16 the end and inserting a semicolon; and

17 (3) by adding after paragraph (13) the fol-
18 lowing:

19 “(14) to promote collaboration among Federal
20 departments and agencies and private sector stake-
21 holders in the development and implementation of
22 standards and conformity assessment frameworks to
23 address specific Federal Government policy goals;
24 and

1 “(15) to convene Federal departments and
2 agencies, as appropriate, to—

3 “(A) coordinate and determine Federal
4 Government positions on specific policy issues
5 related to international technical standards and
6 conformity assessment-related activities; and

7 “(B) coordinate Federal department and
8 agency engagement in the development of inter-
9 national technical standards and conformity as-
10 sessment-related activities.”.

11 (b) REPORT.—The Director, in consultation with ap-
12 propriate Federal agencies, shall submit a report annually
13 to Congress addressing the Federal Government’s tech-
14 nical standards and conformity assessment-related activi-
15 ties. The report shall identify—

16 (1) current and anticipated international stand-
17 ards and conformity assessment-related issues that
18 have the potential to impact the competitiveness and
19 innovation capabilities of the United States;

20 (2) any action being taken by the Federal Gov-
21 ernment to address these issues and the Federal
22 agency taking that action; and

23 (3) any action that the Director is taking or
24 will take to ensure effective Federal Government en-
25 gagement on technical standards and conformity as-

1 assessment-related issues, as appropriate, where the
2 Federal Government is not effectively engaged.

3 **SEC. 406. MANUFACTURING EXTENSION PARTNERSHIP.**

4 (a) COMMUNITY COLLEGE SUPPORT.—Section 25(a)
5 of the National Institute of Standards and Technology Act
6 (15 U.S.C. 278k(a)) is amended—

7 (1) in paragraph (4), by striking “and” after
8 the semicolon;

9 (2) in paragraph (5), by striking the period at
10 the end and inserting “; and”; and

11 (3) by adding after paragraph (5) the following:

12 “(6) providing to community colleges informa-
13 tion about the job skills needed in small- and me-
14 dium-sized manufacturing businesses in the regions
15 they serve.”.

16 (b) INNOVATIVE SERVICES INITIATIVE.—

17 (1) IN GENERAL.—Section 25 of such Act (15
18 U.S.C. 278k) is amended by adding at the end the
19 following:

20 “(g) INNOVATIVE SERVICES INITIATIVE.—

21 “(1) ESTABLISHMENT.—The Director may es-
22 tablish, within the Centers program under this sec-
23 tion, an innovative services initiative to assist small-
24 and medium-sized manufacturers in—

1 “(A) reducing their energy usage and envi-
2 ronmental waste to improve profitability; and

3 “(B) accelerating the domestic commer-
4 cialization of new product technologies, includ-
5 ing components for renewable energy systems.

6 “(2) MARKET DEMAND.—The Director may not
7 undertake any activity to accelerate the domestic
8 commercialization of a new product technology
9 under this subsection unless an analysis of market
10 demand for the new product technology has been
11 conducted.”.

12 (2) GRANTS.—Section 33 of such Act (15
13 U.S.C. 278r) is amended by adding at the end the
14 following:

15 “(g) INNOVATIVE SERVICES.—The Director may
16 make awards under this section to carry out the innovative
17 services initiative under section 25(g).”.

18 (c) REPORTS.—Section 25 of such Act (15 U.S.C.
19 278k) is further amended by adding at the end the fol-
20 lowing:

21 “(h) REPORTS.—

22 “(1) IN GENERAL.—In submitting the 3-year
23 programmatic planning document and annual up-
24 dates under section 23, the Director shall include an

1 assessment of the Director’s governance of the pro-
2 gram established under this section.

3 “(2) CRITERIA.—In conducting such assess-
4 ment, the Director shall use the criteria established
5 pursuant to the Malcolm Baldrige National Quality
6 Award under section 17(d)(1)(C) of the Stevenson-
7 Wydler Technology Innovation Act of 1980 (15
8 U.S.C. 3711a(d)(1)(C)).”.

9 (d) HOLLINGS MANUFACTURING EXTENSION PART-
10 NERSHIP PROGRAM COST-SHARING.—Section 25(c) of
11 such Act (15 U.S.C. 278k(e)) is amended by adding at
12 the end the following:

13 “(7) Notwithstanding paragraphs (1), (3), and
14 (5), for fiscal year 2011 through fiscal year 2015,
15 the Secretary may not provide to a Center more
16 than 50 percent of the costs incurred by such Center
17 and may not require that a Center’s cost share ex-
18 ceed 50 percent.

19 “(8) Not later than 4 years after the date of
20 enactment of the National Institute of Standards
21 and Technology Authorization Act of 2010, the Sec-
22 retary shall submit to Congress a report on the cost
23 share requirements under the program. The report
24 shall—

1 “(A) discuss various cost share structures,
2 including the cost share structure in place prior
3 to such date of enactment and the cost share
4 structure in place under paragraph (7), and the
5 effect of such cost share structures on indi-
6 vidual Centers and the overall program; and

7 “(B) include a recommendation for how
8 best to structure the cost share requirement
9 after fiscal year 2015 to provide for the long-
10 term sustainability of the program.”.

11 (e) ADVISORY BOARD.—Section 25(e)(4) of such Act
12 (15 U.S.C. 278k(e)(4)) is amended to read as follows:

13 “(4) FEDERAL ADVISORY COMMITTEE ACT AP-
14 PLICABILITY.—

15 “(A) IN GENERAL.—In discharging its du-
16 ties under this subsection, the MEP Advisory
17 Board shall function solely in an advisory ca-
18 pacity, in accordance with the Federal Advisory
19 Committee Act.

20 “(B) EXCEPTION.—Section 14 of the Fed-
21 eral Advisory Committee Act shall not apply to
22 the MEP Advisory Board.”.

23 (f) DEFINITIONS.—Section 25 of such Act (15 U.S.C.
24 278k) is further amended by adding at the end the fol-
25 lowing:

1 “(i) DEFINITION.—In this section, the term ‘commu-
2 nity college’ means an institution of higher education (as
3 defined under section 101(a) of the Higher Education Act
4 of 1965 (20 U.S.C. 1001(a))) at which the highest degree
5 that is predominately awarded to students is an associate’s
6 degree.”.

7 **SEC. 407. BIOSCIENCE RESEARCH PROGRAM.**

8 (a) IN GENERAL.—The National Institute of Stand-
9 ards and Technology Act (15 U.S.C. 271 et seq.) is
10 amended—

11 (1) by redesignating section 34 as section 35;

12 and

13 (2) by inserting after section 33 the following:

14 **“SEC. 34. BIOSCIENCE RESEARCH PROGRAM.**

15 “(a) IN GENERAL.—The Director shall establish a
16 bioscience research program to support research and de-
17 velopment of standard reference materials, measurements,
18 methods, and genomic and other data to advance—

19 “(1) biological drug research and development;

20 “(2) molecular diagnostics;

21 “(3) medical imaging technologies; and

22 “(4) personalized medicine.

23 “(b) UNIVERSITY RESEARCH CENTERS.—

24 “(1) ESTABLISHMENT.—The Director may es-
25 tablish research centers at institutions of higher edu-

1 cation (in this section referred to as ‘university re-
2 search centers’) through a competitive application
3 process to conduct research that furthers the objec-
4 tives of the bioscience research program.

5 “(2) APPLICATION.—

6 “(A) IN GENERAL.—An institution of high-
7 er education seeking to establish a university
8 research center under this subsection shall sub-
9 mit an application to the Director at such time,
10 in such manner, and containing such informa-
11 tion and assurances as the Director may re-
12 quire.

13 “(B) COMPONENTS.—The application shall
14 include, at a minimum, a description of—

15 “(i) the relevant research and instruc-
16 tional capacity of the applicant;

17 “(ii) the research projects that will be
18 undertaken by the applicant;

19 “(iii) the extent to which the applicant
20 will partner with industry and the role in-
21 dustry will play in the research undertaken
22 by the university research center;

23 “(iv) how the applicant will dissemi-
24 nate research results effectively; and

1 “(v) the metrics that will be used to
2 evaluate the success of the projects under
3 clause (ii) and the contribution of the uni-
4 versity research center in furthering the
5 objectives of the bioscience research pro-
6 gram.

