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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

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A BILL

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

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the ''America COMPETES Reauthorization Act of 2010''.

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

TITLE I—SCIENCE AND TECHNOLOGY POLICY

Subtitle A—National Nanotechnology Initiative Amendments

SEC. 101. SHORT TITLE.

This subtitle may be cited as the ''National Nanotechnology Initiative Amendments Act of 2010''.

SEC. 102. NATIONAL NANOTECHNOLOGY PROGRAM AMENDMENTS.

The 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7501 et seq.) is amended—

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

''(4) develop, within 12 months after the date of enactment of the National Nanotechnology Initiative Amendments Act of 2010, and update every 3 years thereafter, a strategic plan to guide the activities described under subsection (b) that specifies near-term and long-term objectives for the Program, the anticipated time frame for achieving the near-term objectives, and the metrics to be used for assessing progress toward the objectives, and that describes—

''(A) how the Program will move results out of the laboratory and into applications for the benefit of society, including through cooperation and collaborations with nanotechnology research, development, and technology transition initiatives supported by the States;

''(B) how the Program will encourage and support interdisciplinary research and development in nanotechnology; and

''(C) proposed research in areas of national importance in accordance with the requirements of section 105 of the National Nanotechnology Initiative Amendments Act of 2010;'';

(2) in section 2—

(A) in subsection (d)—

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

(ii) by inserting the following new paragraph before paragraph (2), as so redesignated by clause (i) of this subparagraph:

''(1) the Program budget, for the previous fiscal year, for each agency that participates in the Program, including a breakout of spending for the de-

velopment and acquisition of research facilities and instrumentation, for each program component area, and for all activities pursuant to subsection (b)(10);''; and

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

''(e) STANDARDS SETTING.—The agencies participating in the Program shall support the activities of committees involved in the development of standards for nanotechnology and may reimburse the travel costs of scientists and engineers who participate in activities of such committees.'';

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

''(b) FUNDING.—(1) The operation of the National Nanotechnology Coordination Office shall be supported by funds from each agency participating in the Program. The portion of such Office's total budget provided by each agency for each fiscal year shall be in the same proportion as the agency's share of the total budget for the Program for the previous fiscal year, as specified in the report required under section 2(d)(1).

''(2) The annual report under section 2(d) shall include—

''(A) a description of the funding required by the National Nanotechnology Coordination Office to perform the functions specified under subsection (a) for the next fiscal year by category of activity, including the funding required to carry out the requirements of section 2(b)(10)(D), subsection (d) of this section, and section 5;

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

''(C) the amount of funding provided for such Office for the current fiscal year by each agency participating in the Program.'';

(4) by inserting at the end of section 3 the following new subsection:

''(d) PUBLIC INFORMATION.—(1) The National Nanotechnology Coordination Office shall develop and maintain a database accessible by the public of projects funded under the Environmental, Health, and Safety, the Education and Societal Dimensions, and the Nanomanufacturing program component areas, or any successor program component areas, including a description of each project, its source of funding by agency, and its funding

history. For the Environmental, Health, and Safety program component area, or any successor program component area, projects shall be grouped by major objective as defined by the research plan required under section 103(b) of the National Nanotechnology Initiative Amendments Act of 2010. For the Education and Societal Dimensions program component area, or any successor program component area, the projects shall be grouped in subcategories of—

''(A) education in formal settings;

''(B) education in informal settings;

''(C) public outreach; and

''(D) ethical, legal, and other societal issues.

''(2) The National Nanotechnology Coordination Office shall develop, maintain, and publicize information on nanotechnology facilities supported under the Program, and may include information on nanotechnology facilities supported by the States, that are accessible for use by individuals from academic institutions and from industry. The information shall include at a minimum the terms and conditions for the use of each facility, a description of the capabilities of the instruments and equipment available for use at the facility, and a description of the technical support available to assist users of the facility.'';

(5) in section 4(a)—

(A) by striking ''or designate'';

(B) by inserting ''as a distinct entity'' after ''Advisory Panel''; and

(C) by inserting at the end ''The Advisory Panel shall form a subpanel with membership having specific qualifications tailored to enable it to carry out the requirements of subsection (c)(7).'';

(6) in section 4(b)—

(A) by striking ''or designated'' and ''or designating''; and

(B) by adding at the end the following: ''At least one member of the Advisory Panel shall be an individual employed by and representing a minority-serving institution.'';

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

''SEC. 5. TRIENNIAL EXTERNAL REVIEW OF THE NATIONAL NANOTECHNOLOGY PROGRAM.

''(a) IN GENERAL.—The Director of the National Nanotechnology Coordination Office shall enter into an arrangement with the National Research Council of the National Academy of Sciences to conduct a triennial review of the Program. The Director shall ensure that the arrangement with the National Research Council is concluded in order to allow sufficient time for the reporting

requirements of subsection (b) to be satisfied. Each triennial review shall include an evaluation of the—

"(1) research priorities and technical content of the Program, including whether the allocation of funding among program component areas, as designated according to section 2(c)(2), is appropriate;

"(2) effectiveness of the Program's management and coordination across agencies and disciplines, including an assessment of the effectiveness of the National Nanotechnology Coordination Office;

"(3) Program's scientific and technological accomplishments and its success in transferring technology to the private sector; and

"(4) adequacy of the Program's activities addressing ethical, legal, environmental, and other appropriate societal concerns, including human health concerns.

"(b) EVALUATION TO BE TRANSMITTED TO CONGRESS.—The National Research Council shall document the results of each triennial review carried out in accordance with subsection (a) in a report that includes any recommendations for ways to improve the Program's management and coordination processes and for changes to the Program's objectives, funding priorities, and technical content. Each report shall be submitted to the Director

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

''(c) FUNDING.—Of the amounts provided in accordance with section 3(b)(1), the following amounts shall be available to carry out this section:

''(1) $500,000 for fiscal year 2010.

''(2) $500,000 for fiscal year 2011.

''(3) $500,000 for fiscal year 2012.''; and

(8) in section 10—

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

''(2) NANOTECHNOLOGY.—The term 'nanotechnology' means the science and technology that will enable one to understand, measure, manipulate, and manufacture at the nanoscale, aimed at creating materials, devices, and systems with fundamentally new properties or functions.''; and

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

''(7) NANOSCALE.—The term 'nanoscale' means one or more dimensions of between approximately 1 and 100 nanometers.''.

SEC. 103. SOCIETAL DIMENSIONS OF NANOTECHNOLOGY.

(a) COORDINATOR FOR SOCIETAL DIMENSIONS OF NANOTECHNOLOGY.—The Director of the Office of Science and Technology Policy shall designate an associate director of the Office of Science and Technology Policy as the Coordinator for Societal Dimensions of Nanotechnology. The Coordinator shall be responsible for oversight of the coordination, planning, and budget prioritization of activities required by section 2(b)(10) of the 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7501(b)(10)). The Coordinator shall, with the assistance of appropriate senior officials of the agencies funding activities within the Environmental, Health, and Safety and the Education and Societal Dimensions program component areas of the Program, or any successor program component areas, ensure that the requirements of such section 2(b)(10) are satisfied. The responsibilities of the Coordinator shall include—

(1) ensuring that a research plan for the environmental, health, and safety research activities required under subsection (b) is developed, updated, and implemented and that the plan is responsive to

the recommendations of the subpanel of the Advisory Panel established under section 4(a) of the 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7503(a)), as amended by this subtitle;

(2) encouraging and monitoring the efforts of the agencies participating in the Program to allocate the level of resources and management attention necessary to ensure that the ethical, legal, environmental, and other appropriate societal concerns related to nanotechnology, including human health concerns, are addressed under the Program, including the implementation of the research plan described in subsection (b); and

(3) encouraging the agencies required to develop the research plan under subsection (b) to identify, assess, and implement suitable mechanisms for the establishment of public-private partnerships for support of environmental, health, and safety research.

(b) RESEARCH PLAN.—

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

ronmental, Health, and Safety program component area of the Program, or any successor program component area, and from such other agencies as the Coordinator considers necessary to develop, periodically update, and coordinate the implementation of a research plan for this program component area. In developing and updating the plan, the panel convened by the Coordinator shall solicit and be responsive to recommendations and advice from—

(A) the subpanel of the Advisory Panel established under section 4(a) of the 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7503(a)), as amended by this subtitle; and

(B) the agencies responsible for environmental, health, and safety regulations associated with the production, use, and disposal of nanoscale materials and products.

(2) DEVELOPMENT OF STANDARDS.—The plan required under paragraph (1) shall include a description of how the Program will help to ensure the development of—

(A) standards related to nomenclature associated with engineered nanoscale materials;

(B) engineered nanoscale standard reference materials for environmental, health, and safety testing; and

(C) standards related to methods and procedures for detecting, measuring, monitoring, sampling, and testing engineered nanoscale materials for environmental, health, and safety impacts.

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

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

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

(C) with respect to subparagraphs (A) and (B), describe the role of each agency carrying out or sponsoring research in order to meet the objectives specified under subparagraph (A) and to achieve the milestones specified under subparagraph (B);

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

funding by agency for the current fiscal year; and

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

(4) TRANSMITTAL TO CONGRESS.—The plan required under paragraph (1) shall be submitted not later than 60 days after the date of enactment of this Act to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science and Technology of the House of Representatives.

(5) UPDATING AND APPENDING TO REPORT.—The plan required under paragraph (1) shall be updated annually and appended to the report required under section 2(d) of the 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7501(d)).

(c) NANOTECHNOLOGY PARTNERSHIPS.—

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

by subsection (a)(2) of that section, except that each such partnership shall include 1 or more businesses engaged in the production of nanoscale materials, products, or devices. Partnerships established in accordance with this subsection shall be designated as ''Nanotechnology Education Partnerships''.

(2) PURPOSE.—Nanotechnology Education Partnerships shall be designed to recruit and help prepare secondary school students to pursue postsecondary level courses of instruction in nanotechnology. At a minimum, grants shall be used to support—

(A) professional development activities to enable secondary school teachers to use curricular materials incorporating nanotechnology and to inform teachers about career possibilities for students in nanotechnology;

(B) enrichment programs for students, including access to nanotechnology facilities and equipment at partner institutions, to increase their understanding of nanoscale science and technology and to inform them about career possibilities in nanotechnology as scientists, engineers, and technicians; and

(C) identification of appropriate nanotechnology educational materials and incorporation of nanotechnology into the curriculum for secondary school students at one or more organizations participating in a Partnership.

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

(d) UNDERGRADUATE EDUCATION PROGRAMS.—

(1) ACTIVITIES SUPPORTED.—As part of the activities included under the Education and Societal Dimensions program component area, or any successor program component area, the Program shall support efforts to introduce nanoscale science, engineering, and technology into undergraduate science and engineering education through a variety of interdisciplinary approaches. Activities supported may include—

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

(B) faculty professional development; and

(C) acquisition of equipment and instrumentation suitable for undergraduate education and research in nanotechnology.

(2) COURSE, CURRICULUM, AND LABORATORY IMPROVEMENT AUTHORIZATION.—There are authorized to be appropriated to the Director of the National Science Foundation to carry out activities described in paragraph (1) through the Course, Curriculum, and Laboratory Improvement program from amounts authorized under section 7002(c)(2)(B) of the America COMPETES Act, $5,000,000 for fiscal year 2010.

(3) ADVANCED TECHNOLOGY EDUCATION AUTHORIZATION.—There are authorized to be appropriated to the Director of the National Science Foundation to carry out activities described in paragraph (1) through the Advanced Technology Education program from amounts authorized under section 7002(c)(2)(B) of the America COMPETES Act, $5,000,000 for fiscal year 2010.

(e) INTERAGENCY WORKING GROUP.—The National Science and Technology Council shall establish under the Nanoscale Science, Engineering, and Technology Subcommittee an Education Working Group to coordinate, prioritize, and plan the educational activities supported under the Program.

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

Education and Societal Dimensions program component area, or any successor program component area, that involve informal, precollege, or undergraduate nanotechnology education shall include education regarding the environmental, health and safety, and other societal aspects of nanotechnology.

(g) REMOTE ACCESS TO NANOTECHNOLOGY FACILITIES.—(1) Agencies supporting nanotechnology research facilities as part of the Program shall require the entities that operate such facilities to allow access via the Internet, and support the costs associated with the provision of such access, by secondary school students and teachers, to instruments and equipment within such facilities for educational purposes. The agencies may waive this requirement for cases when particular facilities would be inappropriate for educational purposes or the costs for providing such access would be prohibitive.

(2) The agencies identified in paragraph (1) shall require the entities that operate such nanotechnology research facilities to establish and publish procedures, guidelines, and conditions for the submission and approval of applications for the use of the facilities for the purpose identified in paragraph (1) and shall authorize personnel who operate the facilities to provide necessary technical support to students and teachers.

SEC. 104. TECHNOLOGY TRANSFER.

(a) PROTOTYPING.—

(1) ACCESS TO FACILITIES.—In accordance with section 2(b)(7) of 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7501(b)(7)), the agencies supporting nanotechnology research facilities as part of the Program shall provide access to such facilities to companies for the purpose of assisting the companies in the development of prototypes of nanoscale products, devices, or processes (or products, devices, or processes enabled by nanotechnology) for determining proof of concept. The agencies shall publicize the availability of these facilities and encourage their use by companies as provided for in this section.

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

(A) shall establish and publish procedures, guidelines, and conditions for the submission and approval of applications for use of nanotechnology facilities;

(B) shall publish descriptions of the capabilities of facilities available for use under this subsection, including the availability of technical support; and

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

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

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

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

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

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

(b) USE OF EXISTING TECHNOLOGY TRANSFER PROGRAMS.—

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

(A) encourage the submission of applications for support of nanotechnology related projects to the Small Business Innovation Research Program and the Small Business Technology Transfer Program administered by such agencies; and

(B) through the National Nanotechnology Coordination Office and within 6 months after the date of enactment of this Act, submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science and Technology of the House of Representatives—

(i) the plan described in section 2(c)(7) of the 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7501(c)(7)); and

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

(I) the number of proposals received for nanotechnology related projects during the current fiscal year and the previous 2 fiscal years;

(II) the number of such proposals funded in each year;

(III) the total number of nanotechnology related projects funded and the amount of funding provided for fiscal year 2004 through fiscal year 2008; and

(IV) a description of the projects identified in accordance with subclause (III) which received private sector funding beyond the period of phase II support.

(2) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.—The Director of the National Institute of Standards and Technology in carrying out the requirements of section 28 of the National Institute of Standards and Technology Act (15 U.S.C. 278n) shall—

(A) in regard to subsection (d) of that section, encourage the submission of proposals for support of nanotechnology related projects; and

(B) in regard to subsection (g) of that section, include a description of how the requirement of subparagraph (A) of this paragraph is being met, the number of proposals for nanotechnology related projects received, the number of such proposals funded, the total number of such projects funded since the beginning of the Technology Innovation Program, and the outcomes of such funded projects in terms of the metrics developed in accordance with such subsection (g).

(3) TIP ADVISORY BOARD.—The TIP Advisory Board established under section 28(k) of the National Institute of Standards and Technology Act (15 U.S.C. 278n(k)), in carrying out its responsibilities under subsection (k)(3), shall provide the Director of the National Institute of Standards and Technology with—

(A) advice on how to accomplish the requirement of paragraph (2)(A) of this subsection; and

(B) an assessment of the adequacy of the allocation of resources for nanotechnology related projects supported under the Technology Innovation Program.

(c) INDUSTRY LIAISON GROUPS.—An objective of the Program shall be to establish industry liaison groups for all industry sectors that would benefit from applications of nanotechnology. The Nanomanufacturing, Industry Liaison, and Innovation Working Group of the National Science and Technology Council shall actively pursue establishing such liaison groups.

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

''(5) ensuring United States global leadership in the development and application of nanotechnology, including through coordination and leveraging Federal investments with nanotechnology research, development, and technology transition initiatives supported by the States;''.

SEC. 105. RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

(a) IN GENERAL.—The Program shall include support for nanotechnology research and development activities directed toward application areas that have the potential for significant contributions to national economic competitiveness and for other significant societal benefits. The activities supported shall be designed to advance the development of research discoveries by demonstrating technical

solutions to important problems in such areas as nanoelectronics, energy efficiency, health care, and water remediation and purification. The Advisory Panel shall make recommendations to the Program for candidate research and development areas for support under this section.

(b) CHARACTERISTICS.—

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

(A) include projects selected on the basis of applications for support through a competitive, merit-based process;

(B) involve collaborations among researchers in academic institutions and industry, and may involve nonprofit research institutions and Federal laboratories, as appropriate;

(C) when possible, leverage Federal investments through collaboration with related State initiatives; and

(D) include a plan for fostering the transfer of research discoveries and the results of technology demonstration activities to industry for commercial development.

(2) PROCEDURES.—Determination of the requirements for applications under this subsection, review and selection of applications for support, and

subsequent funding of projects shall be carried out by a collaboration of no fewer than 2 agencies participating in the Program. In selecting applications for support, the agencies shall give special consideration to projects that include cost sharing from non-Federal sources.

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

(c) REPORT.—Reports required under section 2(d) of the 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7501(d)) shall include a description of research and development areas supported in accordance with this section, including the same budget information as is required for program component areas under paragraphs (1) and (2) of such section 2(d).

SEC. 106. NANOMANUFACTURING RESEARCH.

(a) RESEARCH AREAS.—The Nanomanufacturing program component area, or any successor program component area, shall include research on—

(1) development of instrumentation and tools required for the rapid characterization of nanoscale materials and for monitoring of nanoscale manufacturing processes; and

(2) approaches and techniques for scaling the synthesis of new nanoscale materials to achieve industrial-level production rates.

(b) GREEN NANOTECHNOLOGY.—Interdisciplinary research centers supported under the Program in accordance with section 2(b)(4) of the 21st Century Nanotechnology Research and Development Act (15 U.S.C. 7501(b)(4)) that are focused on nanomanufacturing research and centers established under the authority of section 105(b)(3) of this subtitle shall include as part of the activities of such centers—

(1) research on methods and approaches to develop environmentally benign nanoscale products and nanoscale manufacturing processes, taking into consideration relevant findings and results of research supported under the Environmental, Health, and Safety program component area, or any successor program component area;

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

(3) providing for the education of scientists and engineers through interdisciplinary studies in the principles and techniques for the design and development of environmentally benign nanoscale products and processes.

