

## AMERICA COMPETES REAUTHORIZATION ACT OF 2015

MAY 8, 2015.—Committed to the Committee of the Whole House on the State of the  
Union and ordered to be printed

Mr. SMITH of Texas, from the Committee on Science, Space, and  
Technology, submitted the following

### R E P O R T

together with

### MINORITY AND ADDITIONAL VIEWS

[To accompany H.R. 1806]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 1806) to provide for technological innovation through the prioritization of Federal investment in basic research, fundamental scientific discovery, and development to improve the competitiveness of the United States, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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The amendment is as follows:

Strike all after the enacting clause and insert the following:

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

(a) **SHORT TITLE.**—This Act may be cited as the “America COMPETES Reauthorization Act of 2015”.

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

Sec. 1. Short title; table of contents.  
Sec. 2. Definitions.

**TITLE I—NATIONAL SCIENCE FOUNDATION**

Sec. 101. Authorization of appropriations.  
Sec. 102. Findings.  
Sec. 103. Policy objectives.  
Sec. 104. Definitions.  
Sec. 105. Accountability and transparency.  
Sec. 106. Greater accountability in Federal funding for research.  
Sec. 107. Obligation of major research equipment and facilities construction funds.  
Sec. 108. Management and oversight of large facilities.  
Sec. 109. Whistleblower education.  
Sec. 110. Graduate student support.  
Sec. 111. Permissible support.  
Sec. 112. Expanding STEM opportunities.  
Sec. 113. Review of education programs.  
Sec. 114. Recompensation of awards.  
Sec. 115. Sense of the Congress regarding industry investment in STEM education.  
Sec. 116. Misrepresentation of research results.  
Sec. 117. Research reproducibility and replication.  
Sec. 118. Research grant conditions.  
Sec. 119. Computing resources study.  
Sec. 120. Scientific breakthrough prizes.  
Sec. 121. Rotating personnel.  
Sec. 122. Sense of Congress regarding Innovation Corps.  
Sec. 123. Brain Research through Advancing Innovative Neurotechnologies Initiative.  
Sec. 124. Noyce scholarship program amendments.  
Sec. 125. Informal STEM education.  
Sec. 126. Experimental Program to Stimulate Competitive Research.

**TITLE II—SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS**

Sec. 201. Findings; sense of Congress.  
Sec. 202. STEM Education Advisory Panel.  
Sec. 203. Committee on STEM Education.  
Sec. 204. STEM Education Coordinating Office.

**TITLE III—OFFICE OF SCIENCE AND TECHNOLOGY POLICY**

Sec. 301. Authorization of appropriations.  
Sec. 302. Regulatory efficiency.  
Sec. 303. Coordination of international science and technology partnerships.  
Sec. 304. Alternative research funding models.  
Sec. 305. Amendments to prize competitions.  
Sec. 306. United States Chief Technology Officer.  
Sec. 307. National Research Council study on technology for emergency notifications on university campuses.

**TITLE IV—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY**

Sec. 401. Authorization of appropriations.  
Sec. 402. Standards and conformity assessment.  
Sec. 403. Visiting Committee on Advanced Technology.  
Sec. 404. Police and security authority.  
Sec. 405. Education and outreach.  
Sec. 406. Programmatic planning report.  
Sec. 407. Assessments by the National Research Council.  
Sec. 408. Hollings Manufacturing Extension Partnership.  
Sec. 409. Elimination of obsolete reports.  
Sec. 410. Modifications to grants and cooperative agreements.  
Sec. 411. Information systems standards consultation.  
Sec. 412. United States-Israeli cooperation.

**TITLE V—DEPARTMENT OF ENERGY SCIENCE**

Sec. 501. Mission.  
Sec. 502. Basic energy sciences.  
Sec. 503. Advanced scientific computing research.  
Sec. 504. High energy physics.  
Sec. 505. Biological and environmental research.  
Sec. 506. Fusion energy.  
Sec. 507. Nuclear physics.  
Sec. 508. Science laboratories infrastructure program.  
Sec. 509. Domestic manufacturing.  
Sec. 510. Authorization of appropriations.  
Sec. 511. Definitions.

TITLE VI—DEPARTMENT OF ENERGY APPLIED RESEARCH AND DEVELOPMENT

Subtitle A—Crosscutting Research and Development

- Sec. 601. Crosscutting research and development.
- Sec. 602. Strategic research portfolio analysis and coordination plan.
- Sec. 603. Strategy for facilities and infrastructure.

Subtitle B—Electricity Delivery and Energy Reliability Research and Development

- Sec. 611. Distributed energy and electric energy systems.
- Sec. 612. Electric transmission and distribution research and development.