7 “(C) SPECIAL CONSIDERATION.—The Di-
8 rector shall give special consideration to an ap-
9 plication from an institution of higher education
10 that is—

11 “(i) an 1890 Institution, as defined in
12 section 2 of the Agricultural Research, Ex-
13 tension, and Education Reform Act of
14 1998 (7 U.S.C. 7061);

15 “(ii) a Predominantly Black Institu-
16 tion, as defined in section 318 of the High-
17 er Education Act of 1965 (20 U.S.C.
18 1059e);

19 “(iii) a part B institution, as defined
20 in section 322 of the Higher Education
21 Act of 1965 (20 U.S.C. 1061);

22 “(iv) a Tribal College or University,
23 as defined in section 316 of the Higher
24 Education Act of 1965 (20 U.S.C. 1059e);

1 “(v) a Native American-serving, non-
2 tribal institution, as defined in section 319
3 of the Higher Education Act of 1965 (20
4 U.S.C. 1059f);

5 “(vi) an Asian American and Native
6 American Pacific Islander-serving institu-
7 tion, as defined in section 320 of the High-
8 er Education Act of 1965 (20 U.S.C.
9 1059g);

10 “(vii) an Alaska Native-serving insti-
11 tution, as defined in section 317 of the
12 Higher Education Act of 1965 (20 U.S.C.
13 1059d);

14 “(viii) a Native Hawaiian-serving in-
15 stitution, as defined in section 317 of the
16 Higher Education Act of 1965 (20 U.S.C.
17 1059d); or

18 “(ix) a Hispanic-serving institution,
19 as defined in section 502 of the Higher
20 Education Act of 1965 (20 U.S.C. 1101a).

21 “(3) ASSESSMENT.—Not later than 3 years
22 after the date on which a university research center
23 is established and every 3 years thereafter, the Di-
24 rector shall evaluate the university research center

1 for its contributions to the bioscience research pro-
2 gram.

3 “(4) ANNUAL MEETING.—If the Director estab-
4 lishes more than 1 university research center, the
5 Director shall convene an annual meeting of re-
6 searchers from all of the university research centers
7 and the Institute to foster collaboration and commu-
8 nication.

9 “(c) USER FACILITY.—The Director may establish a
10 bioscience user facility to provide access to advanced or
11 unique equipment, services, materials, and other resources
12 to industry, institutions of higher education, nonprofit or-
13 ganizations, and government agencies to perform research
14 and testing.

15 “(d) POSTDOCTORAL FELLOWS.—The Director shall,
16 to the extent practicable, assign 1 or more fellows from
17 the postdoctoral fellowship program established in section
18 19 to the bioscience research program.

19 “(e) PROGRAMMATIC PLANNING DOCUMENT.—The
20 Director shall ensure that the updates to the pro-
21 grammatic planning document transmitted to Congress
22 under section 23(d) include the bioscience research pro-
23 gram.

24 “(f) DEFINITIONS.—In this section:

1 “(1) BIOSCIENCE RESEARCH PROGRAM.—The
2 term ‘bioscience research program’ means the re-
3 search and development program authorized under
4 subsection (a).

5 “(2) INSTITUTION OF HIGHER EDUCATION.—
6 The term ‘institution of higher education’ has the
7 same meaning given the term in section 101(a) of
8 the Higher Education Act of 1965 (20 U.S.C.
9 1001(a)).”.

10 (b) VISITING COMMITTEE ON ADVANCED TECH-
11 NOLOGY AMENDMENTS.—Section 10 of the National Insti-
12 tute of Standards and Technology Act (15 U.S.C. 278)
13 is amended—

14 (1) in subsection (a)—

15 (A) by striking “15 members” and insert-
16 ing “at least 15, but not more than 20, mem-
17 bers”; and

18 (B) by striking “at least 10” and inserting
19 “at least 13”; and

20 (2) in subsection (h)(1), by striking “Program
21 established under section 28” and inserting “pro-
22 grams established under sections 28 and 34”.

1 **SEC. 408. TIP ADVISORY BOARD.**

2 Section 28(k)(4) of the National Institute of Stand-
3 ards and Technology Act (15 U.S.C. 278n(k)(4)) is
4 amended to read as follows:

5 “(4) FEDERAL ADVISORY COMMITTEE ACT AP-
6 PLICABILITY.—

7 “(A) IN GENERAL.—In discharging its du-
8 ties under this subsection, the TIP Advisory
9 Board shall function solely in an advisory ca-
10 pacity, in accordance with the Federal Advisory
11 Committee Act.

12 “(B) EXCEPTION.—Section 14 of the Fed-
13 eral Advisory Committee Act shall not apply to
14 the TIP Advisory Board.”.

15 **SEC. 409. UNDERREPRESENTED MINORITIES.**

16 (a) RESEARCH FELLOWSHIPS.—Section 18 of the
17 National Institute of Standards and Technology Act (15
18 U.S.C. 278g–1) is amended by adding at the end the fol-
19 lowing:

20 “(c) UNDERREPRESENTED MINORITIES.—In evalu-
21 ating applications for fellowships under this section, the
22 Director shall give consideration to the goal of promoting
23 the participation of underrepresented minorities in re-
24 search areas supported by the Institute.”.

25 (b) POSTDOCTORAL FELLOWSHIP PROGRAM.—Sec-
26 tion 19 of such Act (15 U.S.C. 278g–2) is amended by

1 adding at the end the following: “In evaluating applica-
2 tions for fellowships under this section, the Director shall
3 give consideration to the goal of promoting the participa-
4 tion of underrepresented minorities in research areas sup-
5 ported by the Institute.”.

6 (c) **TEACHER DEVELOPMENT.**—Section 19A(c) of
7 such Act (15 U.S.C. 278g–2a(c)) is amended by adding
8 at the end the following: “The Director shall give priority
9 to an application from a teacher from a high-need school,
10 as defined in section 200 of the Higher Education Act of
11 1965 (20 U.S.C. 1021).”.

12 **SEC. 410. CYBER SECURITY STANDARDS AND GUIDELINES.**

13 Cyber security standards and guidelines developed by
14 the National Institute of Standards and Technology for
15 use by United States industry and the public shall be vol-
16 untary.

17 **SEC. 411. DEFINITIONS.**

18 In this title:

19 (1) **DIRECTOR.**—The term “Director” means
20 the Director of the National Institute of Standards
21 and Technology.

22 (2) **FEDERAL AGENCY.**—The term “Federal
23 agency” has the meaning given such term in section
24 4 of the Stevenson-Wydler Technology Innovation
25 Act of 1980 (15 U.S.C. 3703).

1 **TITLE V—INNOVATION**

2 **SEC. 501. OFFICE OF INNOVATION AND ENTREPRENEUR-**
3 **SHIP.**

4 The Stevenson-Wydler Technology Innovation Act of
5 1980 (15 U.S.C. 3701 et seq.) is amended by adding at
6 the end the following new section:

7 **“SEC. 24. OFFICE OF INNOVATION AND ENTREPRENEUR-**
8 **SHIP.**

9 “(a) IN GENERAL.—The Secretary shall establish an
10 Office of Innovation and Entrepreneurship to foster inno-
11 vation and the commercialization of new technologies,
12 products, processes, and services with the goal of pro-
13 moting productivity and economic growth in the United
14 States.

15 “(b) DUTIES.—The Office of Innovation and Entre-
16 preneurship shall be responsible for—

17 “(1) developing and advocating policies to accel-
18 erate innovation and advance the commercialization
19 of research and development, including federally
20 funded research and development;

21 “(2) identifying existing barriers to innovation
22 and commercialization, including access to capital
23 and other resources, and ways to overcome those
24 barriers;

1 “(3) providing access to relevant data, research,
2 and technical assistance on innovation and commer-
3 cialization;

4 “(4) strengthening collaboration on and coordi-
5 nation of policies relating to innovation and commer-
6 cialization within the Department of Commerce and
7 between the Department of Commerce and other
8 Federal agencies, as appropriate; and

9 “(5) any other duties as determined by the Sec-
10 retary.

11 “(c) **ADVISORY COMMITTEE.**—The Secretary shall es-
12 tablish an Advisory Council on Innovation and Entrepre-
13 neurship to provide advice to the Secretary on carrying
14 out subsection (b).”.

15 **SEC. 502. FEDERAL LOAN GUARANTEES FOR INNOVATIVE**
16 **TECHNOLOGIES IN MANUFACTURING.**

17 The Stevenson-Wydler Technology Innovation Act of
18 1980 (15 U.S.C. 3701 et seq.) is further amended by add-
19 ing after section 24, as added by section 501 of this title,
20 the following new section:

21 **“SEC. 25. FEDERAL LOAN GUARANTEES FOR INNOVATIVE**
22 **TECHNOLOGIES IN MANUFACTURING.**

23 “(a) **ESTABLISHMENT.**—The Secretary shall estab-
24 lish a program to provide loan guarantees for obligations

1 to small- or medium-sized manufacturers for the use or
2 production of innovative technologies.

3 “(b) ELIGIBLE PROJECTS.—A loan guarantee may be
4 made under such program only for a project that reequips,
5 expands, or establishes a manufacturing facility in the
6 United States to—

7 “(1) use an innovative technology or an innova-
8 tive process in manufacturing; or

9 “(2) manufacture an innovative technology
10 product or an integral component of such product.

11 “(c) ELIGIBLE BORROWER.—A loan guarantee may
12 be made under such program only for a borrower who is
13 a small- or medium-sized manufacturer, as determined by
14 the Secretary under the criteria established pursuant to
15 subsection (m).