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

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

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

(i) the relevance and value of the research being carried out under the Nanomanufacturing program component area of the Program, or any successor program component area; and

(ii) whether the capabilities of nanotechnology research facilities supported under the Program are adequate—

(I) to meet current and near-term requirements for the fabrication and characterization of nanoscale devices and systems; and

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

(B) receive any recommendations on ways to strengthen the research portfolio supported under the Nanomanufacturing program component area, or any successor program component area, and on improving the capabilities of nanotechnology research facilities supported under the Program.

Companies participating in industry liaison groups shall be invited to participate in the meeting. The Coordination Office shall prepare a report documenting the findings and recommendations resulting from the meeting.

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

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

(A) whether the funding for the Nanomanufacturing program component area, or any successor program component area, is adequate and receiving appropriate priority within the overall resources available for the Program;

(B) the relevance of the research being supported to the identified needs and requirements of industry;

(C) whether the capabilities of nanotechnology research facilities supported under the Program are adequate—

(i) to meet current and near-term requirements for the fabrication and characterization of nanoscale devices and systems; and

(ii) to provide access to and use of instrumentation and equipment at the facilities, by means of networking technology, to individuals who are at locations remote from the facilities; and

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

(i) the acquisition of instrumentation, equipment, and networking technology sufficient to provide the capabilities at nanotechnology research facilities described in subparagraph (C); and

(ii) the operation and maintenance of such facilities.

In carrying out its assessment, the Advisory Panel shall take into consideration the findings and recommendations from the report required under paragraph (1).

(3) REPORT.—Not later than 18 months after the date of enactment of this Act, the Advisory Panel shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science and Technology of the House of Representatives a report on its assessment required under paragraph (2), along with any recommendations and a copy of the report prepared in accordance with paragraph (1).

SEC. 107. DEFINITIONS.

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

Subtitle B—Networking and Information Technology Research and Development

SEC. 111. SHORT TITLE.

This subtitle may be cited as the ''Networking and Information Technology Research and Development Act of 2010''.

SEC. 112. PROGRAM PLANNING AND COORDINATION.

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

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

''(1) periodically assess the contents and funding levels of the Program Component Areas and restructure the Program when warranted, taking into consideration any relevant recommendations of the advisory committee established under subsection (b); and

''(2) ensure that the Program includes large-scale, long-term, interdisciplinary research and development activities, including activities described in section 104.''.

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

''(e) STRATEGIC PLAN.—

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

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

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

networking and information technology research, development, and technology transition initiatives supported by the States;

''(B) encourage and support mechanisms for interdisciplinary research and development in networking and information technology, including through collaborations across agencies, across Program Component Areas, with industry, with Federal laboratories (as defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703)), and with international organizations;

''(C) address long-term challenges of national importance for which solutions require large-scale, long-term, interdisciplinary research and development;

''(D) place emphasis on innovative and high-risk projects having the potential for substantial societal returns on the research investment;

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

''(F) attract more women and underrepresented minorities to pursue postsecondary degrees in networking and information technology.

''(3) NATIONAL RESEARCH INFRASTRUCTURE.—The strategic plan developed in accordance with paragraph (1) shall be accompanied by milestones and roadmaps for establishing and maintaining the national research infrastructure required to support the Program, including the roadmap required by subsection (a)(2)(E).

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

''(A) of the advisory committee established under subsection (b); and

''(B) of the stakeholders whose input was solicited by the National Coordination Office, as required under section 102(b)(3).

''(5) REPORT TO CONGRESS.—The Director of the National Coordination Office shall transmit the strategic plan required under paragraph (1) to the advisory committee, the Committee on Commerce, Science, and Transportation of the Senate, and the Committee on Science and Technology of the House of Representatives.''.

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

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

(2) by inserting after subparagraph (D) the following new subparagraph:

"(E) encourage and monitor the efforts of the agencies participating in the Program to allocate the level of resources and management attention necessary to ensure that the strategic plan under subsection (e) is developed and executed effectively and that the objectives of the Program are met;".

(d) ADVISORY COMMITTEE.—Section 101(b)(1) of such Act (15 U.S.C. 5511(b)(1)) is amended by inserting after "an advisory committee on high-performance computing," the following: "in which the co-chairs shall be members of the President's Council of Advisors on Science and Technology and with the remainder of the committee".

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

(1) in subparagraph (C)—

(A) by striking ''is submitted,'' and inserting ''is submitted, the levels for the previous fiscal year,''; and

(B) by striking ''each Program Component Area;'' and inserting ''each Program Component Area and research area supported in accordance with section 104;'';

(2) in subparagraph (D)—

(A) by striking ''each Program Component Area,'' and inserting ''each Program Component Area and research area supported in accordance with section 104,'';

(B) by striking ''is submitted,'' and inserting ''is submitted, the levels for the previous fiscal year,''; and

(C) by striking ''and'' after the semicolon;

(3) by redesignating subparagraph (E) as subparagraph (G); and

(4) by inserting after subparagraph (D) the following new subparagraphs:

''(E) include a description of how the objectives for each Program Component Area, and the objectives for activities that involve multiple Program Component Areas, relate to the objec-

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

''(F) include—

''(i) a description of the funding required by the National Coordination Office to perform the functions specified under section 102(b) for the next fiscal year by category of activity;

''(ii) a description of the funding required by such Office to perform the functions specified under section 102(b) for the current fiscal year by category of activity; and

''(iii) the amount of funding provided for such Office for the current fiscal year by each agency participating in the Program; and''.

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

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

(2) by inserting before paragraph (2), as so redesignated, the following new paragraph:

''(1) 'cyber-physical systems' means physical or engineered systems whose networking and informa-

tion technology functions and physical elements are deeply integrated and are actively connected to the physical world through sensors, actuators, or other means to perform monitoring and control functions;'';

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

(A) by striking ''high-performance computing'' and inserting ''networking and information technology''; and

(B) by striking ''supercomputer'' and inserting ''high-end computing'';

(4) in paragraph (6), as so redesignated, by striking ''network referred to as'' and all that follows through the semicolon and inserting ''network, including advanced computer networks of Federal agencies and departments;''; and

(5) in paragraph (7), as so redesignated, by striking ''National High-Performance Computing Program'' and inserting ''networking and information technology research and development program''.

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

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

"SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL IMPORTANCE.

"(a) IN GENERAL.—The Program shall encourage agencies identified in section 101(a)(3)(B) to support large-scale, long-term, interdisciplinary research and development activities in networking and information technology directed toward application areas that have the potential for significant contributions to national economic competitiveness and for other significant societal benefits. Such activities, ranging from basic research to the demonstration of technical solutions, shall be designed to advance the development of research discoveries. The advisory committee established under section 101(b) shall make recommendations to the Program for candidate research and development areas for support under this section.

"(b) CHARACTERISTICS.—

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

"(A) include projects selected on the basis of applications for support through a competitive, merit-based process;

"(B) involve collaborations among researchers in institutions of higher education and industry, and may involve nonprofit re-

search institutions and Federal laboratories, as appropriate;

"(C) when possible, leverage Federal investments through collaboration with related State initiatives; and

"(D) include a plan for fostering the transfer of research discoveries and the results of technology demonstration activities, including from institutions of higher education and Federal laboratories, to industry for commercial development.

"(2) COST-SHARING.—In selecting applications for support, the agencies shall give special consideration to projects that include cost sharing from non-Federal sources.

"(3) AGENCY COLLABORATION.—If 2 or more agencies identified in section 101(a)(3)(B), or other appropriate agencies, are working on large-scale research and development activities in the same area of national importance, then such agencies shall strive to collaborate through joint solicitation and selection of applications for support and subsequent funding of projects.

"(4) INTERDISCIPLINARY RESEARCH CENTERS.—Research and development activities under

this section may be supported through interdisciplinary research centers that are organized to investigate basic research questions and carry out technology demonstration activities in areas described in subsection (a). Research may be carried out through existing interdisciplinary centers, including those authorized under section 7024(b)(2) of the America COMPETES Act (Public Law 110–69; 42 U.S.C. 1862o–10).''.

SEC. 114. CYBER-PHYSICAL SYSTEMS AND INFORMATION MANAGEMENT.

(a) ADDITIONAL PROGRAM CHARACTERISTICS.—Section 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is amended—

(1) in subparagraph (H), by striking ''and'' after the semicolon;

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

(3) by adding at the end the following new subparagraphs:

''(J) provide for increased understanding of the scientific principles of cyber-physical systems and improve the methods available for the design, development, and operation of cyber-

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

''(K) provide for research and development on human-computer interactions, visualization, and information management.''.

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

''SEC. 105. UNIVERSITY/INDUSTRY TASK FORCE.

''(a) ESTABLISHMENT.—Not later than 180 days after the date of enactment of the Networking and Information Technology Research and Development Act of 2010, the Director of the National Coordination Office established under section 102 shall convene a task force to explore mechanisms for carrying out collaborative research and development activities for cyber-physical systems, including the related technologies required to enable these systems, through a consortium or other appropriate entity with participants from institutions of higher education, Federal laboratories, and industry.

''(b) FUNCTIONS.—The task force shall—

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

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

''(2) propose a process for developing a research and development agenda for such entity, including objectives and milestones;

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

''(4) propose guidelines for assigning intellectual property rights and for the transfer of research results to the private sector; and

''(5) make recommendations for how such entity could be funded from Federal, State, and nongovernmental sources.

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

''(d) REPORT.—Not later than 1 year after the date of enactment of the Networking and Information Technology Research and Development Act of 2010, the Direc-

tor of the National Coordination Office shall transmit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science and Technology of the House of Representatives a report describing the findings and recommendations of the task force.''.

SEC. 115. NATIONAL COORDINATION OFFICE.

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

''SEC. 102. NATIONAL COORDINATION OFFICE.

''(a) ESTABLISHMENT.—The Director shall establish a National Coordination Office with a Director and full-time staff.

''(b) FUNCTIONS.—The National Coordination Office shall—

''(1) provide technical and administrative support to—

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

''(B) the advisory committee established under section 101(b);

''(2) serve as the primary point of contact on Federal networking and information technology activities for government organizations, academia, in-

dustry, professional societies, State computing and networking technology programs, interested citizen groups, and others to exchange technical and programmatic information;

''(3) solicit input and recommendations from a wide range of stakeholders during the development of each strategic plan required under section 101(e) through the convening of at least 1 workshop with invitees from academia, industry, Federal laboratories, and other relevant organizations and institutions;

''(4) conduct public outreach, including the dissemination of findings and recommendations of the advisory committee, as appropriate; and

''(5) promote access to and early application of the technologies, innovations, and expertise derived from Program activities to agency missions and systems across the Federal Government and to United States industry.

''(c) SOURCE OF FUNDING.—

''(1) IN GENERAL.—The operation of the National Coordination Office shall be supported by funds from each agency participating in the Program.

''(2) SPECIFICATIONS.—The portion of the total budget of such Office that is provided by each agency for each fiscal year shall be in the same proportion as each such agency's share of the total budget for the Program for the previous fiscal year, as specified in the report required under section 101(a)(3).''.

SEC. 116. IMPROVING NETWORKING AND INFORMATION TECHNOLOGY EDUCATION.

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

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

(2) by inserting after paragraph (1) the following new paragraph:

''(2) the National Science Foundation shall use its existing programs, in collaboration with other agencies, as appropriate, to improve the teaching and learning of networking and information technology at all levels of education and to increase participation in networking and information technology fields, including by women and underrepresented minorities;''.

SEC. 117. CONFORMING AND TECHNICAL AMENDMENTS.

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

(1) in the matter preceding paragraph (1), by striking ''high-performance computing'' and inserting ''networking and information technology'';

(2) in paragraph (1), in the matter preceding subparagraph (A), by striking ''high-performance computing'' and inserting ''networking and information technology'';

(3) in subparagraphs (A) and (F) of paragraph (1), by striking ''high-performance computing'' each place it appears and inserting ''networking and information technology''; and

(4) in paragraph (2)—

(A) by striking ''high-performance computing and'' and inserting ''networking and information technology and''; and

(B) by striking ''high-performance computing network'' and inserting ''networking and information technology''.

(b) TITLE I.—The heading of title I of such Act (15 U.S.C. 5511) is amended by striking ''**HIGH-PERFORMANCE COMPUTING**'' and inserting ''**NETWORKING AND INFORMATION TECHNOLOGY**''.

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

(1) in the section heading, by striking "**HIGH-PERFORMANCE COMPUTING**" and inserting "**NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT**";

(2) in subsection (a)—

(A) in the subsection heading, by striking "NATIONAL HIGH-PERFORMANCE COMPUTING" and inserting "NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT";

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

(i) in the matter preceding subparagraph (A), by striking "National High-Performance Computing Program" and inserting "networking and information technology research and development program";

(ii) in subparagraph (A), by striking "high-performance computing, including networking" and inserting "networking and information technology"; and

(iii) in subparagraphs (B), (C), and (G), by striking "high-performance" each

place it appears and inserting ''high-end''; and

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

(i) in subparagraphs (A) and (C)—

(I) by striking ''high-performance computing'' each place it appears and inserting ''networking and information technology''; and

(II) by striking ''development, networking,'' each place it appears and inserting ''development,''; and

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

(3) in subsection (b)(1), in the matter preceding subparagraph (A), by striking ''high-performance computing'' both places it appears and inserting ''networking and information technology''; and

(4) in subsection (c)(1)(A), by striking ''high-performance computing'' and inserting ''networking and information technology''.

(d) SECTION 201.—Section 201(a)(1) of such Act (15 U.S.C. 5521(a)(1)) is amended by striking ''high-performance computing'' and all that follows through ''net-

working;'' and inserting ''networking and information research and development;''.

(e) SECTION 202.—Section 202(a) of such Act (15 U.S.C. 5522(a)) is amended by striking ''high-performance computing'' and inserting ''networking and information technology''.

(f) SECTION 203.—Section 203(a)(1) of such Act (15 U.S.C. 5523(a)(1)) is amended by striking ''high-performance computing and networking'' and inserting ''networking and information technology''.

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

(1) in subparagraph (A), by striking ''high-performance computing systems and networks'' and inserting ''networking and information technology systems and capabilities''; and

(2) in subparagraph (C), by striking ''high-performance computing'' and inserting ''networking and information technology''.

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

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

research'' and inserting ''networking and information technology research''.

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

(1) in the section heading, by striking ''**HIGH-PERFORMANCE COMPUTING**'' and inserting ''**NETWORKING AND INFORMATION TECHNOLOGY**''; and

(2) in subsection (a)—

(A) in paragraph (1), by striking ''High-performance computing and associated'' and inserting ''Networking and information'';

(B) in paragraph (2), by striking ''high-performance computing'' and inserting ''networking and information technologies'';

(C) in paragraph (4), by striking ''high-performance computers and associated'' and inserting ''networking and information''; and

(D) in paragraph (5), by striking ''high-performance computing and associated'' and inserting ''networking and information''.

Subtitle C—Other OSTP Provisions

SEC. 121. FEDERAL SCIENTIFIC COLLECTIONS.

(a) MANAGEMENT OF SCIENTIFIC COLLECTIONS.—The Office of Science and Technology Policy, in consulta-

tion with relevant Federal agencies, shall ensure the development of formal policies for the management and use of Federal scientific collections to improve the quality, organization, access, including online access, and long-term preservation of such collections for the benefit of the scientific enterprise.

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

(c) CLEARINGHOUSE.—The Office of Science and Technology Policy, in consultation with relevant Federal agencies, shall ensure the development of an online clearinghouse for information on the contents of and access to Federal scientific collections.

(d) DISPOSAL OF COLLECTIONS.—The policies developed under subsection (a) shall—

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

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

(B) consult with researchers who have used the collection, and other potentially interested parties, concerning—

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

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

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

(e) COST PROJECTIONS.—The Office of Science and Technology Policy, in consultation with relevant Federal agencies, shall develop a common set of methodologies to be used by Federal agencies for the assessment and projection of costs associated with the management and preservation of their scientific collections.

SEC. 122. COORDINATION OF MANUFACTURING RESEARCH AND DEVELOPMENT.

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

(b) RESPONSIBILITIES OF COMMITTEE.—The interagency committee established or designated under subsection (a) shall—

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

(2) establish goals and priorities for manufacturing research and development that will strengthen United States manufacturing; and

(3) develop and update every 5 years thereafter a strategic plan to guide Federal programs and activities in support of manufacturing research and development, which shall—

(A) specify and prioritize near-term and long-term research and development objectives, the anticipated time frame for achieving the objectives, and the metrics for use in assessing progress toward the objectives;

(B) specify the role of each Federal agency in carrying out or sponsoring research and development to meet the objectives of the strategic plan; and

(C) describe how the Federal agencies supporting manufacturing research and development will foster the transfer of research and de-

velopment results into new manufacturing technologies, processes, and products for the benefit of society and the national interest.

(c) RECOMMENDATIONS.—In the development of the strategic plan required under subsection (b)(3), the Director of the Office of Science and Technology Policy, working through the interagency committee, shall take into consideration the recommendations of a wide range of stakeholders, including representatives from diverse manufacturing companies, academia, and other relevant organizations and institutions.

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

SEC. 123. INTERAGENCY PUBLIC ACCESS COMMITTEE.

(a) DEFINITION.—For the purposes of this section, the term ''Federal science agency'' means any Federal agency with an annual extramural research expenditure of over $100,000,000.

(b) ESTABLISHMENT.—The Director of the Office of Science and Technology Policy shall establish a working group under the National Science and Technology Council with the responsibility to coordinate Federal science agency policies related to the dissemination and long-term stewardship of the results of unclassified research, including digital data and peer-reviewed scholarly publications, supported wholly or in part by funding from the Federal science agencies.

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

(1) develop or designate uniform standards for research data, the structure of full text and metadata, navigation tools, and other applications to achieve interoperability across Federal science agencies, across science and engineering disciplines, and between research data and scholarly publications, taking into account existing consensus standards, including international standards;

(2) foster innovation in the research and educational use of scholarly publications;

(3) address the need for long-term preservation and stewardship of all forms of digital research data, including by supporting research on tools and systems required to ensure preservation and stewardship;

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

(5) take into account research data that advance collective understanding and knowledge in some science and engineering disciplines but are not necessarily published in scholarly journals.

(d) STAKEHOLDER INPUT.—In developing any policies related to public access to the results of federally funded research, the Director, acting through the working group established under subsection (b), shall solicit input and recommendations from and collaborate with non-Federal stakeholders, including universities, nonprofit and for-profit publishers, libraries, and other organizations and institutions with a stake in long term preservation and access to the results of federally funded research, including relevant international organizations.

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

(1) research progress reports presented at professional meetings or conferences;

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

(3) classified research, or research resulting in works that generate revenue or royalties for authors (such as books) or patentable discoveries, to the extent necessary to protect a copyright or patent; or

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

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

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

TITLE II—NATIONAL SCIENCE FOUNDATION

SEC. 201. SHORT TITLE.