Subtitle C—Nuclear Energy Research and Development

- Sec. 621. Objectives.
- Sec. 622. Program objectives study.
- Sec. 623. Nuclear energy research and development programs.
- Sec. 624. Small modular reactor program.
- Sec. 625. Fuel cycle research and development.
- Sec. 626. Nuclear energy enabling technologies program.
- Sec. 627. Technical standards collaboration.
- Sec. 628. Available facilities database.
- Sec. 629. Nuclear waste disposal.

Subtitle D—Energy Efficiency and Renewable Energy Research and Development

- Sec. 641. Energy efficiency.
- Sec. 642. Next Generation Lighting Initiative.
- Sec. 643. Building standards.
- Sec. 644. Secondary electric vehicle battery use program.
- Sec. 645. Network for Manufacturing Innovation Program.
- Sec. 646. Advanced Energy Technology Transfer Centers.
- Sec. 647. Renewable energy.
- Sec. 648. Bioenergy program.
- Sec. 649. Concentrating solar power research program.
- Sec. 650. Renewable energy in public buildings.

Subtitle E—Fossil Energy Research and Development

- Sec. 661. Fossil energy.
- Sec. 662. Coal research, development, demonstration, and commercial application programs.
- Sec. 663. High efficiency gas turbines research and development.

Subtitle F—Advanced Research Projects Agency—Energy

- Sec. 671. ARPA-E amendments.

Subtitle G—Authorization of Appropriations

- Sec. 681. Authorization of appropriations.

Subtitle H—Definitions

- Sec. 691. Definitions.

TITLE VII—DEPARTMENT OF ENERGY TECHNOLOGY TRANSFER

Subtitle A—In General

- Sec. 701. Definitions.
- Sec. 702. Savings clause.

Subtitle B—Innovation Management at Department of Energy

- Sec. 711. Under Secretary for Science and Energy.
- Sec. 712. Technology transfer and transitions assessment.
- Sec. 713. Sense of Congress.
- Sec. 714. Nuclear energy innovation.

Subtitle C—Cross-Sector Partnerships and Grant Competitiveness

- Sec. 721. Agreements for Commercializing Technology pilot program.
- Sec. 722. Public-private partnerships for commercialization.
- Sec. 723. Inclusion of early-stage technology demonstration in authorized technology transfer activities.
- Sec. 724. Funding competitiveness for institutions of higher education and other nonprofit institutions.
- Sec. 725. Participation in the Innovation Corps program.

Subtitle D—Assessment of Impact

- Sec. 731. Report by Government Accountability Office.

TITLE VIII—SENSE OF CONGRESS

- Sec. 801. Sense of Congress.

**SEC. 2. DEFINITIONS.**

In this Act—

- (1) the term “STEM” means the subjects of science, technology, engineering, and mathematics;
- (2) the term “STEM education” means education in the subjects of STEM, including computer science; and
- (3) the term “Committee on STEM Education” means the Committee on Science, Technology, Engineering, and Mathematics Education established

under section 101 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621).

## TITLE I—NATIONAL SCIENCE FOUNDATION

### SEC. 101. AUTHORIZATION OF APPROPRIATIONS.

#### (a) FISCAL YEAR 2016.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation \$7,597,140,000 for fiscal year 2016.

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

(A) \$6,186,300,000 shall be made available to carry out research and related activities, including—

- (i) \$834,800,000 for the Biological Science Directorate;
- (ii) \$1,050,000,000 for the Computer and Information Science and Engineering Directorate;
- (iii) \$1,034,000,000 for the Engineering Directorate;
- (iv) \$1,200,000,000 for the Geosciences Directorate;
- (v) \$1,500,000,000 for the Mathematical and Physical Science Directorate;
- (vi) \$150,000,000 for the Social, Behavioral, and Economics Directorate, of which \$50,000,000 shall be for the National Center for Science and Engineering Statistics;
- (vii) \$38,520,000 for the Office of International Science and Engineering;
- (viii) \$377,500,000 for Integrative Activities; and
- (ix) \$1,480,000 for the United States Arctic Commission;

(B) \$866,000,000 shall be made available for education and human resources;

(C) \$200,310,000 shall be made available for major research equipment and facilities construction;

(D) \$325,000,000 shall be made available for agency operations and award management;

(E) \$4,370,000 shall be made available for the Office of the National Science Board; and

(F) \$15,160,000 shall be made available for the Office of Inspector General.

#### (b) FISCAL YEAR 2017.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation \$7,597,140,000 for fiscal year 2017.