16 “(d) LIMITATION ON AMOUNT.—A loan guarantee
17 shall not exceed an amount equal to 80 percent of the
18 project cost, as estimated at the time at which the loan
19 guarantee is issued.

20 “(e) LIMITATIONS ON LOAN GUARANTEE.—No loan
21 guarantee shall be made unless the Secretary determines
22 that—

23 “(1) there is a reasonable prospect of repay-
24 ment of the principal and interest on the obligation
25 by the borrower;

1 “(2) the amount of the obligation (when com-
2 bined with amounts available to the borrower from
3 other sources) is sufficient to carry out the project;

4 “(3) the obligation is not subordinate to other
5 financing;

6 “(4) the obligation bears interest at a rate that
7 does not exceed a level that the Secretary determines
8 appropriate, taking into account the prevailing rate
9 of interest in the private sector for similar loans and
10 risks; and

11 “(5) the term of an obligation requires full re-
12 payment over a period not to exceed the lesser of—

13 “(A) 30 years; or

14 “(B) 90 percent of the projected useful
15 life, as determined by the Secretary, of the
16 physical asset to be financed by the obligation.

17 “(f) DEFAULTS.—

18 “(1) PAYMENT BY SECRETARY.—

19 “(A) IN GENERAL.—If a borrower defaults
20 (as defined in regulations promulgated by the
21 Secretary and specified in the loan guarantee)
22 on the obligation, the holder of the loan guar-
23 antee shall have the right to demand payment
24 of the unpaid amount from the Secretary.

1 “(B) PAYMENT REQUIRED.—Within such
2 period as may be specified in the loan guar-
3 antee or related agreements, the Secretary shall
4 pay to the holder of the loan guarantee the un-
5 paid interest on and unpaid principal of the ob-
6 ligation as to which the borrower has defaulted,
7 unless the Secretary finds that there was no de-
8 fault by the borrower in the payment of interest
9 or principal or that the default has been rem-
10 edied.

11 “(C) FORBEARANCE.—Nothing in this sub-
12 section precludes any forbearance by the holder
13 of the obligation for the benefit of the borrower
14 which may be agreed upon by the parties to the
15 obligation and approved by the Secretary.

16 “(2) SUBROGATION.—

17 “(A) IN GENERAL.—If the Secretary
18 makes a payment under paragraph (1), the Sec-
19 retary shall be subrogated to the rights, as
20 specified in the loan guarantee, of the recipient
21 of the payment or related agreements including,
22 if appropriate, the authority (notwithstanding
23 any other provision of law) to—

24 “(i) complete, maintain, operate,
25 lease, or otherwise dispose of any property

1 acquired pursuant to such loan guarantee
2 or related agreement; or

3 “(ii) permit the borrower, pursuant to
4 an agreement with the Secretary, to con-
5 tinue to pursue the purposes of the project
6 if the Secretary determines that such an
7 agreement is in the public interest.

8 “(B) SUPERIORITY OF RIGHTS.—The
9 rights of the Secretary, with respect to any
10 property acquired pursuant to a loan guarantee
11 or related agreements, shall be superior to the
12 rights of any other person with respect to the
13 property.

14 “(3) ACTION BY ATTORNEY GENERAL.—

15 “(A) NOTIFICATION.—If the borrower de-
16 faults on an obligation, the Secretary shall no-
17 tify the Attorney General of the default.

18 “(B) RECOVERY.—On notification, the At-
19 torney General shall take such action as is ap-
20 propriate to recover the unpaid principal and
21 interest.

22 “(g) PAYMENT OF PRINCIPAL AND INTEREST BY
23 SECRETARY.—With respect to any obligation guaranteed
24 under this section, the Secretary may enter into a contract
25 to pay, and pay, holders of the obligation for and on behalf

1 of the borrower from funds appropriated for that purpose
2 the principal and interest payments that become due and
3 payable on the unpaid balance of the obligation if the Sec-
4 retary finds that—

5 “(1)(A) the borrower is unable to make the
6 payments and is not in default;

7 “(B) it is in the public interest to permit the
8 borrower to continue to pursue the project; and

9 “(C) the probable net benefit to the Federal
10 Government in paying the principal and interest will
11 be greater than that which would result in the event
12 of a default;

13 “(2) the amount of the payment that the Sec-
14 retary is authorized to pay shall be no greater than
15 the amount of principal and interest that the bor-
16 rower is obligated to pay under the obligation being
17 guaranteed; and

18 “(3) the borrower agrees to reimburse the Sec-
19 retary for the payment (including interest) on terms
20 and conditions that are satisfactory to the Secretary.

21 “(h) TERMS AND CONDITIONS.—A loan guarantee
22 under this section shall include such detailed terms and
23 conditions as the Secretary determines appropriate to—

24 “(1) protect the interests of the United States
25 in the case of default; and

1 “(2) have available all the patents and tech-
2 nology necessary for any person selected, including
3 the Secretary, to complete and operate the project.

4 “(i) CONSULTATION.—In establishing the terms and
5 conditions of a loan guarantee under this section, the Sec-
6 retary shall consult with the Secretary of the Treasury.

7 “(j) FEES.—

8 “(1) IN GENERAL.—The Secretary shall charge
9 and collect fees for loan guarantees in amounts the
10 Secretary determines are sufficient to cover applica-
11 ble administrative expenses.

12 “(2) AVAILABILITY.—Fees collected under this
13 subsection shall—

14 “(A) be deposited by the Secretary into the
15 Treasury of the United States; and

16 “(B) remain available until expended, sub-
17 ject to such other conditions as are contained in
18 annual appropriations Acts.

19 “(k) RECORDS.—

20 “(1) IN GENERAL.—With respect to a loan
21 guarantee under this section, the borrower, the lend-
22 er, and any other appropriate party shall keep such
23 records and other pertinent documents as the Sec-
24 retary shall prescribe by regulation, including such

1 records as the Secretary may require to facilitate an
2 effective audit.

3 “(2) ACCESS.—The Secretary and the Comp-
4 troller General of the United States, or their duly
5 authorized representatives, shall have access to
6 records and other pertinent documents for the pur-
7 pose of conducting an audit.

8 “(1) FULL FAITH AND CREDIT.—The full faith and
9 credit of the United States is pledged to the payment of
10 all loan guarantees issued under this section with respect
11 to principal and interest.

12 “(m) REGULATIONS.—The Secretary shall issue final
13 regulations before making any loan guarantees under the
14 program. Such regulations shall include—

15 “(1) criteria that the Secretary shall use to de-
16 termine eligibility for loan guarantees under this sec-
17 tion, including whether a borrower is a small- or me-
18 dium-sized manufacturer;

19 “(2) a determination of what expenses shall and
20 shall not be included in project costs;

21 “(3) policies and procedures for selecting and
22 monitoring lenders and loan performance; and

23 “(4) any other policies, procedures, or informa-
24 tion necessary to implement this section.

25 “(n) AUDIT.—

1 “(1) ANNUAL INDEPENDENT AUDITS.—The
2 Secretary shall enter into an arrangement with an
3 independent auditor for annual evaluations of the
4 program under this section.

5 “(2) ANNUAL REVIEW.—The Comptroller Gen-
6 eral shall conduct an annual review of the Sec-
7 retary’s execution of the program under this section.

8 “(3) REPORT.—The results of the independent
9 audit under paragraph (1) and the Comptroller Gen-
10 eral’s review under paragraph (2) shall be provided
11 directly to the Committee on Science and Tech-
12 nology of the House of Representatives and the
13 Committee on Commerce, Science, and Transpor-
14 tation of the Senate.

15 “(o) REPORT TO CONGRESS.—Concurrent with the
16 submission to Congress of the President’s annual budget
17 request in each year after the date of enactment of this
18 section, the Secretary shall transmit to the Committee on
19 Science and Technology of the House of Representatives
20 and the Committee on Commerce, Science, and Transpor-
21 tation of the Senate a report containing a summary of
22 all activities carried out under this section.

23 “(p) COORDINATION AND NONDUPLICATION.—To
24 the maximum extent practicable, the Secretary shall en-
25 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) DEFINITIONS.—In this section:

10 “(1) COST.—The term ‘cost’ has the meaning
11 given such term under section 502 of the Federal
12 Credit Reform Act of 1990 (2 U.S.C. 661a).

13 “(2) INNOVATIVE PROCESS.—The term ‘innova-
14 tive process’ means a process that is significantly
15 improved as compared to the process in general use
16 in the commercial marketplace in the United States
17 at the time the loan guarantee is issued.

18 “(3) INNOVATIVE TECHNOLOGY.—The term ‘in-
19 novative technology’ means a technology that is sig-
20 nificantly improved as compared to the technology in
21 general use in the commercial marketplace in the
22 United States at the time the loan guarantee is
23 issued.

24 “(4) LOAN GUARANTEE.—The term ‘loan guar-
25 antee’ has the meaning given such term in section

1 502 of the Federal Credit Reform Act of 1990 (2
2 U.S.C. 661a). The term includes a loan guarantee
3 commitment (as defined in section 502 of such Act
4 (2 U.S.C. 661a)).