This title may be cited as the ''National Science Foundation Authorization Act of 2010''.

Subtitle A—General Provisions

SEC. 211. DEFINITIONS.

In this title:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Science Foundation established under section 2 of the National Science Foundation Act of 1950 (42 U.S.C. 1861).

(2) FOUNDATION.—The term ''Foundation'' means the National Science Foundation established under section 2 of the National Science Foundation Act of 1950 (42 U.S.C. 1861).

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

(4) STATE.—The term ''State'' means one of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the

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

(5) STEM.—The term ''STEM'' means science, technology, engineering, and mathematics.

(6) UNITED STATES.—The term ''United States'' means the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and any other territory or possession of the United States.

SEC. 212. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2011.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $8,219,670,000 for fiscal year 2011.

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

(A) $6,600,000,000 shall be made available for research and related activities;

(B) $1,104,000,000 shall be made available for education and human resources;

(C) $166,000,000 shall be made available for major research equipment and facilities construction;

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

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

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

(b) FISCAL YEAR 2012.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $8,932,080,000 for fiscal year 2012.

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

(A) $7,128,000,000 shall be made available for research and related activities;

(B) $1,192,320,000 shall be made available for education and human resources;

(C) $235,000,000 shall be made available for major research equipment and facilities construction;

(D) $356,400,000 shall be made available for agency operations and award management;

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

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

(c) FISCAL YEAR 2013.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $9,555,160,000 for fiscal year 2013.

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

(A) $7,626,960,000 shall be made available for research and related activities;

(B) $1,275,780,000 shall be made available for education and human resources;

(C) $250,000,000 shall be made available for major research equipment and facilities construction;

(D) $381,350,000 shall be made available for agency operations and award management;

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

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

(d) FISCAL YEAR 2014.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $10,112,940,000 for fiscal year 2014.

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

(A) $8,084,580,000 shall be made available for research and related activities;

(B) $1,352,330,000 shall be made available for education and human resources;

(C) $250,000,000 shall be made available for major research equipment and facilities construction;

(D) $404,230,000 shall be made available for agency operations and award management;

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

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

(e) FISCAL YEAR 2015.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $10,704,180,000 for fiscal year 2015.

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

(A) $8,569,650,000 shall be made available for research and related activities;

(B) $1,433,470,000 shall be made available for education and human resources;

(C) $250,000,000 shall be made available for major research equipment and facilities construction;

(D) $428,480,000 shall be made available for agency operations and award management;

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

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

SEC. 213. NATIONAL SCIENCE BOARD ADMINISTRATIVE AMENDMENTS.

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

(b) SCIENCE AND ENGINEERING INDICATORS DUE DATE.—Section 4(j)(1) of the National Science Foundation Act of 1950 (42 U.S.C. 1863(j)(1)) is amended by striking ''January 15'' and inserting ''May 31''.

(c) NATIONAL SCIENCE BOARD REPORTS.—Section 4(j)(2) of the National Science Foundation Act of 1950 (42 U.S.C. 1863(j)(2)) is amended by inserting ''within the authority of the Foundation (or otherwise as requested by the appropriate Congressional committees of jurisdiction or the President)'' after ''individual policy matters''.

(d) BOARD ADHERENCE TO SUNSHINE ACT.—Section 15(a) of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n–5(a)) is amended—

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

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

(A) by striking ''February 15'' and inserting ''April 15''; and

(B) by striking ''the audit required under paragraph (3) along with'' and inserting ''any''; and

(3) in paragraph (4), as so redesignated by paragraph (1) of this subsection, by striking ''To facilitate the audit required under paragraph (3) of this subsection, the'' and inserting ''The''.

SEC. 214. BROADER IMPACTS REVIEW CRITERION.

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

(1) Increased economic competitiveness of the United States.

(2) Development of a globally competitive STEM workforce.

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

(4) Increased partnerships between academia and industry.

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

(6) Improved undergraduate STEM education.

(7) Increased public scientific literacy.

(8) Increased national security.

(b) POLICY.—Not later than 6 months after the date of enactment of this Act, the Director shall develop and implement a policy for the Broader Impacts Review Criterion that—

(1) provides for educating professional staff at the Foundation, merit review panels, and applicants for Foundation research grants on the policy developed under this subsection;

(2) clarifies that the activities of grant recipients undertaken to satisfy the Broader Impacts Review Criterion shall—

(A) to the extent practicable employ proven strategies and models and draw on existing programs and activities; and

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

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

(4) encourages institutions of higher education and other nonprofit education or research organizations to develop and provide, either as individual institutions or in partnerships thereof, appropriate training and programs to assist Foundation-funded principal investigators at their institutions in achieving the goals of the Broader Impacts Review Criterion as described in subsection (a); and

(5) requires principal investigators applying for Foundation research grants to provide evidence of institutional support for the portion of the investigator's proposal designed to satisfy the Broader Impacts Review Criterion, including evidence of relevant training, programs, and other institutional resources available to the investigator from either their home institution or organization or another institution or organization with relevant expertise.

SEC. 215. NATIONAL CENTER FOR SCIENCE AND ENGINEERING STATISTICS.

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

neering Statistics (in this section referred to as the ''Center''), that shall serve as a central Federal clearinghouse for the collection, interpretation, analysis, and dissemination of objective data on science, engineering, technology, and research and development.

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

(1) collect, acquire, analyze, report, and disseminate statistical data related to the science and engineering enterprise in the United States and other nations that is relevant and useful to practitioners, researchers, policymakers, and the public, including statistical data on—

(A) research and development trends;

(B) the science and engineering workforce;

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

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

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

(3) support the education and training of researchers in the use of large-scale, nationally representative data sets.

(c) STATISTICAL REPORTS.—The Director or the National Science Board, acting through the Center, shall issue regular, and as necessary, special statistical reports on topics related to the national and international science and engineering enterprise such as the biennial report required by section 4 (j)(1) of the National Science Foundation Act of 1950 (42 U.S.C. 1863(j)(1)) on indicators of the state of science and engineering in the United States.

Subtitle B—Research and Innovation

SEC. 221. SUPPORT FOR POTENTIALLY TRANSFORMATIVE RESEARCH.

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

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

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

(2) establish review panels for the primary purpose of selecting high-risk, high-reward proposals or modify instructions to standard review panels to require identification of high-risk, high-reward proposals; and

(3) support workshops and participate in conferences with the primary purpose of identifying new opportunities for high-risk, high-reward basic research, especially at interdisciplinary interfaces.

(c) DEFINITION.—For purposes of this section, the term ''high-risk, high-reward basic research'' means research driven by ideas that have the potential to radically change our understanding of an important existing scientific or engineering concept, or leading to the creation of a new paradigm or field of science or engineering, and that is characterized by its challenge to current understanding or its pathway to new frontiers.

SEC. 222. FACILITATING INTERDISCIPLINARY COLLABORATIONS FOR NATIONAL NEEDS.

(a) IN GENERAL.—The Director shall award competitive, merit-based awards in amounts not to exceed $5,000,000 over a period of up to 5 years to interdisciplinary research collaborations that are likely to assist in ad-

dressing critical challenges to national security, competitiveness, and societal well-being and that—

(1) involve at least 2 co-equal principal investigators at the same or different institutions;

(2) draw upon well-integrated, diverse teams of investigators, including students or postdoctoral researchers, from one or more disciplines; and

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

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

SEC. 223. NATIONAL SCIENCE FOUNDATION MANUFACTURING RESEARCH.

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

(1) nanomanufacturing;

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

(3) manufacturing enterprise systems;

(4) advanced sensing and control techniques;

(5) materials processing; and

(6) information technologies for manufacturing, including predictive and real-time models and simulations, and virtual manufacturing.

SEC. 224. STRENGTHENING INSTITUTIONAL RESEARCH PARTNERSHIPS.

(a) IN GENERAL.—For any Foundation research grant, in an amount greater than $2,000,000, to be carried out through a partnership that includes one or more minority-serving institutions or predominantly undergraduate institutions and one or more institutions described in subsection (b), the Director shall award funds directly, according to the budget justification described in the grant proposal, to at least two of the institutions of higher education in the partnership, including at least one minority-serving institution or one predominantly undergraduate institution, to ensure a strong and equitable partnership.

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

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

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

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

(b) REPORT ON MID-SCALE RESEARCH INSTRUMENTATION PROGRAM.—Not later than 1 year after the date of enactment of this Act, the National Science Board shall submit to Congress a report on mid-scale research instrumentation at the Foundation. At a minimum, this report shall include—

(1) the findings from the Board's evaluation of instrumentation needs required under subsection (a), including a description of differences across disciplines and Foundation research directorates;

(2) a recommendation or recommendations regarding how the Foundation should set priorities for

mid-scale instrumentation across disciplines and Foundation research directorates;

(3) a recommendation or recommendations regarding the appropriateness of expanding existing programs, including the Major Research Instrumentation program or the Major Research Equipment and Facilities Construction program, to support more instrumentation at the mid-scale;

(4) a recommendation or recommendations regarding the need for and appropriateness of a new, Foundation-wide program or initiative in support of mid-scale instrumentation, including any recommendations regarding the administration of and budget for such a program or initiative and the appropriate scope of instruments to be funded under such a program or initiative; and

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

SEC. 226. SENSE OF CONGRESS ON OVERALL SUPPORT FOR RESEARCH INFRASTRUCTURE AT THE FOUNDATION.

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

24 to 27 percent, as recommended in the 2003 National Science Board report entitled ''Science and Engineering Infrastructure for the 21st Century''.

SEC. 227. PARTNERSHIPS FOR INNOVATION.

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

(b) PARTNERSHIPS.—

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

(A) includes at least one private sector entity; and

(B) may include other institutions of higher education, public sector institutions, and private sector entities.

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

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

(A) A minority serving institution.

(B) A primarily undergraduate institution.

(C) A 2-year college.

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

(1) increase the economic or social impact of the most promising research at the institution or institutions of higher education that are members of the partnership through knowledge transfer or commercialization;

(2) increase the engagement of faculty and students across multiple disciplines and departments, including faculty and students in schools of business and other appropriate non-STEM fields and disciplines in knowledge transfer activities;

(3) enhance education and mentoring of students and faculty in innovation and entrepreneurship through networks, courses, and development of best practices and curricula;

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

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

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

(6) build lasting partnerships with local and regional businesses, local and State governments, and other relevant entities.

(d) ADDITIONAL CRITERIA.—In selecting grant recipients under this section, the Director shall also consider the extent to which the applicants are able to demonstrate evidence of institutional support for, and commitment to—

(1) achieving the goals of the program as described in subsection (c);

(2) expansion to a university-wide program if the initial proposal is not for a university-wide program; and

(3) sustaining any new innovation tools and resources generated from funding under this program.

(e) LIMITATION.—No funds provided under this section may be used to construct or renovate a building or structure.

SEC. 228. PRIZE AWARDS.

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

(b) TOPICS.—In identifying topics for prize competitions under this section, the Director shall—

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

(2) give priority to high-risk, high-reward research challenges and to problems whose solution could improve the economic competitiveness of the United States; and

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

(c) TYPES OF CONTESTS.—The Director shall consider all categories of innovation inducement prizes, including—

(1) contests in which the award is to the first team or individual who accomplishes a stated objective; and

(2) contests in which the winner is the team or individual who comes closest to achieving an objective within a specified time.

(d) ADVERTISING AND ANNOUNCEMENT.—

(1) ADVERTISING AND SOLICITATION OF COMPETITORS.—The Director shall widely advertise prize competitions to encourage broad participation, including by individuals, institutions of higher education, nonprofit organizations, and businesses.

(2) ANNOUNCEMENT THROUGH FEDERAL REGISTER NOTICE.—The Director shall announce each prize competition by publishing a notice in the Federal Register. This notice shall include the subject of the competition, the duration of the competition, the eligibility requirements for participation in the competition, the process for participants to register for the competition, the amount of the prize, and the criteria for awarding the prize, including the method by which the prize winner or winners will be selected.

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

(e) FUNDING.—

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

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

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

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

(1) shall have complied with all of the requirements under this section;

(2) in the case of a private entity, shall be incorporated in and maintain a primary place of business in the United States, and in the case of an individual, whether participating singly or in a group, shall be a United States citizen or national, or an alien lawfully admitted to the United States for permanent residence; and

(3) shall not be a Federal entity, a Federal employee acting within the scope of his or her employment, or a person employed at a Federal laboratory acting within the scope of his or her employment.

(g) AWARDS.—

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

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

(3) SELECTING WINNERS.—The Director may convene an expert panel to select a winner of a prize competition. If the panel is unable to select a winner, the Director shall determine the winner of the prize.

(4) PUBLIC OUTREACH.—The Director shall publicly award prizes utilizing the Foundation's existing public affairs and public outreach resources.

(h) ADMINISTERING THE COMPETITION.—The Director may enter into an agreement with a private, nonprofit entity to administer the prize competition, subject to the provisions of this section.

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

section shall not be construed to prevent the Federal Government from negotiating a license for the use of intellectual property developed for a prize competition under this section.

(j) LIABILITY.—The Director may require a registered participant in a prize competition under this section to waive liability against the Federal Government for injuries and damages that result from participation in such competition.

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

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

(1) a description of the nature and status of all completed or ongoing prize competitions carried out under this section, including any scientific achievements, publications, intellectual property, or commercialized technology that resulted from such competitions;

(2) any recommendations regarding changes to, the termination of, or continuation of the pilot program;

(3) an analysis of whether the program is attracting contestants more diverse than the Foundation's traditional academic constituency;

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

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

(6) an analysis of the extent to which private funds are being used to support registered participants.

(m) EARLY TERMINATION OF CONTESTS.—The Director shall terminate a prize contest before any registered participant wins if the Director determines that an unregistered entity has produced an innovation that would otherwise have qualified for the prize award.

(n) AUTHORIZATION OF APPROPRIATIONS.—

(1) IN GENERAL.—

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

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

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

(2) CARRYOVER OF FUNDS.—Funds appropriated for prize awards under this section shall remain available until expended, and may be transferred, reprogrammed, or expended for other purposes as authorized by law only after the expiration of 7 fiscal years after the fiscal year for which the funds were originally appropriated. No provision in this section permits obligation or payment of funds in violation of section 1341 of title 31 of the United States Code (commonly referred to as the Anti-Deficiency Act).

Subtitle C—STEM Education and Workforce Training

SEC. 241. GRADUATE STUDENT SUPPORT.

(a) FINDING.—The Congress finds that—

(1) the Integrative Graduate Education and Research Traineeship program is an important program for training the next generation of scientists

and engineers in team-based interdisciplinary research and problem solving, and for providing them with the many additional skills, such as communication skills, needed to thrive in diverse STEM careers; and

(2) the Integrative Graduate Education and Research Traineeship program is no less valuable to the preparation and support of graduate students than the Foundation's Graduate Research Fellowship program.

(b) EQUAL TREATMENT OF IGERT AND GRF.—Beginning in fiscal year 2011, the Director shall increase or, if necessary, decrease funding for the Foundation's Integrative Graduate Education and Research Traineeship program (or any program by which it is replaced) at least at the same rate as it increases or decreases funding for the Graduate Research Fellowship program.

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

(d) COST OF EDUCATION ALLOWANCE FOR GRF PROGRAM.—Section 10 of the National Science Foundation Act of 1950 (42 U.S.C. 1869) is amended—

(1) by inserting ''(a)'' before ''The Foundation is authorized''; and

(2) by adding at the end the following new subsection:

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

SEC. 242. POSTDOCTORAL FELLOWSHIP IN STEM EDUCATION RESEARCH.

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

(b) AWARDS.—

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

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

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

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

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

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

(1) learning processes and progressions;

(2) knowledge transfer, including curriculum development;

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

(4) integrating STEM fields; and

(5) assessment of student learning and program evaluation.

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

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

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

SEC. 243. ROBERT NOYCE TEACHER SCHOLARSHIP PROGRAM.

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

(1) in subsection (c)(4), by striking ''Service required under this paragraph shall be performed in a high-need local educational agency.''; and

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

''(5) EXCEPTION.—The period of service obligation under paragraph (4) shall be reduced by 1 year for scholarship recipients whose service is performed in a high-need local educational agency. The Director shall establish and maintain a central clearing-

house of information on teaching opportunities available in high-need local educational agencies throughout the United States, which shall be made available to individuals having a service obligation under this section.''.

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

SEC. 244. INSTITUTIONS SERVING PERSONS WITH DISABILITIES.

For the purposes of the activities and programs supported by the Foundation, institutions of higher education chartered to serve large numbers of students with disabilities, including Gallaudet University, Landmark College, and the National Technical Institute for the Deaf, shall be designated as minority-serving institutions.

SEC. 245. INSTITUTIONAL INTEGRATION.

(a) INNOVATION THROUGH INSTITUTIONAL INTEGRATION.—The Director shall award grants for the institutional integration of projects funded by the Foundation with a focus on education, or on broadening participation in STEM by underrepresented groups, for the purpose of increasing collaboration and coordination across funded projects and institutions and expanding the impact of such

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

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

(1) additional opportunities to increase the recruitment, retention, and degree attainment of underrepresented groups in STEM disciplines;

(2) the inclusion of programming, practices, and policies that encourage the integration of education and research;

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

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

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

(1) the extent to which the proposed project addresses the goals of project and program integration and adds value to the existing funded projects;

(2) the extent to which there is a proven record of success for the existing projects on which the proposed integration project is based; and

(3) the extent to which the proposed project addresses the modification of programming, practices, and policies necessary to achieve the purpose described in subsection (a).

(d) PRIORITY.—In selecting recipients of grants under this section, the Director shall give priority to proposals for which a senior institutional administrator, including a dean or other administrator of equal or higher rank, serves as the principal investigator.

SEC. 246. POSTDOCTORAL RESEARCH FELLOWSHIPS.

(a) IN GENERAL.—The Director shall establish a Foundation-wide postdoctoral research fellowship program, to award competitive, merit-based postdoctoral research fellowships in any field of research supported by the Foundation.

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

(c) ELIGIBILITY.—To be eligible to receive a fellowship under this section, an individual—

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

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

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

(d) PRIORITY.—In evaluating applications for fellowships under this section, the Director shall give priority to applications that include—

(1) proposals for interdisciplinary research; or

(2) proposals for high-risk, high-reward research.

(e) ADDITIONAL CONSIDERATIONS.—In evaluating applications for fellowships under this section, the Director shall give consideration to the goal of promoting the participation of individuals identified in section 33 or 34

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

(f) NONSUBSTITUTION.—The fellowship program authorized under this section is not intended to replace or reduce support for postdoctoral research through existing programs at the Foundation.