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

(A) \$6,186,300,000 shall be made available to carry out research and related activities, including—

- (i) \$834,800,000 for the Biological Science Directorate;
- (ii) \$1,050,000,000 for the Computer and Information Science and Engineering Directorate;
- (iii) \$1,034,000,000 for the Engineering Directorate;
- (iv) \$1,200,000,000 for the Geosciences Directorate;
- (v) \$1,500,000,000 for the Mathematical and Physical Science Directorate;
- (vi) \$150,000,000 for the Social, Behavioral, and Economics Directorate, of which \$50,000,000 shall be for the National Center for Science and Engineering Statistics;
- (vii) \$38,520,000 for the Office of International Science and Engineering;
- (viii) \$377,500,000 for Integrative Activities; and
- (ix) \$1,480,000 for the United States Arctic Commission;

(B) \$866,000,000 shall be made available for education and human resources;

(C) \$200,310,000 shall be made available for major research equipment and facilities construction;

(D) \$325,000,000 shall be made available for agency operations and award management;

(E) \$4,370,000 shall be made available for the Office of the National Science Board; and

(F) \$15,160,000 shall be made available for the Office of Inspector General.

**SEC. 102. FINDINGS.**

Congress finds the following:

(1) Taxpayer-supported research investments administered by the Foundation should serve the national interest.

(2) The Foundation has made major contributions for more than 60 years to strengthen and sustain the Nation's academic research enterprise.

(3) The economic strength and national security of the United States, and the quality of life of all Americans, are grounded in the Nation's scientific and technological capabilities.

(4) Providing support for basic research is an investment in our Nation's future security and economic prosperity.

(5) Congress applauds the Foundation's recognition that wise stewardship of taxpayer dollars is necessary to maintain and ensure the public's trust for funding of fundamental scientific and engineering research.

(6) Other nations are increasing their public investments in basic research in the physical sciences in order to boost long-term economic growth.

(7) Longstanding United States leadership in supercomputing, genomics, nanoscience, photonics, quantum physics, and other key technological areas is jeopardized if United States investments in basic research in the natural sciences do not keep pace.

(8) Redundant regulations and reporting requirements imposed by Federal agencies on research institutions and researchers increase costs by tens of millions of dollars annually.

(9) The Foundation carries out important functions by supporting basic research in all science and engineering disciplines and in supporting STEM education at all levels.

(10) The research and education activities of the Foundation promote the discovery, integration, dissemination, and application of new knowledge in service to society and prepare future generations of scientists, mathematicians, and engineers who will be necessary to ensure America's leadership in the global marketplace.

(11) Many of the complex problems and challenges facing the Nation increasingly require the collaboration of multiple scientific disciplines. The Foundation should continue to emphasize cross-directorate research collaboration and activities to address these issues and encourage interdisciplinary research.

(12) The Foundation should meet the highest standards of efficiency, transparency, and accountability in its stewardship of public funds.

(13) The Foundation is charged with the responsibilities—

(A) to develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences;

(B) to initiate, support, and conduct basic scientific research and to appraise the impact of research on industrial development and the general welfare;

(C) to initiate, support, and conduct scientific research activities in connection with matters relating to the national defense, at the request of the Secretary of Defense;

(D) to award scholarships and graduate fellowships in the sciences;

(E) to foster the interchange of scientific information among scientists and across scientific disciplines;

(F) to evaluate scientific research programs undertaken by agencies of the Federal Government, and to correlate the Foundation's scientific research with that undertaken by individuals and by public and private research groups;

(G) to communicate effectively to American citizens the relevance of public investments in scientific discovery and technological innovation to the Nation's security, prosperity, and welfare; and

(H) to establish such special commissions as the Board considers necessary.

(14) The emerging global economic, scientific, and technical environment challenges long standing assumptions about domestic and international policy, requiring the Foundation to play a more proactive role in sustaining the competitive advantage of the United States through superior research capabilities.

**SEC. 103. POLICY OBJECTIVES.**

In allocating resources made available under this title, the Foundation shall have the following policy objectives:

(1) To renew and maintain the Nation's international leadership in science and technology by—

(A) increasing the national investment in basic scientific research and increasing interdisciplinary investment in strategic areas vital to the national interest;

(B) balancing the Nation's research portfolio among the life sciences, mathematics, the physical sciences, computer and information science, geosciences, engineering, and social, behavioral, and economic sciences, all of which are important for the continued development of enabling technologies necessary for sustained economic competitiveness;

(C) encouraging investments in potentially transformative scientific research to benefit our Nation and its citizens;

(D) expanding the pool of scientists and engineers in the United States, including among segments of the population that have been historically underrepresented in STEM fields; and

(E) modernizing the Nation's research infrastructure and establishing and maintaining cooperative international relationships with premier research institutions.