5 “(5) OBLIGATION.—The term ‘obligation’
6 means the loan or other debt obligation that is guar-
7 anteed under this section.

8 “(6) PROGRAM.—The term ‘program’ means
9 the loan guarantee program established in sub-
10 section (a).

11 “(s) AUTHORIZATION OF APPROPRIATIONS.—There
12 are authorized to be appropriated such sums as are nec-
13 essary to provide the cost of loan guarantees under this
14 section.”.

15 **SEC. 503. REGIONAL INNOVATION PROGRAM.**

16 The Stevenson-Wydler Technology Innovation Act of
17 1980 (15 U.S.C. 3701 et seq.) is further amended by add-
18 ing after section 25, as added by section 502 of this title,
19 the following new section:

20 **“SEC. 26. REGIONAL INNOVATION PROGRAM.**

21 “(a) ESTABLISHMENT.—The Secretary shall estab-
22 lish a regional innovation program to encourage and sup-
23 port the development of regional innovation strategies, in-
24 cluding regional innovation clusters.

25 “(b) REGIONAL INNOVATION CLUSTER GRANTS.—

1 “(1) IN GENERAL.—As part of the program es-
2 tablished under subsection (a), the Secretary may
3 award grants on a competitive basis to eligible re-
4 cipients for activities relating to the formation and
5 development of regional innovation clusters.

6 “(2) PERMISSIBLE ACTIVITIES.—Grants award-
7 ed under this subsection may be used for activities
8 determined appropriate by the Secretary including—

9 “(A) feasibility studies;

10 “(B) planning activities;

11 “(C) technical assistance;

12 “(D) developing or strengthening commu-
13 nication and collaboration between and among
14 participants of a regional innovation cluster;

15 “(E) attracting additional participants to a
16 regional innovation cluster;

17 “(F) facilitating market development of
18 products or services provided by a regional in-
19 novation cluster; and

20 “(G) developing relationships between a re-
21 gional innovation cluster and entities or clusters
22 in other regions.

23 “(3) ELIGIBLE RECIPIENT.—For purposes of
24 this subsection, the term ‘eligible recipient’ means
25 any of the following:

1 “(A) A State.

2 “(B) An Indian tribe.

3 “(C) A city or other political subdivision of
4 a State.

5 “(D) An entity that—

6 “(i) is a nonprofit organization, an in-
7 stitution of higher education, a public-pri-
8 vate partnership, or an economic develop-
9 ment organization or similar entity; and

10 “(ii) has an application that is sup-
11 ported by a State or a political subdivision
12 of a State.

13 “(E) A consortium of any of the entities
14 listed in subparagraphs (A) through (D).

15 “(4) APPLICATION.—

16 “(A) IN GENERAL.—An applicant shall
17 submit an application to the Secretary at such
18 time, in such manner, and containing such in-
19 formation and assurances as the Secretary may
20 require.

21 “(B) COMPONENTS.—The application shall
22 include, at a minimum, a description of the re-
23 gional innovation cluster supported by the pro-
24 posed activity, including a description of—

1 “(i) whether the regional innovation
2 cluster is supported by the private sector,
3 State and local governments, and other rel-
4 evant stakeholders;

5 “(ii) how the existing participants in
6 the regional innovation cluster will encour-
7 age and solicit participation by all types of
8 entities that might benefit from partici-
9 tion, including newly formed entities and
10 those rival to existing participants;

11 “(iii) the extent to which the regional
12 innovation cluster is likely to stimulate in-
13 novation and have a positive impact on re-
14 gional economic growth and development;

15 “(iv) whether the participants in the
16 regional innovation cluster have access to,
17 or contribute to, a well-trained workforce;

18 “(v) whether the participants in the
19 regional innovation cluster are capable of
20 attracting additional funds from non-Fed-
21 eral sources; and

22 “(vi) the likelihood that the partici-
23 pants in the regional innovation cluster will
24 be able to sustain activities once grant

1 funds under this subsection have been ex-
2 pended.

3 “(5) COST SHARE.—The Secretary may not
4 provide more than 50 percent of the total cost of
5 any activity funded under this subsection.

6 “(6) USE AND APPLICATION OF RESEARCH AND
7 INFORMATION PROGRAM.—To the maximum extent
8 practicable, the Secretary shall ensure that activities
9 funded under this subsection use and apply any rel-
10 evant research, best practices, and metrics developed
11 under the program established in subsection (c).

12 “(c) REGIONAL INNOVATION RESEARCH AND INFOR-
13 MATION PROGRAM.—

14 “(1) IN GENERAL.—As part of the program es-
15 tablished under subsection (a), the Secretary shall
16 establish a regional innovation research and infor-
17 mation program to—

18 “(A) gather, analyze, and disseminate in-
19 formation on best practices for regional innova-
20 tion strategies (including regional innovation
21 clusters), including information relating to how
22 innovation, productivity, and economic develop-
23 ment can be maximized through such strategies;

24 “(B) provide technical assistance, including
25 through the development of technical assistance

1 guides, for the development and implementation
2 of regional innovation strategies (including re-
3 gional innovation clusters);

4 “(C) support the development of relevant
5 metrics and measurement standards to evaluate
6 regional innovation strategies (including re-
7 gional innovation clusters), including the extent
8 to which such strategies stimulate innovation,
9 productivity, and economic development; and

10 “(D) collect and make available data on re-
11 gional innovation cluster activity in the United
12 States, including data on—

13 “(i) the size, specialization, and com-
14 petitiveness of regional innovation clusters;

15 “(ii) the regional domestic product
16 contribution, total jobs and earnings by
17 key occupations, establishment size, nature
18 of specialization, patents, Federal research
19 and development spending, and other rel-
20 evant information for regional innovation
21 clusters; and

22 “(iii) supply chain product and service
23 flows within and between regional innova-
24 tion clusters.

1 “(2) RESEARCH GRANTS.—The Secretary may
2 award research grants on a competitive basic to sup-
3 port and further the goals of the program estab-
4 lished under this subsection.

5 “(3) DISSEMINATION OF INFORMATION.—Data
6 and analysis compiled by the Secretary under the
7 program established in this subsection shall be made
8 available to other Federal agencies, State and local
9 governments, and nonprofit and for-profit entities.

10 “(4) CLUSTER GRANT PROGRAM.—The Sec-
11 retary shall incorporate data and analysis relating to
12 any regional innovation cluster supported by a grant
13 under subsection (b) into the program established
14 under this subsection.

15 “(d) INTERAGENCY COORDINATION.—

16 “(1) IN GENERAL.—To the maximum extent
17 practicable, the Secretary shall ensure that the ac-
18 tivities carried out under this section are coordinated
19 with, and do not duplicate the efforts of, other pro-
20 grams at the Department of Commerce and other
21 Federal agencies.

22 “(2) COLLABORATION.—The Secretary shall ex-
23 plore and pursue ways to collaborate with other Fed-
24 eral agencies, including through multiagency funding
25 opportunities, on regional innovation strategies.

1 “(e) EVALUATION.—

2 “(1) IN GENERAL.—Not later than 4 years
3 after the date of enactment of this section, the Sec-
4 retary shall enter into a contract with an inde-
5 pendent entity, such as the National Academy of
6 Sciences, to conduct an evaluation of the program
7 established under subsection (a).

8 “(2) REQUIREMENTS.—The evaluation shall in-
9 clude—

10 “(A) whether such program is achieving its
11 goals;

12 “(B) any recommendations for how such
13 program may be improved; and

14 “(C) a recommendation as to whether such
15 program should be continued or terminated.

16 “(f) REGIONAL INNOVATION CLUSTER DEFINED.—

17 The term ‘regional innovation cluster’ means a geographi-
18 cally bounded network of similar, synergistic, or com-
19 plimentary entities that—

20 “(1) are engaged in or with a particular indus-
21 try sector;

22 “(2) have active channels for business trans-
23 actions and communication;

24 “(3) share specialized infrastructure, labor mar-
25 kets, and services; and

1 “(4) leverage the region’s unique competitive
2 strengths to stimulate innovation and create jobs.

3 “(g) AUTHORIZATION OF APPROPRIATIONS.—There
4 are authorized to be appropriated such sums as are nec-
5 essary for each of fiscal years 2011 through 2015 to carry
6 out this section, including such sums as are necessary to
7 carry out the evaluation required under subsection (e).”.

8 **TITLE VI—DEPARTMENT OF**
9 **ENERGY**

10 **Subtitle A—Office of Science**

11 **SEC. 601. SHORT TITLE.**

12 This subtitle may be cited as the “Department of En-
13 ergy Office of Science Authorization Act of 2010”.

14 **SEC. 602. DEFINITIONS.**

15 Except as otherwise provided, in this subtitle:

16 (1) DEPARTMENT.—The term “Department”
17 means the Department of Energy.