SEC. 247. BROADENING PARTICIPATION TRAINING AND OUTREACH.

The Director shall provide education and training—

(1) to Foundation staff and grant proposal review panels on effective mechanisms and tools for broadening participation in STEM by underrepresented groups, including reviewer selection and mitigation of implicit bias in the review process; and

(2) to Foundation staff on related outreach approaches.

SEC. 248. TRANSFORMING UNDERGRADUATE EDUCATION IN STEM.

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

"SEC. 17. TRANSFORMING UNDERGRADUATE EDUCATION IN STEM.

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

higher education to reform undergraduate STEM education for the purpose of increasing the number and quality of students studying toward and completing baccalaureate degrees in STEM and improving the STEM learning outcomes for all undergraduate students, including through—

''(1) development, implementation, and assessment of innovative, research-based approaches to transforming the teaching and learning of disciplinary or interdisciplinary STEM at the undergraduate level; and

''(2) expansion of successful STEM reform efforts beyond a single course or group of courses to achieve reform within an entire academic unit, or expansion of successful reform efforts beyond a single academic unit to other STEM academic units within an institution or to comparable academic units at other institutions.

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

''(1) creation of multidisciplinary or interdisciplinary courses or programs that formalize collaborations for the purpose of improved student instruction and research in STEM;

''(2) expansion of undergraduate STEM research opportunities to include interdisciplinary research opportunities and research opportunities in industry, at Federal labs, and at international research institutions or research sites;

''(3) implementation or expansion of bridge, cohort, tutoring, or mentoring programs proven to enhance student recruitment or persistence to degree completion in STEM, including programs that address student transition from two-year to four-year institutions;

''(4) improvement of undergraduate STEM education for nonmajors, including education majors;

''(5) implementation of evidence-based, technology-driven reform efforts that directly impact undergraduate STEM instruction or research experiences;

''(6) development and implementation of faculty and graduate teaching assistant development programs focused on improved instruction, mentoring, assessment of student learning, and support of undergraduate STEM students;

''(7) support for graduate students and postdoctoral fellows to participate in instructional or

assessment activities at primarily undergraduate institutions; and

''(8) research on teaching and learning of STEM at the undergraduate level related to the proposed reform effort, including assessment and evaluation of the proposed reform activities, research on scalability and sustainability of approaches to reform, and development and implementation of longitudinal studies of students included in the proposed reform effort.

''(c) PARTNERSHIP.—An institution of higher education may partner with one or more other nonprofit education or research organizations, including scientific and engineering societies, for the purposes of carrying out the activities authorized under this section.

''(d) SELECTION PROCESS.—

''(1) APPLICATIONS.—An institution of higher education seeking a grant under this section shall submit an application to the Director at such time, in such manner, and containing such information as the Director may require. The application shall include, at a minimum—

''(A) a description of the proposed reform effort;

''(B) a description of the research findings that will serve as the basis for the proposed reform effort or, in the case of applications that propose an expansion of a previously implemented reform effort, a description of the previously implemented reform effort, including indicators of success such as data on student recruitment, persistence to degree completion, and academic achievement;

''(C) evidence of institutional support for, and commitment to, the proposed reform effort, including long-term commitment to implement successful strategies from the current reform effort beyond the academic unit or units included in the grant proposal or to disseminate successful strategies to other institutions;

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

''(E) a description of the plans for assessment and evaluation of the proposed reform activities, including evidence of participation by

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

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

''(A) the likelihood of success in undertaking the proposed effort at the institution submitting the application, including the extent to which the faculty, staff, and administrators of the institution are committed to making the proposed institutional reform a priority of the participating academic unit or units;

''(B) the degree to which the proposed reform will contribute to change in institutional culture and policy such that a greater value is placed on faculty engagement in undergraduate education;

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

''(D) the degree to which scholarly assessment and evaluation plans are included in the design of the reform effort, including the degree to which such assessment and evaluation con-

tribute to the systematic accumulation of knowledge on STEM education.

''(3) PRIORITY.—For proposals that include an expansion of existing reform efforts beyond a single academic unit, the Director shall give priority to proposals for which a senior institutional administrator, including a dean or other administrator of equal or higher rank, serves as the principal investigator or a coprincipal investigator.

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

SEC. 249. 21ST CENTURY GRADUATE EDUCATION.

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

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

(1) creation of multidisciplinary or interdisciplinary courses or programs for the purpose of improved student instruction and research in STEM;

(2) expansion of graduate STEM research opportunities to include interdisciplinary research opportunities and research opportunities in industry, at Federal laboratories, and at international research institutions or research sites;

(3) development and implementation of future faculty training programs focused on improved instruction, mentoring, assessment of student learning, and support of undergraduate STEM students;

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

(5) creation, improvement, or expansion of innovative graduate programs such as science master's degree programs;

(6) development and implementation of seminars, workshops, and other professional development activities that increase the ability of graduate stu-

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

(7) development and implementation of seminars, workshops, and other professional development activities that increase the ability of graduate students to effectively communicate their research findings to technical audiences outside of their own discipline and to nontechnical audiences;

(8) expansion of successful STEM reform efforts beyond a single academic unit to other STEM academic units within an institution or to comparable academic units at other institutions; and

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

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

(d) SELECTION PROCESS.—

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

submit an application to the Director at such time, in such manner, and containing such information as the Director may require. The application shall include, at a minimum—

(A) a description of the proposed reform effort;

(B) in the case of applications that propose an expansion of a previously implemented reform effort at the applicant's institution or at other institutions, a description of the previously implemented reform effort;

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

(D) a description of the plans for assessment and evaluation of the grant proposed reform activities.

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

(A) the likelihood of success in undertaking the proposed effort at the institution submitting the application, including the extent to which the faculty, staff, and administrators of the institution are committed to making the proposed institutional reform a priority of the participating academic unit or units;

(B) the degree to which the proposed reform will contribute to change in institutional culture and policy such that a greater value is placed on preparing graduate students for diverse careers utilizing STEM degrees;

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

(D) the degree to which scholarly assessment and evaluation plans are included in the design of the reform effort.

(e) REPEAL.—Section 7034 of the America COMPETES Act (42 U.S.C. 1862o–13) is repealed.

SEC. 250. UNDERGRADUATE BROADENING PARTICIPATION PROGRAM.

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

graduate Program, the Louis Stokes Alliances for Minority Participation Program, and the Tribal Colleges and Universities Program as separate programs at least through September 30, 2011.

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

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

(2) addressing the unique needs of the different types of minority serving institutions and underrepresented groups currently provided for by the separate programs.

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

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

(2) solicit recommendations and feedback from a wide range of stakeholders, including representatives from minority serving institutions, other institutions of higher education, and other entities with expertise on effective mechanisms to increase the recruitment and retention of members of underrepresented groups in STEM fields, and the attainment of STEM degrees by underrepresented groups.

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

SEC. 251. GRAND CHALLENGES IN EDUCATION RESEARCH.

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

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

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

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

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

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

(c) TOPICS TO CONSIDER.—In identifying the grand challenges required in subsection (a), the Director and the Secretary shall, at a minimum, consider the following topics:

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

(2) Research that utilizes a systems approach to identifying challenges and opportunities to improve the teaching and learning of STEM, including development of model systems that support improved teaching and learning of STEM across entire school districts and States, and encompassing and integrating the teaching and learning of STEM in formal and informal venues, and in K–12 schools and institutions of higher education.

(3) Research to understand what makes a STEM teacher effective and STEM teacher professional development effective, including development of tools and methodologies to measure STEM teacher effectiveness.

(4) Research and development on cyber-enabled tools and programs and television-based tools and programs for learning and teaching STEM, including development of tools and methodologies for assessing cyber- and television-enabled teaching and learning.

(5) Research and development on STEM teaching and learning in informal environments, including

development of tools and methodologies for assessing STEM teaching and learning in informal environments.

(6) Research and development on how integrating engineering with mathematics and science education may—

(A) improve student learning of mathematics and science;

(B) increase student interest and persistence in STEM; or

(C) improve student understanding of engineering design principles and of the built world.

(d) REPORT TO CONGRESS.—Not later than 18 months after the date of enactment of this Act, the Director and the Secretary shall report back to Congress with a description of—

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

(2) the role of each agency in supporting research and development activities to address the grand challenges;

(3) the common metrics that will be used to assess progress toward meeting the grand challenges;

(4) plans for periodically updating the grand challenges;

(5) how the agencies will disseminate the results of research and development activities carried out under this section to STEM education practitioners, to other Federal agencies that support STEM programs and activities, and to non-Federal funders of STEM education; and

(6) how the agencies will support implementation of best practices identified by the research and development activities.

SEC. 252. RESEARCH EXPERIENCES FOR UNDERGRADUATES.

(a) RESEARCH SITES.—The Director shall award grants, on a merit-reviewed, competitive basis, to institutions of higher education, nonprofit organizations, or consortia of such institutions and organizations, for sites designated by the Director to provide research experiences for 10 or more undergraduate STEM students. The Director shall ensure that—

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

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

(3) the awards support a variety of projects, including independent investigator-led projects, interdisciplinary projects, and multi-institutional projects (including virtual projects);

(4) students participating in each program funded have mentors, including during the academic year to the extent practicable, to help connect the students' research experiences to the overall academic course of study and to help students achieve success in courses of study leading to a baccalaureate degree in a STEM field;

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

(6) student participants are tracked, for employment and continued matriculation in STEM fields, through receipt of the undergraduate degree and for at least 3 years thereafter.

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

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

TITLE III—STEM EDUCATION

SEC. 301. COORDINATION OF FEDERAL STEM EDUCATION.

(a) SHORT TITLE.—This section may be cited as the ''STEM Education Coordination Act of 2010''.

(b) DEFINITION.—In this section, the term ''STEM'' means science, technology, engineering, and mathematics.

(c) ESTABLISHMENT.—The Director of the Office of Science and Technology Policy shall establish a committee under the National Science and Technology Council with the responsibility to coordinate Federal programs and activities in support of STEM education, including at the National Science Foundation, the Department of Energy, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the Department of Education, and all other Federal agencies that have programs and activities in support of STEM education.

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

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

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

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

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

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

(D) with respect to subparagraph (A), describe the role of each agency in supporting programs and activities designed to achieve the objectives; and

(3) establish, periodically update, and maintain an inventory of federally sponsored STEM education programs and activities, including documentation of assessments of the effectiveness of such programs and activities and rates of participation by underrepresented minorities in such programs and activities.

(e) RESPONSIBILITIES OF OSTP.—The Director of the Office of Science and Technology Policy shall encourage and monitor the efforts of the participating agencies

to ensure that the strategic plan under subsection (d)(2) is developed and executed effectively and that the objectives of the strategic plan are met.

(f) REPORT.—The Director of the Office of Science and Technology Policy shall transmit a report annually to Congress at the time of the President's budget request describing the plan required under subsection (d)(2). The annual report shall include—

(1) a description of the STEM education programs and activities for the previous and current fiscal years, and the proposed programs and activities under the President's budget request, of each participating Federal agency;

(2) the levels of funding for each participating Federal agency for the programs and activities described under paragraph (1) for the previous fiscal year and under the President's budget request;

(3) except for the initial annual report, a description of the progress made in carrying out the implementation plan, including a description of the outcome of any program assessments completed in the previous year, and any changes made to that plan since the previous annual report; and

(4) a description of how the participating Federal agencies will disseminate information about fed-

erally supported resources for STEM education practitioners, including teacher professional development programs, to States and to STEM education practitioners, including to teachers and administrators in high-need schools, as defined in section 200 of the Higher Education Act of 1965 (20 U.S.C. 1021).

SEC. 302. ADVISORY COMMITTEE ON STEM EDUCATION.

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

(b) MEMBERSHIP.—The advisory committee established or designated by the President under subsection (a) shall be chaired by at least 2 members of the President's Council of Advisors on Science and Technology, with the remaining advisory committee membership consisting of non-Federal members who are specially qualified to provide the President with advice and information on STEM education. Membership of the advisory committee, at a minimum, shall include individuals from the following categories of individuals and organizations:

(1) STEM educator professional associations.

(2) Organizations that provide informal STEM education activities.

(3) Institutions of higher education.

(4) Scientific and engineering professional societies.

(5) Business and industry associations.

(6) Foundations that fund STEM education activities.

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

(1) soliciting input from teachers, administrators, local education agencies, States, and other public and private STEM education stakeholder groups for the purpose of informing the Federal agencies that support STEM education programs on the STEM education needs of States and school districts;

(2) soliciting input from all STEM education stakeholder groups regarding STEM education programs, including STEM education research programs, supported by Federal agencies;

(3) providing advice to the Federal agencies that support STEM education programs on how their programs can be better aligned with the needs of States and school districts as identified in paragraph (1), consistent with the mission of each agency; and

(4) offering guidance to the President on current STEM education activities, research findings, and best practices, with the purpose of increasing connectivity between public and private STEM education efforts.

SEC. 303. STEM EDUCATION AT THE DEPARTMENT OF ENERGY.

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

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

(2) by inserting after paragraph (1) the following new paragraph:

''(2) ENERGY SYSTEMS SCIENCE AND ENGINEERING.—The term 'energy systems science and engineering' means—

''(A) nuclear science and engineering, including—

''(i) nuclear engineering;

''(ii) nuclear chemistry;

''(iii) radiochemistry; and

''(iv) health physics;

''(B) hydrocarbon system science and engineering, including—

''(i) petroleum or reservoir engineering;

''(ii) environmental geoscience;

''(iii) petrophysics;

''(iv) geophysics;

''(v) geochemistry;

''(vi) petroleum geology;

''(vii) ocean engineering; and

''(viii) environmental engineering;

''(C) energy efficiency and renewable energy technology systems science and engineering, including with respect to—

''(i) solar technology systems;

''(ii) wind technology systems;

''(iii) buildings technology systems;

''(iv) transportation technology systems;

''(v) hydropower systems; and

''(vi) geothermal systems; and

''(D) energy storage and distribution systems science and engineering, including with respect to—

''(i) energy storage; and

''(ii) energy delivery.''.

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

(1) in section 3170—

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

''(1) DIRECTOR.—The term 'Director' means the Director of STEM Education appointed or designated under section 3171(c)(1).'';

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

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

''(2) ENERGY SYSTEMS SCIENCE AND ENGINEERING.—The term 'energy systems science and engineering' means—

''(A) nuclear science and engineering, including—

''(i) nuclear engineering;

''(ii) nuclear chemistry;

''(iii) radiochemistry; and

''(iv) health physics;

''(B) hydrocarbon system science and engineering, including—

''(i) petroleum or reservoir engineering;

''(ii) environmental geoscience;

''(iii) petrophysics;

''(iv) geophysics;

''(v) geochemistry;

''(vi) petroleum geology;

''(vii) ocean engineering; and

''(viii) environmental engineering;

''(C) energy efficiency and renewable energy technology systems science and engineering, including with respect to—

''(i) solar technology systems;

''(ii) wind technology systems;

''(iii) buildings technology systems;

''(iv) transportation technology systems;

''(v) hydropower systems; and

''(vi) geothermal systems; and

''(D) energy storage and distribution systems science and engineering, including with respect to—

''(i) energy storage; and

''(ii) energy delivery.''; and

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

''(4) STEM.—The term 'STEM' means science, technology, engineering, and mathematics.'';

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

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

''CHAPTER 1—STEM EDUCATION

''SEC. 3171. STEM EDUCATION.

''(a) IN GENERAL.—The Secretary of Energy shall develop, conduct, support, promote, and coordinate formal and informal educational activities at all levels that leverage the Department's unique content expertise and facilities to contribute to improving STEM education at all levels in the United States, and to enhance awareness and understanding of STEM, including energy sciences, among the general public, with consideration given to the goal of promoting the participation of individuals from underrepresented groups in the STEM fields.

''(b) PROGRAMS.—The Secretary shall carry out evidence-based programs designed to increase student interest and participation, improve public literacy and support, and improve the teaching and learning of energy systems science and engineering and other STEM disciplines sup-

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

''(1) informal educational programming designed to excite and inspire students and the general public about energy systems science and engineering and other STEM disciplines supported by the Department, while strengthening their content knowledge in these fields;

''(2) teacher training and professional development opportunities for pre-service and in-service elementary and secondary teachers designed to increase the content knowledge of teachers in energy systems science and engineering and other STEM disciplines supported by the Department, including through hands-on research experiences;

''(3) research opportunities for secondary school students, including internships at the National Laboratories, that provide secondary school students with hands-on research experiences as well as exposure to working scientists;

''(4) research opportunities at the National Laboratories for undergraduate and graduate students pursuing degrees in energy systems science and engineering and other STEM disciplines supported by the Department; and

''(5) competitive scholarships, fellowships, and traineeships for undergraduate and graduate students in energy systems science and engineering and other STEM disciplines supported by the Department.

''(c) ORGANIZATION OF STEM EDUCATION PROGRAMS.—

''(1) DIRECTOR OF STEM EDUCATION.—The Secretary shall appoint or designate a Director of STEM Education, who shall have the principal responsibility to oversee and coordinate all programs and activities of the Department in support of STEM education, including energy systems science and engineering education, across all functions of the Department.

''(2) QUALIFICATIONS.—The Director shall be an individual, who by reason of professional background and experience, is specially qualified to advise the Secretary on all matters pertaining to STEM education, including energy systems science and engineering education, at the Department.

''(3) DUTIES.—The Director shall—

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

ergy systems science and engineering education, across all functions of the Department;

"(B) represent the Department as the principal interagency liaison for all STEM education programs, unless otherwise represented by the Secretary, the Under Secretary for Science, or the Under Secretary for Energy;

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

"(D) establish, periodically update, and maintain a publicly accessible online inventory of STEM education programs and activities, including energy systems science and engineering education programs and activities;

"(E) develop, implement, and update the Department of Energy STEM education strategic plan, as required by subsection (d);

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

ergy systems science and engineering education; and

"(G) perform such other matters relating to STEM education as are required by the Secretary, the Under Secretary for Science, or the Under Secretary for Energy.

"(d) DEPARTMENT OF ENERGY STEM EDUCATION STRATEGIC PLAN.—The Director of STEM education appointed or designated under subsection (c)(1) shall develop, implement, and update once every 3 years a 3-year STEM education strategic plan for the Department, which shall—

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

"(2) describe the role of each program or activity of the Department in contributing to the goals and objectives identified under paragraph (1);

"(3) specify the metrics that will be used to assess progress toward achieving those goals and objectives; and

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

''(e) OUTREACH TO STUDENTS FROM UNDERREPRESENTED GROUPS.—In carrying out a program authorized under this section, the Secretary shall give consideration to the goal of promoting the participation of individuals identified in section 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a or 1885b).