(2) To increase overall workforce skills by—

(A) improving the quality of STEM education and tools provided both inside and outside of the classroom, including in kindergarten through grade 12; and

(B) expanding STEM training opportunities at institutions of higher education.

(3) To strengthen innovation by expanding the focus of competitiveness and innovation at the regional and local level.

#### SEC. 104. DEFINITIONS.

In this title:

(1) BOARD.—The term “Board” means the National Science Board.

(2) DIRECTOR.—The term “Director” means the Director of the Foundation.

(3) 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).

(4) 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)).

(5) 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.

(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. 105. ACCOUNTABILITY AND TRANSPARENCY.

It is the sense of Congress that—

(1) sustained, predictable Federal funding is essential to United States leadership in science and technology;

(2) building understanding of and confidence in investments in basic research are essential to public support for sustained, predictable Federal funding; and

(3) the Foundation should commit itself fully to transparency and accountability and to clear, consistent public communication regarding the national interest for each Foundation-awarded grant and cooperative agreement.

#### SEC. 106. GREATER ACCOUNTABILITY IN FEDERAL FUNDING FOR RESEARCH.

(a) STANDARD FOR AWARD OF GRANTS.—The Foundation shall award Federal funding for basic research and education in the sciences through a new research grant or cooperative agreement only if an affirmative determination is made by the Foundation under subsection (b) and written justification relating thereto is published under subsection (c).

(b) DETERMINATION.—A determination referred to in subsection (a) is a justification by the responsible Foundation official as to how the research grant or cooperative agreement promotes the progress of science in the United States, consistent with the Foundation mission as established in the National Science Foundation Act of 1950 (42 U.S.C. 1861 et seq.), and further—

(1) is worthy of Federal funding; and

(2) is in the national interest, as indicated by having the potential to achieve—

(A) increased economic competitiveness in the United States;

(B) advancement of the health and welfare of the American public;

(C) development of an American STEM workforce that is globally competitive;

(D) increased public scientific literacy and public engagement with science and technology in the United States;

(E) increased partnerships between academia and industry in the United States;

(F) support for the national defense of the United States; or

(G) promotion of the progress of science in the United States.

(c) **WRITTEN JUSTIFICATION.**—Public announcement of each award of Federal funding described in subsection (a) shall include a written justification from the responsible Foundation official as to how a grant or cooperative agreement meets the requirements of subsection (b).

(d) **IMPLEMENTATION.**—A determination under subsection (b) shall be made after a research grant or cooperative agreement proposal has satisfied the Foundation's reviews for Merit and Broader Impacts. Nothing in this section shall be construed as altering the Foundation's intellectual merit or broader impacts criteria for evaluating grant applications.

#### **SEC. 107. OBLIGATION OF MAJOR RESEARCH EQUIPMENT AND FACILITIES CONSTRUCTION FUNDS.**

No funds may be obligated for a fiscal year for a construction project for the Foundation that has not commenced before the date of enactment of this Act until 30 days after the report required with respect to each such fiscal year under section 14(a)(2) of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n-4(a)(2)) is transmitted to the Congress.

#### **SEC. 108. MANAGEMENT AND OVERSIGHT OF LARGE FACILITIES.**

(a) **LARGE FACILITIES OFFICE.**—The Director shall maintain a Large Facilities Office within the Office of the Director. The functions of the Large Facilities Office shall be to support the research directorates in the development, implementation, and assessment of major multi-user research facilities, including by—

(1) serving as the Foundation's primary resource for all policy or process issues related to the development and implementation of major multi-user research facilities;

(2) serving as a Foundation-wide resource on project management, including providing expert assistance on nonscientific and nontechnical aspects of project planning, budgeting, implementation, management, and oversight;

(3) coordinating and collaborating with research directorates to share best management practices and lessons learned from prior projects; and

(4) assessing projects during preconstruction and construction phases for cost and schedule risk.

(b) **OVERSIGHT OF LARGE FACILITIES.**—The Director shall appoint a senior agency official within the Office of the Director whose primary responsibility is oversight of major multi-user research facilities. The duties of this official shall include—

(1) oversight of the development, construction, and operation of major multi-user research facilities across the Foundation;

(2) in collaboration with the directors of the research directorates and other senior agency officials as appropriate, ensuring that the requirements of section 14(a) of the National Science Foundation Authorization Act of 2002 are satisfied;

(3) serving as a liaison to the National Science Board for approval and oversight of major multi-user research facilities; and

(4) periodically reviewing and updating as necessary Foundation policies and guidelines for the development and construction of major multi-user research facilities.

(c) **POLICIES FOR LARGE FACILITY COSTS.**—

(1) **IN GENERAL.**—The Director shall ensure that the Foundation's policies for developing and managing major multi-user research facility construction costs are consistent with the best practices described in the March 2009 Government Accountability Office Report GAO-09-3SP, or any successor report thereto.