18 (2) DIRECTOR.—The term “Director” means
19 the Director of the Office of Science.

20 (3) OFFICE OF SCIENCE.—The term “Office of
21 Science” means the Department of Energy Office of
22 Science.

23 (4) SECRETARY.—The term “Secretary” means
24 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 and major sci-
4 entific tools to transform the understanding of nature and
5 to advance the energy, economic, and national security of
6 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 basic research on energy production,
21 storage, transmission, and use; and

22 (B) advancing our understanding of the
23 Earth’s climate through basic research in at-
24 mospheric and environmental sciences and cli-
25 mate 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 **SEC. 604. BASIC ENERGY SCIENCES PROGRAM.**

4 (a) PROGRAM.—As part of the activities authorized
5 under section 603, the Director shall carry out a program
6 in basic energy sciences, including materials sciences and
7 engineering, chemical sciences, biosciences, and geo-
8 sciences, for the purpose of providing the scientific founda-
9 tions for new energy technologies.

10 (b) BASIC ENERGY SCIENCES USER FACILITIES.—

11 (1) IN GENERAL.—The Director shall carry out
12 a program for the construction, operation, and main-
13 tenance of national user facilities to support the pro-
14 gram under this section. As practicable, these facili-
15 ties shall serve the needs of the Department, indus-
16 try, the academic community, and other relevant en-
17 tities to create and examine new materials and
18 chemical processes for the purposes of advancing
19 new energy technologies and improving the competi-
20 tiveness of the United States. These facilities shall
21 include—

22 (A) x-ray light sources;

23 (B) neutron sources;

24 (C) electron beam microcharacterization
25 centers;

1 (D) nanoscale science research centers;
2 and

3 (E) other facilities the Director considers
4 appropriate, consistent with section 603(d).

5 (2) FACILITY CONSTRUCTION AND UP-
6 GRADES.—Consistent with the Office of Science’s
7 project management practices, the Director shall
8 support construction of—

9 (A) the National Synchrotron Light Source
10 II;

11 (B) a Second Target Station at the Spall-
12 ation Neutron Source; and

13 (C) an upgrade of the Advanced Photon
14 Source to improve brightness and performance.

15 (c) ENERGY FRONTIER RESEARCH CENTERS.—

16 (1) IN GENERAL.—The Director shall carry out
17 a grant program to provide awards, on a competi-
18 tive, merit-reviewed basis, to multi-institutional col-
19 laborations or other appropriate entities to conduct
20 fundamental and use-inspired energy research to ac-
21 celerate scientific breakthroughs related to needs
22 identified in—

23 (A) the Grand Challenges report of the De-
24 partment’s Basic Energy Sciences Advisory
25 Committee;

1 (B) the Basic Energy Sciences Basic Re-
2 search Needs workshop reports;

3 (C) energy-related Grand Challenges for
4 Engineering, as described by the National
5 Academy of Engineering; or

6 (D) other relevant reports identified by the
7 Director.

8 (2) COLLABORATIONS.—A collaboration receiv-
9 ing a grant under this subsection may include mul-
10 tiple types of institutions and private sector entities.

11 (3) SELECTION AND DURATION.—

12 (A) IN GENERAL.—A collaboration under
13 this subsection shall be selected for a period of
14 5 years.

15 (B) REAPPLICATION.—After the end of the
16 period described in subparagraph (A), a grantee
17 may reapply for selection for a second period of
18 5 years on a competitive, merit-reviewed basis.

19 (4) NO FUNDING FOR CONSTRUCTION.—No
20 funding provided pursuant to this subsection may be
21 used for the construction of new buildings or facili-
22 ties.

23 (d) ACCELERATOR RESEARCH AND DEVELOP-
24 MENT.—The Director shall carry out research and devel-
25 opment on advanced accelerator technologies relevant to

1 the development of Basic Energy Sciences user facilities,
2 in consultation with the Office of Science's High Energy
3 Physics and Nuclear Physics programs.

4 **SEC. 605. BIOLOGICAL AND ENVIRONMENTAL RESEARCH**
5 **PROGRAM.**

6 (a) IN GENERAL.—As part of the activities author-
7 ized under section 603, the Director shall carry out a pro-
8 gram of research, development, demonstration, and com-
9 mercial application in the areas of biological systems
10 science and climate and environmental science to support
11 the energy and environmental missions of the Department.

12 (b) BIOLOGICAL SYSTEMS SCIENCE SUBPROGRAM.—

13 (1) SUBPROGRAM.—As part of the activities au-
14 thorized under subsection (a), the Director shall
15 carry out a subprogram of research, development,
16 and demonstration on fundamental, structural, com-
17 putational, and systems biology to increase systems-
18 level understanding of complex biological systems,
19 which shall include activities to—

20 (A) accelerate breakthroughs and new
21 knowledge that will enable cost-effective sus-
22 tainable production of biomass-based liquid
23 transportation fuels, bioenergy, and biobased
24 products that minimize greenhouse gas emis-
25 sions;

1 (B) improve understanding of the global
2 carbon cycle, including processes for removing
3 carbon dioxide from the atmosphere, through
4 photosynthesis and other biological processes,
5 for sequestration and storage; and

6 (C) understand the biological mechanisms
7 used to destroy, immobilize, or remove contami-
8 nants from subsurface environments, including
9 at facilities of the Department.

10 (2) RESEARCH PLAN.—Not later than 1 year
11 after the date of enactment of this Act, and at least
12 once every 3 years thereafter, the Director shall pre-
13 pare and transmit to Congress a research plan de-
14 scribing how the subprogram authorized under this
15 subsection will be undertaken.

16 (3) BIOENERGY RESEARCH CENTERS.—

17 (A) IN GENERAL.—In carrying out the
18 subprogram under paragraph (1), the Director
19 shall support at least 3 bioenergy research cen-
20 ters to accelerate basic biological research, de-
21 velopment, demonstration, and commercial ap-
22 plication of biomass-based liquid transportation
23 fuels, bioenergy, and biobased products that re-
24 duce greenhouse gas emissions and are pro-

1 duced from a variety of regionally diverse feed-
2 stocks.

3 (B) GEOGRAPHIC DISTRIBUTION.—The Di-
4 rector shall ensure that the bioenergy research
5 centers under this paragraph are established in
6 geographically diverse locations.

7 (C) SELECTION AND DURATION.—A center
8 established under subparagraph (A) shall be se-
9 lected on a competitive, merit-reviewed basis for
10 a period of 5 years beginning on the date of es-
11 tablishment of that center. A center already in
12 existence on the date of enactment of this Act
13 may continue to receive support for a period of
14 5 years beginning on the date of establishment
15 of that center.

16 (4) ENABLING SYNTHETIC BIOLOGY PLAN.—

17 (A) IN GENERAL.—The Secretary, in con-
18 sultation with other relevant Federal agencies,
19 the academic community, research-based non-
20 profit entities, and the private sector, shall de-
21 velop a comprehensive plan for federally sup-
22 ported research and development activities that
23 will support the energy and environmental mis-
24 sions of the Department and accelerate the

1 growth of a competitive synthetic biology indus-
2 try in the United States.

3 (B) PLAN.—The plan developed under sub-
4 paragraph (A) shall assess the need to create a
5 database for synthetic biology information, the
6 need and process for developing standards for
7 biological parts, components and systems, and
8 the need for a federally funded facility that en-
9 ables the discovery, design, development, pro-
10 duction, and systematic use of parts, compo-
11 nents, and systems created through synthetic
12 biology. The plan shall describe the role of the
13 Federal Government in meeting these needs.

14 (C) SUBMISSION TO CONGRESS.—The Sec-
15 retary shall transmit the plan developed under
16 subparagraph (A) to the Congress not later
17 than 9 months after the date of enactment of
18 this Act.

19 (5) COMPUTATIONAL BIOLOGY AND SYSTEMS
20 BIOLOGY KNOWLEDGEBASE.—As part of the subpro-
21 gram described in paragraph (1), the Director shall
22 carry out research in computational biology, acquire
23 or otherwise ensure the availability of hardware for
24 biology-specific computation, and establish and
25 maintain an open virtual database and information

1 management system to centrally integrate systems
2 biology data, analytical software, and computational
3 modeling tools that will allow data sharing and free
4 information exchange in the scientific community.

5 (6) REPEAL.—Section 977 of the Energy Policy
6 Act of 2005 (42 U.S.C. 16317) is repealed.

7 (c) CLIMATE AND ENVIRONMENTAL SCIENCES SUB-
8 PROGRAM.—

9 (1) IN GENERAL.—As part of the activities au-
10 thorized under subsection (a), the Director shall
11 carry out a subprogram of climate and environ-
12 mental science research, which shall include activi-
13 ties to—

14 (A) understand, observe, and model the re-
15 sponse of the Earth’s atmosphere and bio-
16 sphere, including oceans, to increased green-
17 house gas emissions, and any associated
18 changes in climate;

19 (B) sequester, destroy, immobilize, or re-
20 move contaminants and carbon from subsurface
21 environments, including at facilities of the De-
22 partment; and

23 (C) develop potential mitigation and adap-
24 tation options for increased greenhouse gas

1 emissions and any associated changes in cli-
2 mate.