''(f) CONSULTATION AND PARTNERSHIP WITH OTHER AGENCIES.—In carrying out the programs and activities authorized under this section, the Secretary shall—

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

''(2) consult and partner with the Director of the National Science Foundation in carrying out programs under this section designed to build capacity in STEM education at the undergraduate and graduate level, including by supporting excellent proposals in energy systems science and engineering that are submitted for funding to the Foundation's Advanced Technological Education Program.''; and

(4) in section 3191—

(A) in subsection (a)—

(i) by striking ''web-based''; and

(ii) by inserting ''and project-based learning opportunities'' after ''laboratory experiments'';

(B) in subsection (b)(1), by striking ''the science of energy'' and inserting ''energy systems science and engineering''; and

(C) by striking subsection (d).

(c) ENERGY APPLIED SCIENCE TALENT EXPANSION PROGRAM FOR INSTITUTIONS OF HIGHER EDUCATION.—Strike sections 5004 and 5005 of the America COMPETES Act (42 U.S.C. 16532 and 16533) and insert the following new section:

''SEC. 5004. ENERGY APPLIED SCIENCE TALENT EXPANSION PROGRAM FOR INSTITUTIONS OF HIGHER EDUCATION.

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

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

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

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

''(b) ESTABLISHMENT.—The Secretary shall award grants, on a competitive, merit-reviewed basis, to institutions of higher education to implement or expand the energy systems science and engineering educational and technical training capabilities of the institution, and to provide merit-based financial support for master's and doctoral level students pursuing courses of study and research in energy systems sciences and engineering.

''(c) USE OF FUNDS.—An institution of higher education that receives a grant under this section may use the grant to—

''(1) provide traineeships, including stipends and cost of education allowances, to master's and doctoral students;

''(2) develop or expand multidisciplinary or interdisciplinary courses or programs;

''(3) recruit and retain new faculty;

''(4) develop or improve core and specialized course content;

''(5) encourage interdisciplinary and multidisciplinary research collaborations;

''(6) support outreach efforts to recruit students; and

''(7) pursue opportunities for collaboration with industry and National Laboratories.

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

''(1) the potential to attract new students to the program;

''(2) academic rigor; and

''(3) the ability to offer hands-on education and training opportunities for graduate students in the emerging areas of energy systems science and engineering.

''(e) PRIORITY.—The Secretary shall give priority to proposals that involve active partnerships with a National Laboratory or other energy systems science and engineering related entity, as determined by the Secretary.

''(f) DURATION AND AMOUNT.—

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

''(2) AMOUNT.—An institution of higher education that receives a grant under this section shall be eligible for up to $1,000,000 for each year of the grant period.

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

''(1) $30,000,000 for fiscal year 2011;

''(2) $32,000,000 for fiscal year 2012;

''(3) $36,000,000 for fiscal year 2013;

''(4) $38,000,000 for fiscal year 2014; and

''(5) $40,000,000 for fiscal year 2015.''.

(d) DEPARTMENT OF ENERGY EARLY CAREER AWARDS FOR SCIENCE, ENGINEERING, AND MATHEMATICS RESEARCHERS.—Section 5006 of the America COMPETES Act (42 U.S.C. 16534) is amended—

(1) in subsection (a), by striking ''Director of the Office'' and all that follows through ''shall carry'' and inserting ''Secretary shall carry'';

(2) in subsection (b)(1)—

(A) in subparagraph (A), by inserting ''per year'' after ''$80,000''; and

(B) in subparagraph (B), by striking ''$125,000'' and inserting ''$500,000 per year'';

(3) in subsection (c)(1), by striking '', as determined by the Director'';

(4) in subsections (c)(2), (e), (f), and (g), by striking ''Director'' each place it appears and inserting ''Secretary'';

(5) in subsection (d), by striking ''merit-reviewed'' and inserting ''merit-based, peer reviewed''; and

(6) in subsection (h)—

(A) by striking '', acting through the Director,''; and

(B) by striking ''$25,000,000 for each fiscal years 2008 through 2010'' and inserting ''such sums as are necessary''.

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

(1) in subsections (a) and (b), by inserting ''master's or'' before ''doctoral'';

(2) in subsection (c)—

(A) in paragraph (1), by striking ''involving written and oral interviews, that will result in a wide distribution of awards throughout the United States,''; and

(B) in paragraph (2)(B)(iv), by striking ''verbal and'';

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

(4) by striking subsection (f).

(f) REPEAL.—Section 3164 of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381a) is repealed.

TITLE IV—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

SEC. 401. SHORT TITLE.

This title may be cited as the ''National Institute of Standards and Technology Authorization Act of 2010''.

SEC. 402. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2011.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,012,100,000 for the National Institute of Standards and Technology for fiscal year 2011.

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

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

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

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

(i) $116,000,000 shall be authorized for the Technology Innovation Program under section 28 of the National Institute of Standards and Technology Act (15 U.S.C. 278n);

(ii) $141,100,000 shall be authorized for the Manufacturing Extension Partnership program under sections 25 and 26 of such Act (15 U.S.C. 278k and 278l); and

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

(b) FISCAL YEAR 2012.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,035,400,000 for the National Institute of Standards and Technology for fiscal year 2012.

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

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

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

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

(i) $132,000,000 shall be authorized for the Technology Innovation Program under section 28 of the National Institute of Standards and Technology Act (15 U.S.C. 278n);

(ii) $150,900,000 shall be authorized for the Manufacturing Extension Partnership program under sections 25 and 26 of such Act (15 U.S.C. 278k and 278l); and

(iii) $10,300,000 shall be authorized for the Malcolm Baldrige National Quality Award program under section 17 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3711a).

(c) FISCAL YEAR 2013.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,137,809,000 for the National Institute of Standards and Technology for fiscal year 2013.

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

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

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

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

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

(ii) $161,500,000 shall be authorized for the Manufacturing Extension Partnership program under sections 25 and 26 of such Act (15 U.S.C. 278k and 278l); and

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

(d) FISCAL YEAR 2014.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,188,277,000 for the National Institute of Standards and Technology for fiscal year 2014.

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

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

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

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

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

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

(ii) $172,800,000 shall be authorized for the Manufacturing Extension Partnership program under sections 25 and 26 of such Act (15 U.S.C. 278k and 278l); and

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

(e) FISCAL YEAR 2015.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,255,955,000 for the National Institute of Standards and Technology for fiscal year 2015.

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

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

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

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

(i) $144,000,000 shall be authorized for the Technology Innovation Program under section 28 of the National Institute of Standards and Technology Act (15 U.S.C. 278n);

(ii) $184,900,000 shall be authorized for the Manufacturing Extension Partnership program under sections 25 and 26 of such Act (15 U.S.C. 278k and 278l); and

(iii) $11,255,000 shall be authorized for the Malcolm Baldrige National Quality Award program under section 17 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3711a).

SEC. 403. UNDER SECRETARY OF COMMERCE FOR STANDARDS AND TECHNOLOGY.

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

(1) in the heading, by striking ''**EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE**'' and inserting ''**STANDARDS AND**'';

(2) in the heading in subsection (a), by striking ''PROGRAM ESTABLISHMENT'' and inserting ''ESTABLISHMENT OF EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE TECHNOLOGY'';

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

(4) by inserting before subsection (b), as so redesignated, the following:

''(a) UNDER SECRETARY OF COMMERCE FOR STANDARDS AND TECHNOLOGY.—

''(1) ESTABLISHMENT.—There shall be in the Department of Commerce an Under Secretary of Commerce for Standards and Technology who shall serve as the Director of the National Institute of Standards and Technology and perform such duties as provided for in the National Institute of Standards and Technology Act (15 U.S.C. 271 et seq.) and as the Secretary shall prescribe.

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

''(3) APPLICABILITY.—The individual serving on the date of enactment of the National Institute of Standards and Technology Authorization Act of 2010 as the Director of the National Institute of Standards and Technology shall also serve as the Under Secretary of Commerce for Standards and Technology until such time as a successor is appointed under paragraph (2).''.

(b) CONFORMING AMENDMENTS.—

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

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

(2) TITLE 5, UNITED STATES CODE.—

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

''Under Secretary of Commerce for Standards and Technology, the incumbent of which also serves

as Director of the National Institute of Standards and Technology.''.

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

(3) NIST ACT.—Section 5 of the National Institute of Standards and Technology Act (15 U.S.C. 274) is amended by striking the following: ''The Director shall be compensated at the rate in effect for level IV of the Executive Schedule under section 5315 of title 5, United States Code.''.

SEC. 404. REORGANIZATION OF NIST LABORATORIES.

(a) ORGANIZATION.—The Director shall reorganize the scientific and technical research and services laboratory program into the following operational units:

(1) The Physical Measurement Laboratory, whose mission is to realize and disseminate the national standards for length, mass, time and frequency, electricity, temperature, force, and radiation by activities including fundamental research in measurement science, the provision of measurement services and standards, and the provision of testing facilities resources for use by the Federal Government.

(2) The Information Technology Laboratory, whose mission is to develop and disseminate standards, measurements, and testing capabilities for interoperability, security, usability, and reliability of information technologies, including cyber security standards and guidelines for Federal agencies, United States industry, and the public, through fundamental and applied research in computer science, mathematics, and statistics.

(3) The Engineering Laboratory, whose mission is to develop and disseminate advanced manufacturing and construction technologies to the United States manufacturing and construction industries through activities including measurement science research, performance metrics, tools for engineering applications, promotion of green infrastructure, and energy efficiency measurements and standards.

(4) The Material Measurement Laboratory, whose mission is to serve as the national reference laboratory in biological, chemical, and material sciences and engineering through activities including fundamental research in the composition, structure, and properties of biological and environmental materials and processes, the development of certified reference materials and critically evaluated data, and

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

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

(6) The NIST Center for Neutron Research, a national shared-use facility, whose mission is to provide neutron-based measurement capabilities to researchers from industry, institutions of higher education, the National Institute of Standards and Technology, and other Federal agencies in support of materials research, nondestructive evaluation, neutron imaging, chemical analysis, neutron standards, dosimetry, and radiation metrology.

(b) REVISION.—

(1) IN GENERAL.—Subsequent to the reorganization required under subsection (a), the Director may revise the organization of the scientific and technical research and services laboratory program.

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

SEC. 405. FEDERAL GOVERNMENT STANDARDS AND CONFORMITY ASSESSMENT COORDINATION.

(a) COORDINATION.—Section 2(b) of the National Institute of Standards and Technology Act (15 U.S.C. 272(b)) is amended—

(1) in paragraph (12), by striking ''and'' after the semicolon;

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

(3) by adding after paragraph (13) the following:

''(14) to promote collaboration among Federal departments and agencies and private sector stakeholders in the development and implementation of standards and conformity assessment frameworks to address specific Federal Government policy goals; and

''(15) to convene Federal departments and agencies, as appropriate, to—

''(A) coordinate and determine Federal Government positions on specific policy issues related to international technical standards and conformity assessment-related activities; and

''(B) coordinate Federal department and agency engagement in the development of international technical standards and conformity assessment-related activities.''.

(b) REPORT.—The Director, in consultation with appropriate Federal agencies, shall submit a report annually to Congress addressing the Federal Government's technical standards and conformity assessment-related activities. The report shall identify—

(1) current and anticipated international standards and conformity assessment-related issues that have the potential to impact the competitiveness and innovation capabilities of the United States;

(2) any action being taken by the Federal Government to address these issues and the Federal agency taking that action; and

(3) any action that the Director is taking or will take to ensure effective Federal Government engagement on technical standards and conformity as-

sessment-related issues, as appropriate, where the Federal Government is not effectively engaged.

SEC. 406. MANUFACTURING EXTENSION PARTNERSHIP.

(a) COMMUNITY COLLEGE SUPPORT.—Section 25(a) of the National Institute of Standards and Technology Act (15 U.S.C. 278k(a)) is amended—

(1) in paragraph (4), by striking ''and'' after the semicolon;

(2) in paragraph (5), by striking the period at the end and inserting ''; and''; and

(3) by adding after paragraph (5) the following:

''(6) providing to community colleges information about the job skills needed in small- and medium-sized manufacturing businesses in the regions they serve.''.

(b) INNOVATIVE SERVICES INITIATIVE.—

(1) IN GENERAL.—Section 25 of such Act (15 U.S.C. 278k) is amended by adding at the end the following:

''(g) INNOVATIVE SERVICES INITIATIVE.—

''(1) ESTABLISHMENT.—The Director may establish, within the Centers program under this section, an innovative services initiative to assist small- and medium-sized manufacturers in—

''(A) reducing their energy usage and environmental waste to improve profitability; and

''(B) accelerating the domestic commercialization of new product technologies, including components for renewable energy systems.

''(2) MARKET DEMAND.—The Director may not undertake any activity to accelerate the domestic commercialization of a new product technology under this subsection unless an analysis of market demand for the new product technology has been conducted.''.

(2) GRANTS.—Section 33 of such Act (15 U.S.C. 278r) is amended by adding at the end the following:

''(g) INNOVATIVE SERVICES.—The Director may make awards under this section to carry out the innovative services initiative under section 25(g).''.

(c) REPORTS.—Section 25 of such Act (15 U.S.C. 278k) is further amended by adding at the end the following:

''(h) REPORTS.—

''(1) IN GENERAL.—In submitting the 3-year programmatic planning document and annual updates under section 23, the Director shall include an

assessment of the Director's governance of the program established under this section.

"(2) CRITERIA.—In conducting such assessment, the Director shall use the criteria established pursuant to the Malcolm Baldrige National Quality Award under section 17(d)(1)(C) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3711a(d)(1)(C))."

(d) HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP PROGRAM COST-SHARING.—Section 25(c) of such Act (15 U.S.C. 278k(c)) is amended by adding at the end the following:

"(7) Notwithstanding paragraphs (1), (3), and (5), for fiscal year 2011 through fiscal year 2015, the Secretary may not provide to a Center more than 50 percent of the costs incurred by such Center and may not require that a Center's cost share exceed 50 percent.

"(8) Not later than 4 years after the date of enactment of the National Institute of Standards and Technology Authorization Act of 2010, the Secretary shall submit to Congress a report on the cost share requirements under the program. The report shall—

''(A) discuss various cost share structures, including the cost share structure in place prior to such date of enactment and the cost share structure in place under paragraph (7), and the effect of such cost share structures on individual Centers and the overall program; and

''(B) include a recommendation for how best to structure the cost share requirement after fiscal year 2015 to provide for the long-term sustainability of the program.''.

(e) ADVISORY BOARD.—Section 25(e)(4) of such Act (15 U.S.C. 278k(e)(4)) is amended to read as follows:

''(4) FEDERAL ADVISORY COMMITTEE ACT APPLICABILITY.—

''(A) IN GENERAL.—In discharging its duties under this subsection, the MEP Advisory Board shall function solely in an advisory capacity, in accordance with the Federal Advisory Committee Act.

''(B) EXCEPTION.—Section 14 of the Federal Advisory Committee Act shall not apply to the MEP Advisory Board.''.

(f) DEFINITIONS.—Section 25 of such Act (15 U.S.C. 278k) is further amended by adding at the end the following:

''(i) DEFINITION.—In this section, the term 'community college' means an institution of higher education (as defined under section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a))) at which the highest degree that is predominately awarded to students is an associate's degree.''.

SEC. 407. BIOSCIENCE RESEARCH PROGRAM.

(a) IN GENERAL.—The National Institute of Standards and Technology Act (15 U.S.C. 271 et seq.) is amended—

(1) by redesignating section 34 as section 35; and

(2) by inserting after section 33 the following:

''SEC. 34. BIOSCIENCE RESEARCH PROGRAM.

''(a) IN GENERAL.—The Director shall establish a bioscience research program to support research and development of standard reference materials, measurements, methods, and genomic and other data to advance—

''(1) biological drug research and development;

''(2) molecular diagnostics;

''(3) medical imaging technologies; and

''(4) personalized medicine.

''(b) UNIVERSITY RESEARCH CENTERS.—

''(1) ESTABLISHMENT.—The Director may establish research centers at institutions of higher edu-

cation (in this section referred to as 'university research centers') through a competitive application process to conduct research that furthers the objectives of the bioscience research program.

''(2) APPLICATION.—

''(A) IN GENERAL.—An institution of higher education seeking to establish a university research center under this subsection shall submit an application to the Director at such time, in such manner, and containing such information and assurances as the Director may require.

''(B) COMPONENTS.—The application shall include, at a minimum, a description of—

''(i) the relevant research and instructional capacity of the applicant;

''(ii) the research projects that will be undertaken by the applicant;

''(iii) the extent to which the applicant will partner with industry and the role industry will play in the research undertaken by the university research center;

''(iv) how the applicant will disseminate research results effectively; and

"(v) the metrics that will be used to evaluate the success of the projects under clause (ii) and the contribution of the university research center in furthering the objectives of the bioscience research program.

"(C) SPECIAL CONSIDERATION.—The Director shall give special consideration to an application from an institution of higher education that is—

"(i) an 1890 Institution, as defined in section 2 of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7061);

"(ii) a Predominantly Black Institution, as defined in section 318 of the Higher Education Act of 1965 (20 U.S.C. 1059e);

"(iii) a part B institution, as defined in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061);

"(iv) a Tribal College or University, as defined in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c);

"(v) a Native American-serving, non-tribal institution, as defined in section 319 of the Higher Education Act of 1965 (20 U.S.C. 1059f);

"(vi) an Asian American and Native American Pacific Islander-serving institution, as defined in section 320 of the Higher Education Act of 1965 (20 U.S.C. 1059g);

"(vii) an Alaska Native-serving institution, as defined in section 317 of the Higher Education Act of 1965 (20 U.S.C. 1059d);

"(viii) a Native Hawaiian-serving institution, as defined in section 317 of the Higher Education Act of 1965 (20 U.S.C. 1059d); or

"(ix) a Hispanic-serving institution, as defined in section 502 of the Higher Education Act of 1965 (20 U.S.C. 1101a).

"(3) ASSESSMENT.—Not later than 3 years after the date on which a university research center is established and every 3 years thereafter, the Director shall evaluate the university research center

for its contributions to the bioscience research program.

''(4) ANNUAL MEETING.—If the Director establishes more than 1 university research center, the Director shall convene an annual meeting of researchers from all of the university research centers and the Institute to foster collaboration and communication.

''(c) USER FACILITY.—The Director may establish a bioscience user facility to provide access to advanced or unique equipment, services, materials, and other resources to industry, institutions of higher education, nonprofit organizations, and government agencies to perform research and testing.