(2) **REPORT.**—Not later than 12 months after the date of enactment of this Act, the Director shall submit to Congress the results of a study and a report reforming the Foundation's policies on financial management of major multi-user research facilities, including a description of any aspects of the policies that diverge from the best practices recommended in Government Accountability Office Report GAO-09-3SP and the Uniform Guidance in 2 C.F.R. Part 200.

(3) **MANAGEMENT FEES.**—

(A) **DEFINITION.**—In this paragraph, the term “management fee” means a portion of an award made by the Foundation for the purpose of covering

ordinary and necessary business expenses necessary to maintain operational stability which are not otherwise allowable under Cost Principles Uniform Guidance in 2 C.F.R. part 200, Subpart E, , or any successor regulation thereto.

(B) LIMITATION.—The Foundation may provide management fees under an award only if the awardee has demonstrated that it has limited or no other financial resources for covering the expenses for which the management fees are sought.

(C) FINANCIAL INFORMATION.—The Foundation shall require award applicants to provide income and financial information covering a period of no less than three prior years (or in the case of an entity established less than three years prior to the entity's application date, the period beginning on the date of establishment and ending on the application date), including cash on hand and net asset information, in support of a request for management fees. The Foundation shall also require awardees to report to the Foundation, within 30 days of receipt, any sources of non-Federal funds received in excess of \$50,000 during the award period.

(D) EXPENSE REPORTING.—The Foundation shall require awardees to track and report to the Foundation annually all expenses reimbursed or otherwise paid for with management fee funds, in accordance with Federal accounting practices as established in Government Accountability Office Report GAO-12-331G, or any successor report thereto.

(E) AUDITS.—The Inspector General of the Foundation may audit any Foundation award for compliance with this paragraph.

(F) PROHIBITED USES.—An awardee may not use management fees for—

- (i) costs allowable under Cost Principles Uniform Guidance in 2 C.F.R. part 200, Subpart E, or any successor regulation thereto;
- (ii) alcoholic beverages;
- (iii) tickets to concerts, or sporting and other entertainment events;
- (iv) vacation or other travel for nonbusiness purposes;
- (v) charitable contributions;
- (vi) social or sporting club memberships;
- (vii) meals for nonbusiness purposes;
- (viii) luxury or personal items;
- (ix) lobbying, as described in the Uniform Guidance at 2 C.F.R. 200.450; or
- (x) any other purpose the Foundation determines is inappropriate.

(G) REVIEW.—The Foundation shall review management fee usage under each Foundation award on at least an annual basis for compliance with this paragraph and the Foundation's Large Facilities Manual.

(4) REPORT.—Not later than 12 months after the date of enactment of this Act, the Director shall submit to Congress a report describing the Foundation's policies for developing and managing major multi-user research facility construction costs, including a description of any aspects of the policies that diverge from the best practices recommended in Government Accountability Office Report GAO-09-3SP, or any successor report thereto, and the Uniform Guidance in 2 C.F.R. part 200.

#### SEC. 109. WHISTLEBLOWER EDUCATION.

(a) IN GENERAL.—The Foundation shall be subject to section 4712 of title 41, United States Code.

(b) EDUCATION AND TRAINING.—The Foundation shall provide education and training for Foundation managers and staff on the requirements of such section 4712, and provide information on the law to all grantees, contractors, and employees of such grantees and contractors.

#### SEC. 110. GRADUATE STUDENT SUPPORT.

(a) SENSE OF CONGRESS.—It is the sense of Congress that the essential elements of the NSF Research Traineeship Program, formerly the Integrative Graduate Education and Research Traineeship program, (or any successor thereto) should be maintained, including—

- (1) collaborative research that transcends traditional disciplinary boundaries to solve large and complex research problems of significant scientific and societal importance; and
- (2) providing students the opportunity to become leaders in the science and engineering of the future.

(b) MODELS FOR SUPPORT.—The Director shall enter into an agreement with the National Research Council to convene a workshop or roundtable to examine models of Federal support for STEM graduate students, including the Foundation's Grad-



uate Research Fellowship program and comparable fellowship programs at other agencies, traineeship programs, and the research assistant model.

(c) **PURPOSE.**—The purpose of the workshop or roundtable shall be to compare and evaluate the extent to which each of these models helps to prepare graduate students for diverse careers utilizing STEM degrees, including at diverse types of institutions of higher education, in industry, and at government agencies and research laboratories, and to make recommendations regarding—

(1) how current Federal programs and models, including programs and models at the Foundation, can be improved;

(2) the appropriateness of the current distribution of funding among the different models at the Foundation and across the agencies; and

(3) the appropriateness of creating a new education and training program for graduate students distinct from programs that provide direct financial support, including the grants authorized in section 527 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p-15).