3 (2) SUBSURFACE BIOGEOCHEMISTRY RE-
4 SEARCH.—

5 (A) IN GENERAL.—As part of the subpro-
6 gram described in paragraph (1), the Director
7 shall carry out research to advance a funda-
8 mental understanding of coupled physical,
9 chemical, and biological processes for control-
10 ling the movement of sequestered carbon and
11 subsurface environmental contaminants, includ-
12 ing field observations of subsurface microorga-
13 nisms and 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.—The Director, in col-
8 laboration with other relevant agencies that are
9 participants in the United States Global
10 Change Research Program, shall carry out the
11 selection and development of a next-generation
12 ecosystem-climate change experiment to under-
13 stand the impact and feedbacks of increased
14 temperature and elevated carbon levels on eco-
15 systems.

16 (B) REPORT.—Not later than 1 year after
17 the date of enactment of this Act, the Director
18 shall transmit to the Congress a report con-
19 taining—

20 (i) an identification of the location or
21 locations that have been selected for the
22 experiment described in subparagraph (A);

23 (ii) a description of the need for addi-
24 tional experiments; and

25 (iii) an associated research plan.

1 (4) AMERIFLUX NETWORK COORDINATION AND
2 RESEARCH.—As part of the subprogram described in
3 paragraph (1), the Director shall carry out research
4 and coordinate the AmeriFlux Network to directly
5 observe and understand the exchange of greenhouse
6 gases, water, and energy within terrestrial eco-
7 systems and the response of those systems to climate
8 change and other dynamic terrestrial landscape
9 changes. The Director, in collaboration with other
10 relevant Federal agencies, shall—

11 (A) identify opportunities to incorporate
12 innovative and emerging observation tech-
13 nologies and practices into the existing Net-
14 work;

15 (B) conduct research to determine the
16 need for increased greenhouse gas observation
17 facilities across North America to meet future
18 mitigation and adaptation needs of the United
19 States; and

20 (C) examine how the technologies and
21 practices described in subparagraph (A), and
22 increased coordination among scientific commu-
23 nities through the Network, have the potential
24 to help characterize baseline greenhouse gas

1 emission sources and sinks in the United States
2 and internationally.

3 (5) REGIONAL AND GLOBAL CLIMATE MOD-
4 ELING.—As part of the subprogram described in
5 paragraph (1), the Director, in collaboration with
6 the Office of Advanced Scientific Computing Re-
7 search described in section 606, shall carry out re-
8 search to develop, evaluate, and use high-resolution
9 regional and global climate and Earth models and
10 predictions to determine, and support efforts to re-
11 duce, the impacts of changing climate.

12 (6) INTEGRATED ASSESSMENT RESEARCH.—
13 The Director shall carry out research into options
14 for 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 interactions, subsurface science, and the inter-
16 faces of natural and engineered materials; and

17 (C) measurement of cloud and aerosol
18 properties used for examining atmospheric proc-
19 esses and evaluating climate model perform-
20 ance, including ground stations at various loca-
21 tions, mobile resources, and aerial vehicles.

22 **SEC. 606. ADVANCED SCIENTIFIC COMPUTING RESEARCH**
23 **PROGRAM.**

24 (a) IN GENERAL.—As part of the activities author-
25 ized under section 603, the Director shall carry out a re-

1 search, development, demonstration, and commercial ap-
2 plication program to advance computational and net-
3 working capabilities to analyze, model, simulate, and pre-
4 dict complex phenomena relevant to the development of
5 new energy technologies and the competitiveness of the
6 United States.

7 (b) COORDINATION.—

8 (1) DIRECTOR.—The Director shall carry out
9 activities under this section in accordance with prior-
10 ities established by the Department’s Under Sec-
11 retary for Science to determine and meet the com-
12 putational and networking research and facility
13 needs of the Office of Science and all other relevant
14 energy technology programs within the Department.

15 (2) UNDER SECRETARY FOR SCIENCE.—The
16 Department’s Under Secretary for Science shall en-
17 sure the coordination of the activities of the Depart-
18 ment, including activities under this section, to de-
19 termine and meet the computational and networking
20 research and facility needs of the Office of Science
21 and all other relevant energy technology programs
22 within the Department.

23 (c) RESEARCH TO SUPPORT ENERGY APPLICA-
24 TIONS.—As part of the activities authorized under sub-
25 section (a), the program shall support research in high-

1 performance computing and networking relevant to energy
2 applications, including both basic and applied energy re-
3 search programs carried out by the Secretary.

4 (d) REPORTS.—

5 (1) ADVANCED COMPUTING FOR ENERGY APPLI-
6 CATIONS.—Not later than one year after the date of
7 enactment of this Act, the Secretary shall transmit
8 to the Congress a plan to integrate and leverage the
9 expertise and capabilities of the program described
10 in subsection (a), as well as other relevant computa-
11 tional and networking research programs and re-
12 sources supported by the Federal Government, to
13 advance the missions of the Department’s applied
14 energy and energy efficiency programs.

15 (2) EXASCALE COMPUTING.—At least 18
16 months prior to the initiation of construction or in-
17 stallation of any exascale-class computing facility,
18 the Secretary shall transmit a plan to the Congress
19 detailing the proposed facility’s cost projections and
20 capabilities to significantly accelerate the develop-
21 ment of new energy technologies.

22 (e) APPLIED MATHEMATICS AND SOFTWARE DEVEL-
23 OPMENT FOR HIGH-END COMPUTING SYSTEMS.—The Di-
24 rector shall carry out activities to develop, test, and sup-
25 port mathematics, models, and algorithms for complex

1 systems, as well as programming environments, tools, lan-
2 guages, and operating systems for high-end computing
3 systems (as defined in section 2 of the Department of En-
4 ergy High-End Computing Revitalization Act of 2004 (15
5 U.S.C. 5541)).

6 (f) HIGH-END COMPUTING FACILITIES.—The Direc-
7 tor shall—

8 (1) provide for sustained access by the public
9 and private research community in the United
10 States to high-end computing systems and to Lead-
11 ership Systems (as defined in section 2 of the De-
12 partment of Energy High-End Computing Revital-
13 ization Act of 2004 (15 U.S.C. 5541)), including
14 provision of technical support for users of such sys-
15 tems; and

16 (2) conduct research and development on next-
17 generation computing architectures and platforms to
18 support the missions of the Department.

19 (g) OUTREACH.—The Director shall conduct out-
20 reach programs and may form partnerships to increase the
21 use of and access to high-performance computing mod-
22 eling and simulation capabilities by industry, including
23 manufacturers.

1 **SEC. 607. FUSION ENERGY RESEARCH PROGRAM.**

2 (a) PROGRAM.—As part of the activities authorized
3 under section 603, the Director shall carry out a fusion
4 energy sciences research and development program to ef-
5 fectively address the scientific and engineering challenges
6 to building a cost-competitive fusion power plant and a
7 competitive fusion power industry in the United States.
8 As part of this program, the Director shall carry out re-
9 search activities to expand the fundamental understanding
10 of plasmas and matter at very high temperatures and den-
11 sities.

12 (b) ITER.—The Director shall coordinate and carry
13 out the responsibilities of the United States with respect
14 to the ITER international fusion project pursuant to the
15 Agreement on the Establishment of the ITER Inter-
16 national Fusion Energy Organization for the Joint Imple-
17 mentation of the ITER Project.

18 (c) IDENTIFICATION OF PRIORITIES.—Not later than
19 1 year after the date of enactment of this Act, the Sec-
20 retary shall transmit to the Congress a report on the De-
21 partment's proposed research and development activities
22 in magnetic fusion over the 10 years following the date
23 of enactment of this Act under four realistic budget sce-
24 narios. The report shall—

25 (1) identify specific areas of fusion energy de-
26 velopment in which the United States can and

1 should establish or solidify a lead in the global fu-
2 sion energy development effort; and

3 (2) identify priorities for initiation of facility
4 construction and facility decommissioning under
5 each of those scenarios.

6 (d) FUSION MATERIALS RESEARCH AND DEVELOP-
7 MENT.—The Director, in coordination with the Assistant
8 Secretary for Nuclear Energy of the Department, shall
9 carry out research and development activities to identify,
10 characterize, and create materials that can endure the
11 neutron, plasma, and heat fluxes expected in a commercial
12 fusion power plant. As part of the activities authorized
13 under subsection (c), the Secretary shall—

14 (1) provide an assessment of the need for a fa-
15 cility or facilities that can examine and test potential
16 fusion and next generation fission materials; and

17 (2) provide an assessment of whether a single
18 new facility that substantially addresses magnetic
19 fusion, inertial fusion, and next generation fission
20 materials research needs is feasible, in conjunction
21 with the expected capabilities of facilities operational
22 as of the date of enactment of this Act.