''(d) POSTDOCTORAL FELLOWS.—The Director shall, to the extent practicable, assign 1 or more fellows from the postdoctoral fellowship program established in section 19 to the bioscience research program.

''(e) PROGRAMMATIC PLANNING DOCUMENT.—The Director shall ensure that the updates to the programmatic planning document transmitted to Congress under section 23(d) include the bioscience research program.

''(f) DEFINITIONS.—In this section:

''(1) BIOSCIENCE RESEARCH PROGRAM.—The term 'bioscience research program' means the research and development program authorized under subsection (a).

''(2) INSTITUTION OF HIGHER EDUCATION.—The term 'institution of higher education' has the same meaning given the term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).''.

(b) VISITING COMMITTEE ON ADVANCED TECHNOLOGY AMENDMENTS.—Section 10 of the National Institute of Standards and Technology Act (15 U.S.C. 278) is amended—

(1) in subsection (a)—

(A) by striking ''15 members'' and inserting ''at least 15, but not more than 20, members''; and

(B) by striking ''at least 10'' and inserting ''at least 13''; and

(2) in subsection (h)(1), by striking ''Program established under section 28'' and inserting ''programs established under sections 28 and 34''.

SEC. 408. TIP ADVISORY BOARD.

Section 28(k)(4) of the National Institute of Standards and Technology Act (15 U.S.C. 278n(k)(4)) is amended to read as follows:

''(4) FEDERAL ADVISORY COMMITTEE ACT APPLICABILITY.—

''(A) IN GENERAL.—In discharging its duties under this subsection, the TIP Advisory Board shall function solely in an advisory capacity, in accordance with the Federal Advisory Committee Act.

''(B) EXCEPTION.—Section 14 of the Federal Advisory Committee Act shall not apply to the TIP Advisory Board.''.

SEC. 409. UNDERREPRESENTED MINORITIES.

(a) RESEARCH FELLOWSHIPS.—Section 18 of the National Institute of Standards and Technology Act (15 U.S.C. 278g–1) is amended by adding at the end the following:

''(c) UNDERREPRESENTED MINORITIES.—In evaluating applications for fellowships under this section, the Director shall give consideration to the goal of promoting the participation of underrepresented minorities in research areas supported by the Institute.''.

(b) POSTDOCTORAL FELLOWSHIP PROGRAM.—Section 19 of such Act (15 U.S.C. 278g–2) is amended by

adding at the end the following: ''In evaluating applications for fellowships under this section, the Director shall give consideration to the goal of promoting the participation of underrepresented minorities in research areas supported by the Institute.''.

(c) TEACHER DEVELOPMENT.—Section 19A(c) of such Act (15 U.S.C. 278g–2a(c)) is amended by adding at the end the following: ''The Director shall give priority to an application from a teacher from a high-need school, as defined in section 200 of the Higher Education Act of 1965 (20 U.S.C. 1021).''.

SEC. 410. CYBER SECURITY STANDARDS AND GUIDELINES.

Cyber security standards and guidelines developed by the National Institute of Standards and Technology for use by United States industry and the public shall be voluntary.

SEC. 411. DEFINITIONS.

In this title:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Institute of Standards and Technology.

(2) FEDERAL AGENCY.—The term ''Federal agency'' has the meaning given such term in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703).

TITLE V—INNOVATION

SEC. 501. OFFICE OF INNOVATION AND ENTREPRENEURSHIP.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is amended by adding at the end the following new section:

"SEC. 24. OFFICE OF INNOVATION AND ENTREPRENEURSHIP.

''(a) IN GENERAL.—The Secretary shall establish an Office of Innovation and Entrepreneurship to foster innovation and the commercialization of new technologies, products, processes, and services with the goal of promoting productivity and economic growth in the United States.

''(b) DUTIES.—The Office of Innovation and Entrepreneurship shall be responsible for—

''(1) developing and advocating policies to accelerate innovation and advance the commercialization of research and development, including federally funded research and development;

''(2) identifying existing barriers to innovation and commercialization, including access to capital and other resources, and ways to overcome those barriers;

''(3) providing access to relevant data, research, and technical assistance on innovation and commercialization;

''(4) strengthening collaboration on and coordination of policies relating to innovation and commercialization within the Department of Commerce and between the Department of Commerce and other Federal agencies, as appropriate; and

''(5) any other duties as determined by the Secretary.

''(c) ADVISORY COMMITTEE.—The Secretary shall establish an Advisory Council on Innovation and Entrepreneurship to provide advice to the Secretary on carrying out subsection (b).''.

SEC. 502. FEDERAL LOAN GUARANTEES FOR INNOVATIVE TECHNOLOGIES IN MANUFACTURING.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is further amended by adding after section 24, as added by section 501 of this title, the following new section:

''SEC. 25. FEDERAL LOAN GUARANTEES FOR INNOVATIVE TECHNOLOGIES IN MANUFACTURING.

''(a) ESTABLISHMENT.—The Secretary shall establish a program to provide loan guarantees for obligations

to small- or medium-sized manufacturers for the use or production of innovative technologies.

''(b) ELIGIBLE PROJECTS.—A loan guarantee may be made under such program only for a project that reequips, expands, or establishes a manufacturing facility in the United States to—

''(1) use an innovative technology or an innovative process in manufacturing; or

''(2) manufacture an innovative technology product or an integral component of such product.

''(c) ELIGIBLE BORROWER.—A loan guarantee may be made under such program only for a borrower who is a small- or medium-sized manufacturer, as determined by the Secretary under the criteria established pursuant to subsection (m).

''(d) LIMITATION ON AMOUNT.—A loan guarantee shall not exceed an amount equal to 80 percent of the project cost, as estimated at the time at which the loan guarantee is issued.

''(e) LIMITATIONS ON LOAN GUARANTEE.—No loan guarantee shall be made unless the Secretary determines that—

''(1) there is a reasonable prospect of repayment of the principal and interest on the obligation by the borrower;

''(2) the amount of the obligation (when combined with amounts available to the borrower from other sources) is sufficient to carry out the project;

''(3) the obligation is not subordinate to other financing;

''(4) the obligation bears interest at a rate that does not exceed a level that the Secretary determines appropriate, taking into account the prevailing rate of interest in the private sector for similar loans and risks; and

''(5) the term of an obligation requires full repayment over a period not to exceed the lesser of—

''(A) 30 years; or

''(B) 90 percent of the projected useful life, as determined by the Secretary, of the physical asset to be financed by the obligation.

''(f) DEFAULTS.—

''(1) PAYMENT BY SECRETARY.—

''(A) IN GENERAL.—If a borrower defaults (as defined in regulations promulgated by the Secretary and specified in the loan guarantee) on the obligation, the holder of the loan guarantee shall have the right to demand payment of the unpaid amount from the Secretary.

''(B) PAYMENT REQUIRED.—Within such period as may be specified in the loan guarantee or related agreements, the Secretary shall pay to the holder of the loan guarantee the unpaid interest on and unpaid principal of the obligation as to which the borrower has defaulted, unless the Secretary finds that there was no default by the borrower in the payment of interest or principal or that the default has been remedied.

''(C) FORBEARANCE.—Nothing in this subsection precludes any forbearance by the holder of the obligation for the benefit of the borrower which may be agreed upon by the parties to the obligation and approved by the Secretary.

''(2) SUBROGATION.—

''(A) IN GENERAL.—If the Secretary makes a payment under paragraph (1), the Secretary shall be subrogated to the rights, as specified in the loan guarantee, of the recipient of the payment or related agreements including, if appropriate, the authority (notwithstanding any other provision of law) to—

''(i) complete, maintain, operate, lease, or otherwise dispose of any property

acquired pursuant to such loan guarantee or related agreement; or

"(ii) permit the borrower, pursuant to an agreement with the Secretary, to continue to pursue the purposes of the project if the Secretary determines that such an agreement is in the public interest.

"(B) SUPERIORITY OF RIGHTS.—The rights of the Secretary, with respect to any property acquired pursuant to a loan guarantee or related agreements, shall be superior to the rights of any other person with respect to the property.

"(3) ACTION BY ATTORNEY GENERAL.—

"(A) NOTIFICATION.—If the borrower defaults on an obligation, the Secretary shall notify the Attorney General of the default.

"(B) RECOVERY.—On notification, the Attorney General shall take such action as is appropriate to recover the unpaid principal and interest.

"(g) PAYMENT OF PRINCIPAL AND INTEREST BY SECRETARY.—With respect to any obligation guaranteed under this section, the Secretary may enter into a contract to pay, and pay, holders of the obligation for and on behalf

of the borrower from funds appropriated for that purpose the principal and interest payments that become due and payable on the unpaid balance of the obligation if the Secretary finds that—

''(1)(A) the borrower is unable to make the payments and is not in default;

''(B) it is in the public interest to permit the borrower to continue to pursue the project; and

''(C) the probable net benefit to the Federal Government in paying the principal and interest will be greater than that which would result in the event of a default;

''(2) the amount of the payment that the Secretary is authorized to pay shall be no greater than the amount of principal and interest that the borrower is obligated to pay under the obligation being guaranteed; and

''(3) the borrower agrees to reimburse the Secretary for the payment (including interest) on terms and conditions that are satisfactory to the Secretary.

''(h) TERMS AND CONDITIONS.—A loan guarantee under this section shall include such detailed terms and conditions as the Secretary determines appropriate to—

''(1) protect the interests of the United States in the case of default; and

''(2) have available all the patents and technology necessary for any person selected, including the Secretary, to complete and operate the project.

''(i) CONSULTATION.—In establishing the terms and conditions of a loan guarantee under this section, the Secretary shall consult with the Secretary of the Treasury.

''(j) FEES.—

''(1) IN GENERAL.—The Secretary shall charge and collect fees for loan guarantees in amounts the Secretary determines are sufficient to cover applicable administrative expenses.

''(2) AVAILABILITY.—Fees collected under this subsection shall—

''(A) be deposited by the Secretary into the Treasury of the United States; and

''(B) remain available until expended, subject to such other conditions as are contained in annual appropriations Acts.

''(k) RECORDS.—

''(1) IN GENERAL.—With respect to a loan guarantee under this section, the borrower, the lender, and any other appropriate party shall keep such records and other pertinent documents as the Secretary shall prescribe by regulation, including such

records as the Secretary may require to facilitate an effective audit.

''(2) ACCESS.—The Secretary and the Comptroller General of the United States, or their duly authorized representatives, shall have access to records and other pertinent documents for the purpose of conducting an audit.

''(l) FULL FAITH AND CREDIT.—The full faith and credit of the United States is pledged to the payment of all loan guarantees issued under this section with respect to principal and interest.

''(m) REGULATIONS.—The Secretary shall issue final regulations before making any loan guarantees under the program. Such regulations shall include—

''(1) criteria that the Secretary shall use to determine eligibility for loan guarantees under this section, including whether a borrower is a small- or medium-sized manufacturer;

''(2) a determination of what expenses shall and shall not be included in project costs;

''(3) policies and procedures for selecting and monitoring lenders and loan performance; and

''(4) any other policies, procedures, or information necessary to implement this section.

''(n) AUDIT.—

''(1) ANNUAL INDEPENDENT AUDITS.—The Secretary shall enter into an arrangement with an independent auditor for annual evaluations of the program under this section.

''(2) ANNUAL REVIEW.—The Comptroller General shall conduct an annual review of the Secretary's execution of the program under this section.

''(3) REPORT.—The results of the independent audit under paragraph (1) and the Comptroller General's review under paragraph (2) shall be provided directly to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

''(o) REPORT TO CONGRESS.—Concurrent with the submission to Congress of the President's annual budget request in each year after the date of enactment of this section, the Secretary shall transmit to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report containing a summary of all activities carried out under this section.

''(p) COORDINATION AND NONDUPLICATION.—To the maximum extent practicable, the Secretary shall ensure that the activities carried out under this section are

coordinated with, and do not duplicate the efforts of, other loan guarantee programs within the Federal Government.

''(q) MEP CENTERS.—The Secretary may use centers established under section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) to provide information about the program established under this section and to conduct outreach to potential borrowers, as appropriate.

''(r) DEFINITIONS.—In this section:

''(1) COST.—The term 'cost' has the meaning given such term under section 502 of the Federal Credit Reform Act of 1990 (2 U.S.C. 661a).

''(2) INNOVATIVE PROCESS.—The term 'innovative process' means a process that is significantly improved as compared to the process in general use in the commercial marketplace in the United States at the time the loan guarantee is issued.

''(3) INNOVATIVE TECHNOLOGY.—The term 'innovative technology' means a technology that is significantly improved as compared to the technology in general use in the commercial marketplace in the United States at the time the loan guarantee is issued.

''(4) LOAN GUARANTEE.—The term 'loan guarantee' has the meaning given such term in section

502 of the Federal Credit Reform Act of 1990 (2 U.S.C. 661a). The term includes a loan guarantee commitment (as defined in section 502 of such Act (2 U.S.C. 661a)).

''(5) OBLIGATION.—The term 'obligation' means the loan or other debt obligation that is guaranteed under this section.

''(6) PROGRAM.—The term 'program' means the loan guarantee program established in subsection (a).

''(s) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated such sums as are necessary to provide the cost of loan guarantees under this section.''.

SEC. 503. REGIONAL INNOVATION PROGRAM.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is further amended by adding after section 25, as added by section 502 of this title, the following new section:

''SEC. 26. REGIONAL INNOVATION PROGRAM.

''(a) ESTABLISHMENT.—The Secretary shall establish a regional innovation program to encourage and support the development of regional innovation strategies, including regional innovation clusters.

''(b) REGIONAL INNOVATION CLUSTER GRANTS.—

''(1) IN GENERAL.—As part of the program established under subsection (a), the Secretary may award grants on a competitive basis to eligible recipients for activities relating to the formation and development of regional innovation clusters.

''(2) PERMISSIBLE ACTIVITIES.—Grants awarded under this subsection may be used for activities determined appropriate by the Secretary including—

''(A) feasibility studies;

''(B) planning activities;

''(C) technical assistance;

''(D) developing or strengthening communication and collaboration between and among participants of a regional innovation cluster;

''(E) attracting additional participants to a regional innovation cluster;

''(F) facilitating market development of products or services provided by a regional innovation cluster; and

''(G) developing relationships between a regional innovation cluster and entities or clusters in other regions.

''(3) ELIGIBLE RECIPIENT.—For purposes of this subsection, the term 'eligible recipient' means any of the following:

''(A) A State.

''(B) An Indian tribe.

''(C) A city or other political subdivision of a State.

''(D) An entity that—

''(i) is a nonprofit organization, an institution of higher education, a public-private partnership, or an economic development organization or similar entity; and

''(ii) has an application that is supported by a State or a political subdivision of a State.

''(E) A consortium of any of the entities listed in subparagraphs (A) through (D).

''(4) APPLICATION.—

''(A) IN GENERAL.—An applicant shall submit an application to the Secretary at such time, in such manner, and containing such information and assurances as the Secretary may require.

''(B) COMPONENTS.—The application shall include, at a minimum, a description of the regional innovation cluster supported by the proposed activity, including a description of—

"(i) whether the regional innovation cluster is supported by the private sector, State and local governments, and other relevant stakeholders;

"(ii) how the existing participants in the regional innovation cluster will encourage and solicit participation by all types of entities that might benefit from participation, including newly formed entities and those rival to existing participants;

"(iii) the extent to which the regional innovation cluster is likely to stimulate innovation and have a positive impact on regional economic growth and development;

"(iv) whether the participants in the regional innovation cluster have access to, or contribute to, a well-trained workforce;

"(v) whether the participants in the regional innovation cluster are capable of attracting additional funds from non-Federal sources; and

"(vi) the likelihood that the participants in the regional innovation cluster will be able to sustain activities once grant

funds under this subsection have been expended.

''(5) COST SHARE.—The Secretary may not provide more than 50 percent of the total cost of any activity funded under this subsection.

''(6) USE AND APPLICATION OF RESEARCH AND INFORMATION PROGRAM.—To the maximum extent practicable, the Secretary shall ensure that activities funded under this subsection use and apply any relevant research, best practices, and metrics developed under the program established in subsection (c).

''(c) REGIONAL INNOVATION RESEARCH AND INFORMATION PROGRAM.—

''(1) IN GENERAL.—As part of the program established under subsection (a), the Secretary shall establish a regional innovation research and information program to—

''(A) gather, analyze, and disseminate information on best practices for regional innovation strategies (including regional innovation clusters), including information relating to how innovation, productivity, and economic development can be maximized through such strategies;

''(B) provide technical assistance, including through the development of technical assistance

guides, for the development and implementation of regional innovation strategies (including regional innovation clusters);

''(C) support the development of relevant metrics and measurement standards to evaluate regional innovation strategies (including regional innovation clusters), including the extent to which such strategies stimulate innovation, productivity, and economic development; and

''(D) collect and make available data on regional innovation cluster activity in the United States, including data on—

''(i) the size, specialization, and competitiveness of regional innovation clusters;

''(ii) the regional domestic product contribution, total jobs and earnings by key occupations, establishment size, nature of specialization, patents, Federal research and development spending, and other relevant information for regional innovation clusters; and

''(iii) supply chain product and service flows within and between regional innovation clusters.

''(2) RESEARCH GRANTS.—The Secretary may award research grants on a competitive basic to support and further the goals of the program established under this subsection.

''(3) DISSEMINATION OF INFORMATION.—Data and analysis compiled by the Secretary under the program established in this subsection shall be made available to other Federal agencies, State and local governments, and nonprofit and for-profit entities.

''(4) CLUSTER GRANT PROGRAM.—The Secretary shall incorporate data and analysis relating to any regional innovation cluster supported by a grant under subsection (b) into the program established under this subsection.

''(d) INTERAGENCY COORDINATION.—

''(1) IN GENERAL.—To the maximum extent practicable, the Secretary shall ensure that the activities carried out under this section are coordinated with, and do not duplicate the efforts of, other programs at the Department of Commerce and other Federal agencies.

''(2) COLLABORATION.—The Secretary shall explore and pursue ways to collaborate with other Federal agencies, including through multiagency funding opportunities, on regional innovation strategies.

''(e) EVALUATION.—

''(1) IN GENERAL.—Not later than 4 years after the date of enactment of this section, the Secretary shall enter into a contract with an independent entity, such as the National Academy of Sciences, to conduct an evaluation of the program established under subsection (a).

''(2) REQUIREMENTS.—The evaluation shall include—

''(A) whether such program is achieving its goals;

''(B) any recommendations for how such program may be improved; and

''(C) a recommendation as to whether such program should be continued or terminated.