(d) **CRITERIA.**—At a minimum, in comparing programs and models, the workshop or roundtable participants shall consider the capacity of such programs or models to provide students with knowledge and skills—

(1) to become independent, creative, successful researchers;

(2) to participate in large interdisciplinary research projects, including in an international context;

(3) to adhere to the highest standards for research ethics;

(4) to become high-quality teachers utilizing the most currently available evidence-based pedagogy;

(5) in oral and written communication, to both technical and nontechnical audiences;

(6) in innovation, entrepreneurship, and business ethics; and

(7) in program management.

(e) **GRADUATE STUDENT INPUT.**—The participants in the workshop or roundtable shall include current or recent STEM graduate students.

(f) **REPORT.**—Not later than 1 year after the date of enactment of this Act, the National Research Council shall submit to Congress a summary report of the findings and recommendations of the workshop or roundtable convened under this section.

#### **SEC. 111. PERMISSIBLE SUPPORT.**

A grant made by the Education and Human Resources Directorate to support informal education may be used—

(1) to support the participation of underrepresented students in nonprofit competitions, out-of-school activities, and field experiences related to STEM subjects (such as robotics, science research, invention, mathematics, and technology competitions), including—

(A) the purchase of parts and supplies needed to participate in such competitions; and

(B) incentives and stipends for teachers and instructional leaders who are involved in assisting students and preparing students for such competitions, if such activities fall outside the regular duties and responsibilities of such teachers and instructional leaders; and

(2) to broaden underrepresented secondary school students' access to, and interest in, careers that require academic preparation in STEM subjects.

#### **SEC. 112. EXPANDING STEM OPPORTUNITIES.**

(a) **IN GENERAL.**—Within the Directorate for Education and Human Resources (or any successor thereto), under existing programs targeting broadening participation, the Director shall provide grants on a merit-reviewed, competitive basis for research on programming that engages underrepresented students in grades kindergarten through 8 in STEM.

(b) **USE OF FUNDS.**—

(1) **IN GENERAL.**—Grants awarded under this section shall be used for research to advance the engagement of underrepresented students in grades kindergarten through 8 in STEM through the development and implementation of innovative before-school, after-school, out-of-school, or summer activities, including programs (if applicable to the target population) provided in a single-gender environment, that are designed to encourage interest, engagement, and skills development of underrepresented students in STEM. Such research shall be conducted in learning environments that actively provide programming to underrepresented students in grades kindergarten through 8 in STEM.

(2) **PERMITTED ACTIVITIES.**—Such activities may include—

(A) the development and implementation of programming described in subsection (a) for the purpose of research;

(B) the use of a variety of engagement methods, including cooperative and hands-on learning;

(C) exposure of underrepresented youth to role models in the fields of STEM, including researchers in the National Laboratories, and nearpeer mentors;

(D) training of informal learning educators and youth-serving professionals using evidence-based methods consistent with the target student population being served;

(E) education of students on the relevance and significance of STEM careers, provision of academic advice and assistance, and activities designed to help students make real-world connections to STEM content activities;

(F) the attendance of underrepresented youth at events, competitions, and academic programs to provide content expertise and encourage career exposure in STEM;

(G) activities designed to engage parents of underrepresented youth;

(H) innovative strategies to engage underrepresented youth, such as using leadership skill outcome measures to encourage youth with the confidence to pursue STEM coursework and academic study;

(I) coordination with STEM-rich environments, including other nonprofit, nongovernmental organizations, classroom and out-of-classroom settings, institutions of higher education, vocational facilities, corporations, museums, National Laboratories, or science centers; and

(J) the acquisition of instructional materials or technology-based tools to conduct applicable grant activity.

(c) APPLICATION.—An applicant seeking funding under the section shall submit an application at such time, in such manner, and containing such information as may be required. The application shall include, at a minimum, the following:

(1) A description of the target audience to be served by the program.

(2) A description of the process for recruitment and selection of students, as appropriate.

(3) A description of how such research activity may inform programming that engages underrepresented students in grades kindergarten through 8 in STEM.

(4) A description of how such research activity may inform programming that promotes student academic achievement in STEM.

(5) An evaluation plan that includes, at a minimum, the use of outcome-oriented measures to determine the impact and efficacy of activities being researched.

(d) AWARDS.—In awarding grants under this section, the Director shall give priority to applicants which, for the purpose of grant activity, include or partner with a nonprofit, nongovernmental organization that has extensive experience and expertise in increasing the participation of underrepresented students in STEM.