23 (e) 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 (f) 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 priate Federal agencies as necessary, shall maximize the
2 access of United States researchers to the most advanced
3 accelerator facilities and research capabilities in the world,
4 including the Large Hadron Collider.

5 **SEC. 609. NUCLEAR PHYSICS PROGRAM.**

6 (a) PROGRAM.—As part of the activities authorized
7 under section 603, the Director shall carry out a research
8 program, and support relevant facilities, to discover and
9 understand various forms of nuclear matter.

10 (b) FACILITY CONSTRUCTION AND UPGRADES.—
11 Consistent with the Office of Science’s project manage-
12 ment practices, the Director shall carry out—

13 (1) an upgrade of the Continuous Electron
14 Beam Accelerator Facility to a 12 gigaelectronvolt
15 beam of electrons; and

16 (2) construction of the Facility for Rare Isotope
17 Beams.

18 (c) ISOTOPE DEVELOPMENT AND PRODUCTION FOR
19 RESEARCH APPLICATIONS.—The Director shall carry out
20 a program for the production of isotopes, including the
21 development of techniques to produce isotopes, that the
22 Secretary determines are needed for research or other pur-
23 poses. In making this determination, the Secretary shall
24 consider any relevant recommendations made by Federal
25 advisory committees, the National Academies, and inter-

1 agency working groups in which the Department partici-
2 pates.

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) \$6,221,000,000 for fiscal year 2011, of
16 which—

17 (A) \$2,020,000,000 shall be for Basic En-
18 ergy Sciences activities under section 604;

19 (B) \$700,000,000 shall be for Biological
20 and Environmental Research activities under
21 section 605; and

22 (C) \$469,000,000 shall be for Advanced
23 Scientific Computing Research activities under
24 section 606;

1 (2) \$6,656,000,000 for fiscal year 2012, of
2 which—

3 (A) \$2,220,000,000 shall be for Basic En-
4 ergy Sciences activities under section 604;

5 (B) \$791,000,000 shall be for Biological
6 and Environmental Research activities under
7 section 605; and

8 (C) \$515,000,000 shall be for Advanced
9 Scientific Computing Research activities under
10 section 606;

11 (3) \$7,122,000,000 for fiscal year 2013, of
12 which—

13 (A) \$2,440,000,000 shall be for Basic En-
14 ergy Sciences activities under section 604;

15 (B) \$894,000,000 shall be for Biological
16 and Environmental Research activities under
17 section 605; and

18 (C) \$567,000,000 shall be for Advanced
19 Scientific Computing Research activities under
20 section 606;

21 (4) \$7,621,000,000 for fiscal year 2014, of
22 which—

23 (A) \$2,690,000,000 shall be for Basic En-
24 ergy Sciences activities under section 604;

1 (B) \$957,000,000 shall be for Biological
2 and Environmental Research activities under
3 section 605; and

4 (C) \$624,000,000 shall be for Advanced
5 Scientific Computing Research activities under
6 section 606; and

7 (5) \$8,154,000,000 for fiscal year 2015, of
8 which—

9 (A) \$2,960,000,000 shall be for Basic En-
10 ergy Sciences activities under section 604;

11 (B) \$1,060,000,000 shall be for Biological
12 and Environmental Research activities under
13 section 605; and

14 (C) \$686,000,000 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) by redesignating subsections (f) through
18 (m) as subsections (g), (h), (i), (j), (l), (m), (n), and
19 (o), respectively;

20 (4) by inserting after subsection (e) the fol-
21 lowing new subsection:

22 “(f) AWARDS.—In carrying out this section, the Di-
23 rector shall initiate and execute awards in the form of
24 grants, contracts, cooperative agreements, cash prizes,
25 and other transactions.”;

1 (5) in subsection (g), as so redesignated by
2 paragraph (3) of this section—

3 (A) by redesignating paragraphs (1) and
4 (2) as paragraphs (2) and (3), respectively;

5 (B) by inserting before paragraph (2), as
6 so redesignated by subparagraph (A) of this
7 paragraph, the following new paragraph:

8 “(1) IN GENERAL.—The Director shall establish
9 and maintain within ARPA–E a staff, including
10 legal counsel, contracting personnel, and program di-
11 rectors, with sufficient qualifications and expertise
12 to enable ARPA–E to carry out its responsibilities
13 under this section separate and distinct from the op-
14 erations of the rest of the Department.”;

15 (C) in paragraph (2)(A), as so redesi-
16 gnated by subparagraph (A) of this paragraph,
17 by striking “each of”;

18 (D) in paragraph (2)(B), as so redesi-
19 gnated by subparagraph (A) of this paragraph—

20 (i) in clause (iv), by striking “, with
21 advice under subsection (j) as appro-
22 priate,”;

23 (ii) by redesignating clauses (v) and
24 (vi) as clauses (vi) and (viii), respectively;

1 (iii) by inserting after clause (iv) the
2 following new clause:

3 “(v) identifying innovative cost-shar-
4 ing arrangements for ARPA–E projects,
5 including through use of the authority
6 under section 988(b)(3) of the Energy Pol-
7 icy Act of 2005 (42 U.S.C. 16352(b)(3));”;

8 (iv) in clause (vi), as so redesignated
9 by clause (ii) of this subparagraph, by
10 striking “; and” and inserting a semicolon;
11 and

12 (v) by inserting after clause (vi), as so
13 redesignated by clause (ii) of this subpara-
14 graph, the following new clause:

15 “(vii) identifying mechanisms for com-
16 mercial application of successful energy
17 technology development projects, including
18 through establishment of partnerships be-
19 tween awardees and commercial entities;
20 and”;

21 (E) in paragraph (2)(C), as so redesi-
22 gnated by subparagraph (A) of this paragraph,
23 by inserting “up to” after “shall be”;

24 (F) in paragraph (3), as so redesignated
25 by subparagraph (A) of this paragraph, by

1 striking subparagraph (B) and redesignating
2 subparagraphs (C) and (D) as subparagraphs
3 (B) and (C), respectively;

4 (G) by striking “program managers” each
5 place it appears and inserting “program direc-
6 tors”;

7 (H) by striking “program manager” each
8 place it appears and inserting “program direc-
9 tor”; and

10 (I) by adding at the end the following new
11 paragraph:

12 “(4) FELLOWSHIPS.—The Director is author-
13 ized to select exceptional early-career and senior sci-
14 entific, legal, business, and technical personnel to
15 serve as fellows to work at ARPA–E for terms not
16 to exceed two years. Responsibilities of fellows may
17 include—

18 “(A) supporting program managers in pro-
19 gram creation, design, implementation, and
20 management;

21 “(B) exploring technical fields for future
22 ARPA–E program areas;

23 “(C) assisting the Director in the creation
24 of the strategic vision for ARPA–E referred to
25 in subsection (h)(2);

1 “(D) preparing energy technology and eco-
2 nomic analyses; and

3 “(E) any other appropriate responsibilities
4 identified by the Director.”;

5 (6) in subsection (h)(2), as so redesignated by
6 paragraph (3) of this section—

7 (A) by striking “2008” and inserting
8 “2010”; and

9 (B) by striking “2011” and inserting
10 “2013”;

11 (7) by amending subsection (j), as so redesign-
12 nated by paragraph (3) of this section, to read as
13 follows:

14 “(j) FEDERAL DEMONSTRATION OF TECH-
15 NOLOGIES.—The Director shall seek opportunities to part-
16 ner with purchasing and procurement programs of Federal
17 agencies to demonstrate energy technologies resulting
18 from activities funded through ARPA-E.”;

19 (8) by inserting after such subsection (j) the
20 following new subsection:

21 “(k) EVENTS.—The Director is authorized to con-
22 vene, organize, and sponsor events that further the objec-
23 tives of ARPA-E, including events that assemble award-
24 ees, the most promising applicants for ARPA-E funding,
25 and a broad range of ARPA-E stakeholders (which may

1 include members of relevant scientific research and aca-
2 demic communities, government officials, financial institu-
3 tions, private investors, entrepreneurs, and other private
4 entities), for the purposes of—

5 “(1) demonstrating projects of ARPA–E award-
6 ees;

7 “(2) demonstrating projects of finalists for
8 ARPA–E awards and other energy technology
9 projects;

10 “(3) facilitating discussion of the commercial
11 application of energy technologies developed under
12 ARPA–E and other government-sponsored research
13 and development programs; or

14 “(4) such other purposes as the Director con-
15 siders appropriate.”;

16 (9) in subsection (m)(1), as so redesignated by
17 paragraph (3) of this section, by striking “4 years”
18 and inserting “6 years”;

19 (10) in subsection (m)(2)(B), as so redesign-
20 nated by paragraph (3) of this section, by inserting
21 “, and how those lessons may apply to the operation
22 of other programs within the Department of En-
23 ergy” after “ARPA–E”;

1 (11) by amending subsection (o)(2), as so re-
2 designated by paragraph (3) of this section, to read
3 as follows:

4 “(2) AUTHORIZATION OF APPROPRIATIONS.—
5 Subject to paragraph (4), there are authorized to be
6 appropriated to the Director for deposit in the
7 Fund, without fiscal year limitation—

8 “(A) \$300,000,000 for fiscal year 2011;

9 “(B) \$500,000,000 for fiscal year 2012;

10 “(C) \$700,000,000 for fiscal year 2013;

11 “(D) \$900,000,000 for fiscal year 2014;

12 “(E) \$1,000,000,000 for fiscal year 2015;

13 and

14 “(F) such sums as are necessary for each
15 of fiscal years 2016 through 2020.”;

16 (12) in subsection (o), as so redesignated by
17 paragraph (3) of this section, by—

18 (A) striking paragraph (4); and

19 (B) redesignated paragraph (5) as para-
20 graph (4); and

21 (13) in subsection (o)(4)(B), as so redesignated
22 by paragraphs (3) and (12)(B) of this subsection—

23 (A) by striking “2.5 percent” and inserting
24 “5 percent”; and

1 (B) by inserting “, consistent with the goal
2 described in subsection (c)(2)(D) and within the
3 responsibilities of program directors as specified
4 in subsection (g)(2)(B)(vii)” after “outreach ac-
5 tivities”.