''(f) REGIONAL INNOVATION CLUSTER DEFINED.—The term 'regional innovation cluster' means a geographically bounded network of similar, synergistic, or complimentary entities that—

''(1) are engaged in or with a particular industry sector;

''(2) have active channels for business transactions and communication;

''(3) share specialized infrastructure, labor markets, and services; and

''(4) leverage the region's unique competitive strengths to stimulate innovation and create jobs.

''(g) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated such sums as are necessary for each of fiscal years 2011 through 2015 to carry out this section, including such sums as are necessary to carry out the evaluation required under subsection (e).''.

TITLE VI—DEPARTMENT OF ENERGY

Subtitle A—Office of Science

SEC. 601. SHORT TITLE.

This subtitle may be cited as the ''Department of Energy Office of Science Authorization Act of 2010''.

SEC. 602. DEFINITIONS.

Except as otherwise provided, in this subtitle:

(1) DEPARTMENT.—The term ''Department'' means the Department of Energy.

(2) DIRECTOR.—The term ''Director'' means the Director of the Office of Science.

(3) OFFICE OF SCIENCE.—The term ''Office of Science'' means the Department of Energy Office of Science.

(4) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

SEC. 603. MISSION OF THE OFFICE OF SCIENCE.

(a) MISSION.—The mission of the Office of Science shall be the delivery of scientific discoveries and major scientific tools to transform the understanding of nature and to advance the energy, economic, and national security of the United States.

(b) DUTIES.—In support of this mission, the Secretary shall carry out, through the Office of Science, programs on basic energy sciences, biological and environmental research, advanced scientific computing research, fusion energy sciences, high energy physics, and nuclear physics through activities focused on—

(1) Science for Discovery to unravel nature's mysteries through the study of subatomic particles, atoms, and molecules that make up the materials of our everyday world to DNA, proteins, cells, and entire biological systems;

(2) Science for National Need by—

(A) advancing a clean energy agenda through basic research on energy production, storage, transmission, and use; and

(B) advancing our understanding of the Earth's climate through basic research in atmospheric and environmental sciences and climate change; and

(3) National Scientific User Facilities to deliver the 21st century tools of science, engineering, and technology and provide the Nation's researchers with the most advanced tools of modern science including accelerators, colliders, supercomputers, light sources and neutron sources, and facilities for studying the nanoworld.

(c) SUPPORTING ACTIVITIES.—The activities described in subsection (b) shall include providing for relevant facilities and infrastructure, analysis, coordination, and education and outreach activities.

(d) USER FACILITIES.—The Director shall carry out the construction, operation, and maintenance of user facilities to support the activities described in subsection (b). As practicable, these facilities shall serve the needs of the Department, industry, the academic community, and other relevant entities for the purposes of advancing the missions of the Department.

(e) OTHER AUTHORIZED ACTIVITIES.—In addition to the activities authorized under this subtitle, the Office of Science shall carry out such other activities it is authorized or required to carry out by law.

(f) COORDINATION AND JOINT ACTIVITIES.—The Department's Under Secretary for Science shall ensure the coordination of activities under this subtitle with the

other activities of the Department, and shall support joint activities among the programs of the Department.

SEC. 604. BASIC ENERGY SCIENCES PROGRAM.

(a) PROGRAM.—As part of the activities authorized under section 603, the Director shall carry out a program in basic energy sciences, including materials sciences and engineering, chemical sciences, biosciences, and geosciences, for the purpose of providing the scientific foundations for new energy technologies.

(b) BASIC ENERGY SCIENCES USER FACILITIES.—

(1) IN GENERAL.—The Director shall carry out a program for the construction, operation, and maintenance of national user facilities to support the program under this section. As practicable, these facilities shall serve the needs of the Department, industry, the academic community, and other relevant entities to create and examine new materials and chemical processes for the purposes of advancing new energy technologies and improving the competitiveness of the United States. These facilities shall include—

(A) x-ray light sources;

(B) neutron sources;

(C) electron beam microcharacterization centers;

(D) nanoscale science research centers; and

(E) other facilities the Director considers appropriate, consistent with section 603(d).

(2) FACILITY CONSTRUCTION AND UPGRADES.—Consistent with the Office of Science's project management practices, the Director shall support construction of—

(A) the National Synchrotron Light Source II;

(B) a Second Target Station at the Spallation Neutron Source; and

(C) an upgrade of the Advanced Photon Source to improve brightness and performance.

(c) ENERGY FRONTIER RESEARCH CENTERS.—

(1) IN GENERAL.—The Director shall carry out a grant program to provide awards, on a competitive, merit-reviewed basis, to multi-institutional collaborations or other appropriate entities to conduct fundamental and use-inspired energy research to accelerate scientific breakthroughs related to needs identified in—

(A) the Grand Challenges report of the Department's Basic Energy Sciences Advisory Committee;

(B) the Basic Energy Sciences Basic Research Needs workshop reports;

(C) energy-related Grand Challenges for Engineering, as described by the National Academy of Engineering; or

(D) other relevant reports identified by the Director.

(2) COLLABORATIONS.—A collaboration receiving a grant under this subsection may include multiple types of institutions and private sector entities.

(3) SELECTION AND DURATION.—

(A) IN GENERAL.—A collaboration under this subsection shall be selected for a period of 5 years.

(B) REAPPLICATION.—After the end of the period described in subparagraph (A), a grantee may reapply for selection for a second period of 5 years on a competitive, merit-reviewed basis.

(4) NO FUNDING FOR CONSTRUCTION.—No funding provided pursuant to this subsection may be used for the construction of new buildings or facilities.

(d) ACCELERATOR RESEARCH AND DEVELOPMENT.—The Director shall carry out research and development on advanced accelerator technologies relevant to

the development of Basic Energy Sciences user facilities, in consultation with the Office of Science's High Energy Physics and Nuclear Physics programs.

SEC. 605. BIOLOGICAL AND ENVIRONMENTAL RESEARCH PROGRAM.

(a) IN GENERAL.—As part of the activities authorized under section 603, the Director shall carry out a program of research, development, demonstration, and commercial application in the areas of biological systems science and climate and environmental science to support the energy and environmental missions of the Department.

(b) BIOLOGICAL SYSTEMS SCIENCE SUBPROGRAM.—

(1) SUBPROGRAM.—As part of the activities authorized under subsection (a), the Director shall carry out a subprogram of research, development, and demonstration on fundamental, structural, computational, and systems biology to increase systems-level understanding of complex biological systems, which shall include activities to—

(A) accelerate breakthroughs and new knowledge that will enable cost-effective sustainable production of biomass-based liquid transportation fuels, bioenergy, and biobased products that minimize greenhouse gas emissions;

(B) improve understanding of the global carbon cycle, including processes for removing carbon dioxide from the atmosphere, through photosynthesis and other biological processes, for sequestration and storage; and

(C) understand the biological mechanisms used to destroy, immobilize, or remove contaminants from subsurface environments, including at facilities of the Department.

(2) RESEARCH PLAN.—Not later than 1 year after the date of enactment of this Act, and at least once every 3 years thereafter, the Director shall prepare and transmit to Congress a research plan describing how the subprogram authorized under this subsection will be undertaken.

(3) BIOENERGY RESEARCH CENTERS.—

(A) IN GENERAL.—In carrying out the subprogram under paragraph (1), the Director shall support at least 3 bioenergy research centers to accelerate basic biological research, development, demonstration, and commercial application of biomass-based liquid transportation fuels, bioenergy, and biobased products that reduce greenhouse gas emissions and are pro-

duced from a variety of regionally diverse feedstocks.

(B) GEOGRAPHIC DISTRIBUTION.—The Director shall ensure that the bioenergy research centers under this paragraph are established in geographically diverse locations.

(C) SELECTION AND DURATION.—A center established under subparagraph (A) shall be selected on a competitive, merit-reviewed basis for a period of 5 years beginning on the date of establishment of that center. A center already in existence on the date of enactment of this Act may continue to receive support for a period of 5 years beginning on the date of establishment of that center.

(4) ENABLING SYNTHETIC BIOLOGY PLAN.—

(A) IN GENERAL.—The Secretary, in consultation with other relevant Federal agencies, the academic community, research-based nonprofit entities, and the private sector, shall develop a comprehensive plan for federally supported research and development activities that will support the energy and environmental missions of the Department and accelerate the

growth of a competitive synthetic biology industry in the United States.

(B) PLAN.—The plan developed under subparagraph (A) shall assess the need to create a database for synthetic biology information, the need and process for developing standards for biological parts, components and systems, and the need for a federally funded facility that enables the discovery, design, development, production, and systematic use of parts, components, and systems created through synthetic biology. The plan shall describe the role of the Federal Government in meeting these needs.

(C) SUBMISSION TO CONGRESS.—The Secretary shall transmit the plan developed under subparagraph (A) to the Congress not later than 9 months after the date of enactment of this Act.

(5) COMPUTATIONAL BIOLOGY AND SYSTEMS BIOLOGY KNOWLEDGEBASE.—As part of the subprogram described in paragraph (1), the Director shall carry out research in computational biology, acquire or otherwise ensure the availability of hardware for biology-specific computation, and establish and maintain an open virtual database and information

management system to centrally integrate systems biology data, analytical software, and computational modeling tools that will allow data sharing and free information exchange in the scientific community.

(6) REPEAL.—Section 977 of the Energy Policy Act of 2005 (42 U.S.C. 16317) is repealed.

(c) CLIMATE AND ENVIRONMENTAL SCIENCES SUBPROGRAM.—

(1) IN GENERAL.—As part of the activities authorized under subsection (a), the Director shall carry out a subprogram of climate and environmental science research, which shall include activities to—

(A) understand, observe, and model the response of the Earth's atmosphere and biosphere, including oceans, to increased greenhouse gas emissions, and any associated changes in climate;

(B) sequester, destroy, immobilize, or remove contaminants and carbon from subsurface environments, including at facilities of the Department; and

(C) develop potential mitigation and adaptation options for increased greenhouse gas

emissions and any associated changes in climate.

(2) SUBSURFACE BIOGEOCHEMISTRY RESEARCH.—

(A) IN GENERAL.—As part of the subprogram described in paragraph (1), the Director shall carry out research to advance a fundamental understanding of coupled physical, chemical, and biological processes for controlling the movement of sequestered carbon and subsurface environmental contaminants, including field observations of subsurface microorganisms and field-scale subsurface research.

(B) COORDINATION.—

(i) DIRECTOR.—The Director shall carry out activities under this paragraph in accordance with priorities established by the Department's Under Secretary for Science to support and accelerate the decontamination of relevant facilities managed by the Department.

(ii) UNDER SECRETARY FOR SCIENCE.—The Department's Under Secretary for Science shall ensure the coordination of the activities of the Department,

including activities under this paragraph, to support and accelerate the decontamination of relevant facilities managed by the Department.

(3) NEXT-GENERATION ECOSYSTEM-CLIMATE EXPERIMENT.—

(A) IN GENERAL.—The Director, in collaboration with other relevant agencies that are participants in the United States Global Change Research Program, shall carry out the selection and development of a next-generation ecosystem-climate change experiment to understand the impact and feedbacks of increased temperature and elevated carbon levels on ecosystems.

(B) REPORT.—Not later than 1 year after the date of enactment of this Act, the Director shall transmit to the Congress a report containing—

(i) an identification of the location or locations that have been selected for the experiment described in subparagraph (A);

(ii) a description of the need for additional experiments; and

(iii) an associated research plan.

(4) AMERIFLUX NETWORK COORDINATION AND RESEARCH.—As part of the subprogram described in paragraph (1), the Director shall carry out research and coordinate the AmeriFlux Network to directly observe and understand the exchange of greenhouse gases, water, and energy within terrestrial ecosystems and the response of those systems to climate change and other dynamic terrestrial landscape changes. The Director, in collaboration with other relevant Federal agencies, shall—

(A) identify opportunities to incorporate innovative and emerging observation technologies and practices into the existing Network;

(B) conduct research to determine the need for increased greenhouse gas observation facilities across North America to meet future mitigation and adaptation needs of the United States; and

(C) examine how the technologies and practices described in subparagraph (A), and increased coordination among scientific communities through the Network, have the potential to help characterize baseline greenhouse gas

emission sources and sinks in the United States and internationally.

(5) REGIONAL AND GLOBAL CLIMATE MODELING.—As part of the subprogram described in paragraph (1), the Director, in collaboration with the Office of Advanced Scientific Computing Research described in section 606, shall carry out research to develop, evaluate, and use high-resolution regional and global climate and Earth models and predictions to determine, and support efforts to reduce, the impacts of changing climate.

(6) INTEGRATED ASSESSMENT RESEARCH.—The Director shall carry out research into options for mitigation of and adaptation to climate change through multiscale models of the entire climate system. Such modeling shall include human processes and greenhouse gas emissions, land use, and interaction among human and Earth systems.

(7) COORDINATION.—The Director shall coordinate activities under this subsection with other Office of Science activities and with the United States Global Change Research Program.

(d) USER FACILITIES AND ANCILLARY EQUIPMENT.—

(1) IN GENERAL.—The Director shall carry out a program for the construction, operation, and maintenance of user facilities to support the program under this section. As practicable, these facilities shall serve the needs of the Department, industry, the academic community, and other relevant entities.

(2) INCLUDED FUNCTIONS.—User facilities described in paragraph (1) shall include facilities which carry out—

(A) genome sequencing and analysis of plants, microbes, and microbial communities using high throughput tools, technologies, and comparative analysis;

(B) molecular level research in biological interactions, subsurface science, and the interfaces of natural and engineered materials; and

(C) measurement of cloud and aerosol properties used for examining atmospheric processes and evaluating climate model performance, including ground stations at various locations, mobile resources, and aerial vehicles.

SEC. 606. ADVANCED SCIENTIFIC COMPUTING RESEARCH PROGRAM.

(a) IN GENERAL.—As part of the activities authorized under section 603, the Director shall carry out a re-

search, development, demonstration, and commercial application program to advance computational and networking capabilities to analyze, model, simulate, and predict complex phenomena relevant to the development of new energy technologies and the competitiveness of the United States.

(b) COORDINATION.—

(1) DIRECTOR.—The Director shall carry out activities under this section in accordance with priorities established by the Department's Under Secretary for Science to determine and meet the computational and networking research and facility needs of the Office of Science and all other relevant energy technology programs within the Department.

(2) UNDER SECRETARY FOR SCIENCE.—The Department's Under Secretary for Science shall ensure the coordination of the activities of the Department, including activities under this section, to determine and meet the computational and networking research and facility needs of the Office of Science and all other relevant energy technology programs within the Department.

(c) RESEARCH TO SUPPORT ENERGY APPLICATIONS.—As part of the activities authorized under subsection (a), the program shall support research in high-

performance computing and networking relevant to energy applications, including both basic and applied energy research programs carried out by the Secretary.

(d) REPORTS.—

(1) ADVANCED COMPUTING FOR ENERGY APPLICATIONS.—Not later than one year after the date of enactment of this Act, the Secretary shall transmit to the Congress a plan to integrate and leverage the expertise and capabilities of the program described in subsection (a), as well as other relevant computational and networking research programs and resources supported by the Federal Government, to advance the missions of the Department's applied energy and energy efficiency programs.

(2) EXASCALE COMPUTING.—At least 18 months prior to the initiation of construction or installation of any exascale-class computing facility, the Secretary shall transmit a plan to the Congress detailing the proposed facility's cost projections and capabilities to significantly accelerate the development of new energy technologies.

(e) APPLIED MATHEMATICS AND SOFTWARE DEVELOPMENT FOR HIGH-END COMPUTING SYSTEMS.—The Director shall carry out activities to develop, test, and support mathematics, models, and algorithms for complex

systems, as well as programming environments, tools, languages, and operating systems for high-end computing systems (as defined in section 2 of the Department of Energy High-End Computing Revitalization Act of 2004 (15 U.S.C. 5541)).

(f) HIGH-END COMPUTING FACILITIES.—The Director shall—

(1) provide for sustained access by the public and private research community in the United States to high-end computing systems and to Leadership Systems (as defined in section 2 of the Department of Energy High-End Computing Revitalization Act of 2004 (15 U.S.C. 5541)), including provision of technical support for users of such systems; and

(2) conduct research and development on next-generation computing architectures and platforms to support the missions of the Department.

(g) OUTREACH.—The Director shall conduct outreach programs and may form partnerships to increase the use of and access to high-performance computing modeling and simulation capabilities by industry, including manufacturers.

SEC. 607. FUSION ENERGY RESEARCH PROGRAM.

(a) PROGRAM.—As part of the activities authorized under section 603, the Director shall carry out a fusion energy sciences research and development program to effectively address the scientific and engineering challenges to building a cost-competitive fusion power plant and a competitive fusion power industry in the United States. As part of this program, the Director shall carry out research activities to expand the fundamental understanding of plasmas and matter at very high temperatures and densities.

(b) ITER.—The Director shall coordinate and carry out the responsibilities of the United States with respect to the ITER international fusion project pursuant to the Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project.

(c) IDENTIFICATION OF PRIORITIES.—Not later than 1 year after the date of enactment of this Act, the Secretary shall transmit to the Congress a report on the Department's proposed research and development activities in magnetic fusion over the 10 years following the date of enactment of this Act under four realistic budget scenarios. The report shall—

(1) identify specific areas of fusion energy development in which the United States can and

should establish or solidify a lead in the global fusion energy development effort; and

(2) identify priorities for initiation of facility construction and facility decommissioning under each of those scenarios.

(d) FUSION MATERIALS RESEARCH AND DEVELOPMENT.—The Director, in coordination with the Assistant Secretary for Nuclear Energy of the Department, shall carry out research and development activities to identify, characterize, and create materials that can endure the neutron, plasma, and heat fluxes expected in a commercial fusion power plant. As part of the activities authorized under subsection (c), the Secretary shall—

(1) provide an assessment of the need for a facility or facilities that can examine and test potential fusion and next generation fission materials; and

(2) provide an assessment of whether a single new facility that substantially addresses magnetic fusion, inertial fusion, and next generation fission materials research needs is feasible, in conjunction with the expected capabilities of facilities operational as of the date of enactment of this Act.

(e) FUSION SIMULATION PROJECT.—In collaboration with the Office of Science's Advanced Scientific Computing Research program described in section 606, the Di-

rector shall carry out a computational project to advance the capability of fusion researchers to accurately simulate an entire fusion energy system.