(e) ACCOUNTABILITY AND DISSEMINATION.—

(1) EVALUATION REQUIRED.—Not later than 5 years after the date of enactment of this Act, the Director shall evaluate the grants provided under this section. In addition to evaluating the effectiveness of the grant activities, such evaluation shall—

(A) use a common set of benchmarks and assessment tools to identify best practices and materials developed or demonstrated by the research; and

(B) to the extent practicable, combine the research resulting from the grant activity with the current research on serving underrepresented students in grades kindergarten through 8.

(2) REPORT ON EVALUATIONS.—Not later than 180 days after the completion of the evaluation under paragraph (1), the Director shall submit to Congress and make widely available to the public a report that includes—

(A) the results of the evaluation; and

(B) any recommendations for administrative and legislative action that could optimize the effectiveness of the program.

(f) COORDINATION.—In carrying out this section, the Director shall consult, cooperate, and coordinate, to enhance program effectiveness and to avoid duplication, with the programs and policies of other relevant Federal agencies.

#### SEC. 113. REVIEW OF EDUCATION PROGRAMS.

(a) IN GENERAL.—The Director shall review the education programs of the Foundation that are in operation as of the date of enactment of this Act to determine—

(1) whether any of such programs duplicate target groups, services provided, fields of focus, or objectives; and

(2) how those programs are being evaluated and assessed for outcome-oriented effectiveness.

(b) **REPORT.**—Not later than 1 year after the date of enactment of this Act, and annually thereafter as part of the annual budget submission to Congress, the Director shall complete a report on the review carried out under this section and shall submit the report to the Committee on Science, Space, and Technology and the Committee on Appropriations of the House of Representatives, and to the Committee on Commerce, Science, and Transportation, the Committee on Health, Education, Labor, and Pensions, and the Committee on Appropriations of the Senate, and shall make the report widely available to the public.

**SEC. 114. RECOMPETITION OF AWARDS.**

(a) **FINDINGS.**—The Congress finds that—

(1) the merit-reviewed competition of grant and award proposals is a hallmark of the Foundation grant and award making process;

(2) the majority of Foundation-funded multi-user research facilities have transitioned to five-year cooperative agreements, and every five years the program officer responsible for the facility makes a recommendation to the National Science Board as to the renewal, recompetition, or termination of support for the facility; and

(3) requiring the recompetition of expiring awards is based on the conviction that competition is most likely to ensure the effective stewardship of Foundation funds for supporting research and education.

(b) **RECOMPETITION.**—The Director shall ensure that the system for recompetition of Maintenance and Operations of facilities, equipment and instrumentation is fair, consistent, and transparent and is applied in a manner that renews grants and awards in a timely manner. The Director shall periodically evaluate whether the criteria of the system are being applied in a manner that is transparent, reliable, and valid.

**SEC. 115. SENSE OF THE CONGRESS REGARDING INDUSTRY INVESTMENT IN STEM EDUCATION.**

It is the sense of Congress that—

(1) in order to bolster the STEM workforce pipeline, many industry sectors are becoming involved in K-12 initiatives and supporting undergraduate and graduate work in STEM subject areas and fields;

(2) partnerships with education providers, STEM focused competitions, and other opportunities have become important aspects of private sector efforts to strengthen the STEM workforce;

(3) understanding the work that private sector organizations are undertaking in STEM fields should inform the Federal Government's role in STEM education; and

(4) successful private sector STEM initiatives, as reflected by measurements of relevant outcomes, should be encouraged and supported by the Foundation.

**SEC. 116. MISREPRESENTATION OF RESEARCH RESULTS.**

(a) **PROHIBITION.**—The findings and conclusions of any article authored by a principal investigator receiving a research grant from the Foundation, using the results of the research conducted under the grant, that is published in a peer-reviewed publication, otherwise made publicly available, or incorporated in an application for a research grant or grant extension from the Foundation may not contain any falsification, fabrication, or plagiarism, as established in the Foundation's Research Misconduct regulation (45 C.F.R. 689).

(b) **PUBLICATION.**—The Director shall make publicly available any finding that research misconduct (as defined in 45 C.F.R. 689) has been committed, including the name of the principal investigator, within 30 days of the final administration action of the Foundation.

**SEC. 117. RESEARCH REPRODUCIBILITY AND REPLICATION.**

(a) **SENSE OF CONGRESS.**—It is the sense of Congress that—

(1) the gold standard of good science is the ability of a researcher or research lab to reproduce a published method and finding;

(2) there is growing concern that some published research findings cannot be reproduced or replicated, which can negatively affect the public's trust in science;

(3) there are a complex set of factors affecting reproducibility and replication; and

(4) the increasing interdisciplinary nature and complexity of scientific research may be a contributing factor to issues with research reproducibility and replication.