6 **Subtitle C—Energy Innovation** 7 **Hubs**

8 **SEC. 631. SHORT TITLE.**

9 This subtitle may be cited as the “Energy Innovation
10 Hubs Authorization Act of 2010”.

11 **SEC. 632. ENERGY INNOVATION HUBS.**

12 (a) ESTABLISHMENT OF PROGRAM.—

13 (1) IN GENERAL.—The Secretary of Energy
14 shall carry out a program to enhance the Nation’s
15 economic, environmental, and energy security by
16 making grants to consortia for establishing and op-
17 erating Energy Innovation Hubs to conduct and
18 support, whenever practicable at one centralized lo-
19 cation, multidisciplinary, collaborative research, de-
20 velopment, demonstration, and commercial applica-
21 tion of advanced energy technologies in areas not
22 being served by the private sector.

23 (2) TECHNOLOGY DEVELOPMENT FOCUS.—The
24 Secretary shall designate for each Hub a unique ad-
25 vanced energy technology development focus.

1 (3) COORDINATION.—The Secretary shall en-
2 sure the coordination of, and avoid unnecessary du-
3 plication of, the activities of Hubs with those of
4 other Department of Energy research entities, in-
5 cluding the National Laboratories, the Advanced Re-
6 search Projects Agency—Energy, and Energy Fron-
7 tier Research Centers, and within industry. Such co-
8 ordination shall include convening and consulting
9 with representatives of staff of the Department of
10 Energy, representatives from Hubs and the quali-
11 fying entities that are members of the consortia op-
12 erating the Hubs, and representatives of such other
13 entities as the Secretary considers appropriate, to
14 share research results, program plans, and opportu-
15 nities for collaboration.

16 (4) ADMINISTRATION.—The Secretary shall ad-
17 minister this section with respect to each Hub
18 through the Department program office appropriate
19 to administer the subject matter of the technology
20 development focus assigned under paragraph (2) for
21 the Hub.

22 (b) CONSORTIA.—

23 (1) ELIGIBILITY.—To be eligible to receive a
24 grant under this section for the establishment and
25 operation of a Hub, a consortium shall—

1 (A) be composed of no fewer than 2 quali-
2 fying entities;

3 (B) operate subject to a binding agreement
4 entered into by its members that documents—

5 (i) the proposed partnership agree-
6 ment, including the governance and man-
7 agement structure of the Hub;

8 (ii) measures to enable cost-effective
9 implementation of the program under this
10 section;

11 (iii) a proposed budget, including fi-
12 nancial contributions from non-Federal
13 sources;

14 (iv) conflict of interest procedures
15 consistent with subsection (d)(3), all
16 known material conflicts of interest, and
17 corresponding mitigation plans;

18 (v) an accounting structure that en-
19 ables the Secretary to ensure that the con-
20 sortium has complied with the require-
21 ments of this section; and

22 (vi) an external advisory committee
23 consistent with subsection (d)(2); and

24 (C) operate as a nonprofit organization.

1 (2) APPLICATION.—A consortium seeking to es-
2 tablish and operate a Hub under this section, acting
3 through a prime applicant, shall transmit to the Sec-
4 retary an application at such time, in such form,
5 and accompanied by such information as the Sec-
6 retary shall require, including a detailed description
7 of the elements of the consortium agreement re-
8 quired under paragraph (1)(B).

9 (c) SELECTION AND SCHEDULE.—The Secretary
10 shall select consortia for grants for the establishment and
11 operation of Hubs through competitive selection processes.
12 Grants made to a Hub shall be for a period not to exceed
13 5 years, after which the grant may be renewed, subject
14 to a competitive selection process.

15 (d) HUB OPERATIONS.—

16 (1) IN GENERAL.—Hubs shall conduct or pro-
17 vide for multidisciplinary, collaborative research, de-
18 velopment, demonstration, and commercial applica-
19 tion of advanced energy technologies within the tech-
20 nology development focus designated for the Hub by
21 the Secretary under subsection (a)(2). Each Hub
22 shall—

23 (A) encourage collaboration and commu-
24 nication among the member qualifying entities
25 of the consortium and awardees by conducting

1 activities whenever practicable at one central-
2 ized location;

3 (B) develop and publish on the Depart-
4 ment of Energy's Web site proposed plans and
5 programs;

6 (C) submit an annual report to the Sec-
7 retary summarizing the Hub's activities, includ-
8 ing detailing organizational expenditures, listing
9 external advisory committee members, and de-
10 scribing each project undertaken by the Hub;
11 and

12 (D) monitor project implementation and
13 coordination.

14 (2) EXTERNAL ADVISORY COMMITTEE.—Each
15 Hub shall establish an external advisory committee,
16 the membership of which shall have sufficient exper-
17 tise to advise and provide guidance on scientific,
18 technical, industry, financial, and research manage-
19 ment matters.

20 (3) CONFLICTS OF INTEREST.—

21 (A) PROCEDURES.—Hubs shall establish
22 conflict of interest procedures, consistent with
23 those of the Department of Energy, to ensure
24 that employees and consortia designees for Hub
25 activities who are in decisionmaking capacities

1 disclose all material conflicts of interest, includ-
2 ing financial, organizational, and personal con-
3 flicts of interest.

4 (B) DISQUALIFICATION AND REVOCA-
5 TION.—The Secretary may disqualify an appli-
6 cation or revoke funds distributed to a Hub if
7 the Secretary discovers a failure to comply with
8 conflict of interest procedures established under
9 subparagraph (A).

10 (e) PROHIBITION ON CONSTRUCTION.—No funds
11 provided pursuant to this section may be used for con-
12 struction of new buildings or facilities for Hubs. Construc-
13 tion of new buildings or facilities shall not be considered
14 as part of the non-Federal share of a Hub cost-sharing
15 agreement.

16 (f) OVERSIGHT BOARD.—The Secretary shall estab-
17 lish and maintain within the Department an Oversight
18 Board to oversee the progress of Hubs.

19 (g) DEFINITIONS.—For purposes of this section:

20 (1) ADVANCED ENERGY TECHNOLOGY.—The
21 term “advanced energy technology” means an inno-
22 vative technology—

23 (A) that produces energy from solar, wind,
24 geothermal, biomass, tidal, wave, ocean, or
25 other renewable energy resources;

1 (B) that produces nuclear energy;

2 (C) for carbon capture and sequestration;

3 or

4 (D) that generates, transmits, distributes,
5 utilizes, or stores energy more efficiently than
6 conventional technologies.

7 (2) HUB.—The term “Hub” means an Energy
8 Innovation Hub established in accordance with this
9 section.

10 (3) INSTITUTION OF HIGHER EDUCATION.—The
11 term “institution of higher education” has the
12 meaning given that term in section 101(a) of the
13 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

14 (4) QUALIFYING ENTITY.—The term “quali-
15 fying entity” means—

16 (A) an institution of higher education;

17 (B) an appropriate State or Federal entity;

18 (C) a nongovernmental organization with
19 expertise in advanced energy technology re-
20 search, development, demonstration, or com-
21 mercial application; or

22 (D) any other relevant entity the Secretary
23 considers appropriate.

24 (5) SECRETARY.—The term “Secretary” means
25 the Secretary of Energy.

1 (h) AUTHORIZATION OF APPROPRIATIONS.—There
2 are authorized to be appropriated to the Secretary to carry
3 out this section—

4 (1) \$110,000,000 for fiscal year 2011;

5 (2) \$135,000,000 for fiscal year 2012;

6 (3) \$195,000,000 for fiscal year 2013;

7 (4) \$210,000,000 for fiscal year 2014; and

8 (5) \$210,000,000 for fiscal year 2015.

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