(f) INERTIAL FUSION ENERGY RESEARCH AND DEVELOPMENT PROGRAM.—The Secretary shall carry out a program of research and technology development in inertial fusion for energy applications, including ion beam and laser fusion. Not later than 180 days after the release of a report from the National Academies on inertial fusion energy research, the Secretary shall transmit to Congress a report describing the Department's plan to incorporate any relevant recommendations from the National Academies' report into this program.

SEC. 608. HIGH ENERGY PHYSICS PROGRAM.

(a) PROGRAM.—As part of the activities authorized under section 603, the Director shall carry out a research program on the elementary constituents of matter and energy and the nature of space and time.

(b) NEUTRINO RESEARCH.—As part of the program described in subsection (a), the Director shall carry out research activities on rare decay processes and the nature of the neutrino, which may—

(1) include collaborations with the National Science Foundation on relevant projects; and

(2) utilize components of existing accelerator facilities to produce neutrino beams of sufficient intensity to explore research priorities identified by the High Energy Physics Advisory Panel or the National Academy of Sciences.

(c) DARK ENERGY AND DARK MATTER RESEARCH.—As part of the program described in subsection (a), the Director shall carry out research activities on the nature of dark energy and dark matter. These activities shall be consistent with research priorities identified by the High Energy Physics Advisory Panel or the National Academy of Sciences, and may include—

(1) the development of space-based and land-based facilities and experiments; and

(2) collaborations with the National Aeronautics and Space Administration, the National Science Foundation, or international collaborations on relevant research projects.

(d) ACCELERATOR RESEARCH AND DEVELOPMENT.—The Director shall carry out research and development in advanced accelerator concepts and technologies to reduce the necessary scope and cost for the next generation of particle accelerators.

(e) INTERNATIONAL COLLABORATION.—The Director, as practicable and in coordination with other appro-

priate Federal agencies as necessary, shall maximize the access of United States researchers to the most advanced accelerator facilities and research capabilities in the world, including the Large Hadron Collider.

SEC. 609. NUCLEAR PHYSICS PROGRAM.

(a) PROGRAM.—As part of the activities authorized under section 603, the Director shall carry out a research program, and support relevant facilities, to discover and understand various forms of nuclear matter.

(b) FACILITY CONSTRUCTION AND UPGRADES.—Consistent with the Office of Science's project management practices, the Director shall carry out—

(1) an upgrade of the Continuous Electron Beam Accelerator Facility to a 12 gigaelectronvolt beam of electrons; and

(2) construction of the Facility for Rare Isotope Beams.

(c) ISOTOPE DEVELOPMENT AND PRODUCTION FOR RESEARCH APPLICATIONS.—The Director shall carry out a program for the production of isotopes, including the development of techniques to produce isotopes, that the Secretary determines are needed for research or other purposes. In making this determination, the Secretary shall consider any relevant recommendations made by Federal advisory committees, the National Academies, and inter-

agency working groups in which the Department participates.

SEC. 610. SCIENCE LABORATORIES INFRASTRUCTURE PROGRAM.

(a) PROGRAM.—The Director shall carry out a program to improve the safety, efficiency, and mission readiness of infrastructure at Office of Science laboratories. The program shall include projects to—

(1) renovate or replace space that does not meet research needs;

(2) replace facilities that are no longer cost effective to renovate or operate;

(3) modernize utility systems to prevent failures and ensure efficiency;

(4) remove excess facilities to allow safe and efficient operations; and

(5) construct modern facilities to conduct advanced research in controlled environmental conditions.

(b) MINOR CONSTRUCTION PROJECTS.—

(1) AUTHORITY.—Using operation and maintenance funds or facilities and infrastructure funds authorized by law, the Secretary may carry out minor construction projects with respect to laboratories administered by the Office of Science.

(2) ANNUAL REPORT.—The Secretary shall submit to Congress, as part of the annual budget submission of the Department, a report on each exercise of the authority under subsection (a) during the preceding fiscal year. Each report shall include a summary of maintenance and infrastructure needs and associated funding requirements at each of the laboratories, including the amount of both planned and deferred infrastructure spending at each laboratory. Each report shall provide a brief description of each minor construction project covered by the report.

(3) COST VARIATION REPORTS.—If, at any time during the construction of any minor construction project, the estimated cost of the project is revised and the revised cost of the project exceeds the minor construction threshold, the Secretary shall immediately submit to Congress a report explaining the reasons for the cost variation.

(4) DEFINITIONS.—In this section—

(A) the term ''minor construction project'' means any plant project not specifically authorized by law for which the approved total estimated cost does not exceed the minor construction threshold; and

(B) the term ''minor construction threshold'' means $10,000,000, with such amount to be adjusted by the Secretary in accordance with the Engineering News-Record Construction Cost Index, or an appropriate alternative index as determined by the Secretary, once every five years after the date of enactment of this Act.

(5) NONAPPLICABILITY.—Sections 4703 and 4704 of the Atomic Energy Defense Act (50 U.S.C. 2743 and 2744) shall not apply to laboratories administered by the Office of Science.

SEC. 611. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Secretary for the activities of the Office of Science—

(1) $6,221,000,000 for fiscal year 2011, of which—

(A) $2,020,000,000 shall be for Basic Energy Sciences activities under section 604;

(B) $700,000,000 shall be for Biological and Environmental Research activities under section 605; and

(C) $469,000,000 shall be for Advanced Scientific Computing Research activities under section 606;

(2) $6,656,000,000 for fiscal year 2012, of which—

(A) $2,220,000,000 shall be for Basic Energy Sciences activities under section 604;

(B) $791,000,000 shall be for Biological and Environmental Research activities under section 605; and

(C) $515,000,000 shall be for Advanced Scientific Computing Research activities under section 606;

(3) $7,122,000,000 for fiscal year 2013, of which—

(A) $2,440,000,000 shall be for Basic Energy Sciences activities under section 604;

(B) $894,000,000 shall be for Biological and Environmental Research activities under section 605; and

(C) $567,000,000 shall be for Advanced Scientific Computing Research activities under section 606;

(4) $7,621,000,000 for fiscal year 2014, of which—

(A) $2,690,000,000 shall be for Basic Energy Sciences activities under section 604;

(B) $957,000,000 shall be for Biological and Environmental Research activities under section 605; and

(C) $624,000,000 shall be for Advanced Scientific Computing Research activities under section 606; and

(5) $8,154,000,000 for fiscal year 2015, of which—

(A) $2,960,000,000 shall be for Basic Energy Sciences activities under section 604;

(B) $1,060,000,000 shall be for Biological and Environmental Research activities under section 605; and

(C) $686,000,000 shall be for Advanced Scientific Computing Research activities under section 606.

Subtitle B—Advanced Research Projects Agency—Energy

SEC. 621. SHORT TITLE.

This subtitle may be cited as the ''ARPA–E Reauthorization Act of 2010''.

SEC. 622. ARPA–E AMENDMENTS.

Section 5012 of the America COMPETES Act (42 U.S.C. 16538) is amended—

(1) in subsection (c)(2)—

(A) in subparagraph (A), by inserting ''and applied'' after ''advances in fundamental'';

(B) by striking ''and'' at the end of subparagraph (B);

(C) by striking the period at the end of subparagraph (C) and inserting ''; and''; and

(D) by adding at the end the following new subparagraph:

''(D) promoting the commercial application of advanced energy technologies.'';

(2) in subsection (e)(3), by amending subparagraph (C) to read as follows:

''(C) research and development of advanced manufacturing process and technologies for the domestic manufacturing of novel energy technologies; and'';

(3) by redesignating subsections (f) through (m) as subsections (g), (h), (i), (j), (l), (m), (n), and (o), respectively;

(4) by inserting after subsection (e) the following new subsection:

''(f) AWARDS.—In carrying out this section, the Director shall initiate and execute awards in the form of grants, contracts, cooperative agreements, cash prizes, and other transactions.'';

(5) in subsection (g), as so redesignated by paragraph (3) of this section—

(A) by redesignating paragraphs (1) and (2) as paragraphs (2) and (3), respectively;

(B) by inserting before paragraph (2), as so redesignated by subparagraph (A) of this paragraph, the following new paragraph:

''(1) IN GENERAL.—The Director shall establish and maintain within ARPA–E a staff, including legal counsel, contracting personnel, and program directors, with sufficient qualifications and expertise to enable ARPA–E to carry out its responsibilities under this section separate and distinct from the operations of the rest of the Department.'';

(C) in paragraph (2)(A), as so redesignated by subparagraph (A) of this paragraph, by striking ''each of'';

(D) in paragraph (2)(B), as so redesignated by subparagraph (A) of this paragraph—

(i) in clause (iv), by striking '', with advice under subsection (j) as appropriate,'';

(ii) by redesignating clauses (v) and (vi) as clauses (vi) and (viii), respectively;

(iii) by inserting after clause (iv) the following new clause:

''(v) identifying innovative cost-sharing arrangements for ARPA–E projects, including through use of the authority under section 988(b)(3) of the Energy Policy Act of 2005 (42 U.S.C. 16352(b)(3));'';

(iv) in clause (vi), as so redesignated by clause (ii) of this subparagraph, by striking ''; and'' and inserting a semicolon; and

(v) by inserting after clause (vi), as so redesignated by clause (ii) of this subparagraph, the following new clause:

''(vii) identifying mechanisms for commercial application of successful energy technology development projects, including through establishment of partnerships between awardees and commercial entities; and'';

(E) in paragraph (2)(C), as so redesignated by subparagraph (A) of this paragraph, by inserting ''up to'' after ''shall be'';

(F) in paragraph (3), as so redesignated by subparagraph (A) of this paragraph, by

striking subparagraph (B) and redesignating subparagraphs (C) and (D) as subparagraphs (B) and (C), respectively;

(G) by striking ''program managers'' each place it appears and inserting ''program directors'';

(H) by striking ''program manager'' each place it appears and inserting ''program director''; and

(I) by adding at the end the following new paragraph:

''(4) FELLOWSHIPS.—The Director is authorized to select exceptional early-career and senior scientific, legal, business, and technical personnel to serve as fellows to work at ARPA–E for terms not to exceed two years. Responsibilities of fellows may include—

''(A) supporting program managers in program creation, design, implementation, and management;

''(B) exploring technical fields for future ARPA–E program areas;

''(C) assisting the Director in the creation of the strategic vision for ARPA–E referred to in subsection (h)(2);

''(D) preparing energy technology and economic analyses; and

''(E) any other appropriate responsibilities identified by the Director.'';

(6) in subsection (h)(2), as so redesignated by paragraph (3) of this section—

(A) by striking ''2008'' and inserting ''2010''; and

(B) by striking ''2011'' and inserting ''2013'';

(7) by amending subsection (j), as so redesignated by paragraph (3) of this section, to read as follows:

''(j) FEDERAL DEMONSTRATION OF TECHNOLOGIES.—The Director shall seek opportunities to partner with purchasing and procurement programs of Federal agencies to demonstrate energy technologies resulting from activities funded through ARPA–E.'';

(8) by inserting after such subsection (j) the following new subsection:

''(k) EVENTS.—The Director is authorized to convene, organize, and sponsor events that further the objectives of ARPA–E, including events that assemble awardees, the most promising applicants for ARPA–E funding, and a broad range of ARPA–E stakeholders (which may

include members of relevant scientific research and academic communities, government officials, financial institutions, private investors, entrepreneurs, and other private entities), for the purposes of—

''(1) demonstrating projects of ARPA–E awardees;

''(2) demonstrating projects of finalists for ARPA–E awards and other energy technology projects;

''(3) facilitating discussion of the commercial application of energy technologies developed under ARPA–E and other government-sponsored research and development programs; or

''(4) such other purposes as the Director considers appropriate.'';

(9) in subsection (m)(1), as so redesignated by paragraph (3) of this section, by striking ''4 years'' and inserting ''6 years'';

(10) in subsection (m)(2)(B), as so redesignated by paragraph (3) of this section, by inserting '', and how those lessons may apply to the operation of other programs within the Department of Energy'' after ''ARPA–E'';

(11) by amending subsection (o)(2), as so redesignated by paragraph (3) of this section, to read as follows:

''(2) AUTHORIZATION OF APPROPRIATIONS.—Subject to paragraph (4), there are authorized to be appropriated to the Director for deposit in the Fund, without fiscal year limitation—

''(A) $300,000,000 for fiscal year 2011;

''(B) $500,000,000 for fiscal year 2012;

''(C) $700,000,000 for fiscal year 2013;

''(D) $900,000,000 for fiscal year 2014;

''(E) $1,000,000,000 for fiscal year 2015; and

''(F) such sums as are necessary for each of fiscal years 2016 through 2020.'';

(12) in subsection (o), as so redesignated by paragraph (3) of this section, by—

(A) striking paragraph (4); and

(B) redesignated paragraph (5) as paragraph (4); and

(13) in subsection (o)(4)(B), as so redesignated by paragraphs (3) and (12)(B) of this subsection—

(A) by striking ''2.5 percent'' and inserting ''5 percent''; and

(B) by inserting ", consistent with the goal described in subsection (c)(2)(D) and within the responsibilities of program directors as specified in subsection (g)(2)(B)(vii)" after "outreach activities".

Subtitle C—Energy Innovation Hubs

SEC. 631. SHORT TITLE.

This subtitle may be cited as the "Energy Innovation Hubs Authorization Act of 2010".

SEC. 632. ENERGY INNOVATION HUBS.

(a) ESTABLISHMENT OF PROGRAM.—

(1) IN GENERAL.—The Secretary of Energy shall carry out a program to enhance the Nation's economic, environmental, and energy security by making grants to consortia for establishing and operating Energy Innovation Hubs to conduct and support, whenever practicable at one centralized location, multidisciplinary, collaborative research, development, demonstration, and commercial application of advanced energy technologies in areas not being served by the private sector.

(2) TECHNOLOGY DEVELOPMENT FOCUS.—The Secretary shall designate for each Hub a unique advanced energy technology development focus.

(3) COORDINATION.—The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of Hubs with those of other Department of Energy research entities, including the National Laboratories, the Advanced Research Projects Agency—Energy, and Energy Frontier Research Centers, and within industry. Such coordination shall include convening and consulting with representatives of staff of the Department of Energy, representatives from Hubs and the qualifying entities that are members of the consortia operating the Hubs, and representatives of such other entities as the Secretary considers appropriate, to share research results, program plans, and opportunities for collaboration.

(4) ADMINISTRATION.—The Secretary shall administer this section with respect to each Hub through the Department program office appropriate to administer the subject matter of the technology development focus assigned under paragraph (2) for the Hub.

(b) CONSORTIA.—

(1) ELIGIBILITY.—To be eligible to receive a grant under this section for the establishment and operation of a Hub, a consortium shall—

(A) be composed of no fewer than 2 qualifying entities;

(B) operate subject to a binding agreement entered into by its members that documents—

(i) the proposed partnership agreement, including the governance and management structure of the Hub;

(ii) measures to enable cost-effective implementation of the program under this section;

(iii) a proposed budget, including financial contributions from non-Federal sources;

(iv) conflict of interest procedures consistent with subsection (d)(3), all known material conflicts of interest, and corresponding mitigation plans;

(v) an accounting structure that enables the Secretary to ensure that the consortium has complied with the requirements of this section; and

(vi) an external advisory committee consistent with subsection (d)(2); and

(C) operate as a nonprofit organization.

(2) APPLICATION.—A consortium seeking to establish and operate a Hub under this section, acting through a prime applicant, shall transmit to the Secretary an application at such time, in such form, and accompanied by such information as the Secretary shall require, including a detailed description of the elements of the consortium agreement required under paragraph (1)(B).

(c) SELECTION AND SCHEDULE.—The Secretary shall select consortia for grants for the establishment and operation of Hubs through competitive selection processes. Grants made to a Hub shall be for a period not to exceed 5 years, after which the grant may be renewed, subject to a competitive selection process.

(d) HUB OPERATIONS.—

(1) IN GENERAL.—Hubs shall conduct or provide for multidisciplinary, collaborative research, development, demonstration, and commercial application of advanced energy technologies within the technology development focus designated for the Hub by the Secretary under subsection (a)(2). Each Hub shall—

(A) encourage collaboration and communication among the member qualifying entities of the consortium and awardees by conducting

activities whenever practicable at one centralized location;

(B) develop and publish on the Department of Energy's Web site proposed plans and programs;

(C) submit an annual report to the Secretary summarizing the Hub's activities, including detailing organizational expenditures, listing external advisory committee members, and describing each project undertaken by the Hub; and

(D) monitor project implementation and coordination.

(2) EXTERNAL ADVISORY COMMITTEE.—Each Hub shall establish an external advisory committee, the membership of which shall have sufficient expertise to advise and provide guidance on scientific, technical, industry, financial, and research management matters.

(3) CONFLICTS OF INTEREST.—

(A) PROCEDURES.—Hubs shall establish conflict of interest procedures, consistent with those of the Department of Energy, to ensure that employees and consortia designees for Hub activities who are in decisionmaking capacities

disclose all material conflicts of interest, including financial, organizational, and personal conflicts of interest.

(B) DISQUALIFICATION AND REVOCATION.—The Secretary may disqualify an application or revoke funds distributed to a Hub if the Secretary discovers a failure to comply with conflict of interest procedures established under subparagraph (A).

(e) PROHIBITION ON CONSTRUCTION.—No funds provided pursuant to this section may be used for construction of new buildings or facilities for Hubs. Construction of new buildings or facilities shall not be considered as part of the non-Federal share of a Hub cost-sharing agreement.

(f) OVERSIGHT BOARD.—The Secretary shall establish and maintain within the Department an Oversight Board to oversee the progress of Hubs.

(g) DEFINITIONS.—For purposes of this section:

(1) ADVANCED ENERGY TECHNOLOGY.—The term ''advanced energy technology'' means an innovative technology—

(A) that produces energy from solar, wind, geothermal, biomass, tidal, wave, ocean, or other renewable energy resources;

(B) that produces nuclear energy;

(C) for carbon capture and sequestration; or

(D) that generates, transmits, distributes, utilizes, or stores energy more efficiently than conventional technologies.

(2) HUB.—The term ''Hub'' means an Energy Innovation Hub established in accordance with this section.

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

(4) QUALIFYING ENTITY.—The term ''qualifying entity'' means—

(A) an institution of higher education;

(B) an appropriate State or Federal entity;

(C) a nongovernmental organization with expertise in advanced energy technology research, development, demonstration, or commercial application; or

(D) any other relevant entity the Secretary considers appropriate.

(5) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

(h) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section—

(1) $110,000,000 for fiscal year 2011;

(2) $135,000,000 for fiscal year 2012;

(3) $195,000,000 for fiscal year 2013;

(4) $210,000,000 for fiscal year 2014; and

(5) $210,000,000 for fiscal year 2015.

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