(b) **REPORT.**—The Director shall—

(1) not later than 45 days after the date of enactment of this Act, enter into an agreement with the National Research Council to provide, within 18 months

after the date of enactment of this Act, a report to assess research and data reproducibility and replicability issues in interdisciplinary research and to make recommendations on how to improve rigor and transparency in scientific research; and

(2) not later than 60 days after receiving the results of the assessment under paragraph (1), submit a report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on the findings of the assessment, together with the agreement or disagreement of the Director and Board with each of its findings and recommendations.

#### **SEC. 118. RESEARCH GRANT CONDITIONS.**

The Foundation shall establish procedures to ensure that—

(1) a research grant awarded by the Foundation to a principal investigator supports a scope of work not otherwise being directly funded by grants provided by other Federal agencies;

(2) a principal investigator includes in any application for a research grant awarded by the Foundation a list of all Federal research funding received by the principal investigator, as well as any funding that is being requested as of that time;

(3) unpublished research results used to support a grant proposal made to the Foundation do not include any knowing misrepresentations of data;

(4) principal investigators who receive Foundation research grant funding under more than one grant at the same time have sufficient resources to conduct the proposed research under each of those grants appropriately under the terms of the grant; and

(5) barriers to early career and new investigator applicants are addressed, including taking into account the broader accomplishments and potential of the individual investigator in addition to the potential impact of the project.

#### **SEC. 119. COMPUTING RESOURCES STUDY.**

Not later than 1 year after the date of enactment of this Act, the Comptroller General shall transmit to the Congress a report detailing the results of a study on the use of scientific computing resources funded by the Foundation at institutions of higher education. Such study shall assess—

(1) efficiencies that can be achieved by using shared scientific computing resources for projects that have similar scientific computing requirements or projects where specialized software solutions could be shared with other practitioners in the scientific community;

(2) efficiencies that can be achieved by using shared hardware that can be cost effectively procured from cloud computing services;

(3) efficiencies that can be achieved by using shared software from an open source repository or platform; and

(4) cost savings that could be achieved by potential sharing of scientific computing resources across all Foundation grants.

#### **SEC. 120. SCIENTIFIC BREAKTHROUGH PRIZES.**

The Director shall place a high priority on designing and administering pilot programs for scientific breakthrough prizes, in conjunction with private entities, that are consistent with Office of Science and Technology Policy guidelines. Breakthrough prizes shall center around technological breakthroughs that are of strategic importance to the Nation, and have the capacity to spur new economic growth.

#### **SEC. 121. ROTATING PERSONNEL.**

In order to control the costs to the Foundation of individuals employed pursuant to the Intergovernmental Personnel Act of 1970 (42 U.S.C. 4701 note)—

(1) the Foundation shall provide to Congress a written justification and waiver by the Deputy Director in instances in which such an individual is to be paid at a rate that exceeds the maximum rate of pay for the Senior Executive Service, including, if applicable, adjustment for the certified Senior Executive Service Performance Appraisal System;

(2) the Foundation shall provide to Congress a written justification and waiver by the Director in instances in which such an individual is to be paid at a rate that exceeds the annual salary rate of the Vice President of the United States; and

(3) the Foundation shall provide an annual report to Congress on the costs to the Foundation of employing such individuals, including—

(A) the timeliness and completeness of Foundation actions in response to recommendations and findings from the Office of Inspector General related to the employment of such individuals;

(B) actions taken by the Foundation to reduce the cost to the Foundation of the employment of such individuals at pay levels that exceed the threshold described in paragraph (1);

(C) the value to the Foundation of employing individuals pursuant to the Intergovernmental Personnel Act of 1970 (42 U.S.C. 4701 note) whose pay is set below the threshold described in paragraph (1); and

(D) the value to the Foundation of employing individuals who are not permanent employees whose pay requires a justification and waiver under paragraph (1) or (2).

**SEC. 122. SENSE OF CONGRESS REGARDING INNOVATION CORPS.**

It is the sense of Congress that—

(1) the Foundation's Innovation Corps (I-Corps) was established to foster a national innovation ecosystem by encouraging institutions, scientists, engineers, and entrepreneurs to identify and explore the innovation and commercial potential of Foundation-funded research well beyond the laboratory;

(2) the Foundation's I-Corps includes investment in entrepreneurship and commercialization education, training, and mentoring, ultimately leading to the practical deployment of technologies, products, processes, and services that improve the Nation's competitiveness, promote economic growth, and benefit society; and

(3) by building networks of entrepreneurs, educators, mentors, institutions, and collaborations, and supporting specialized education and training, I-Corps is at the leading edge of a strong, lasting foundation for an American innovation ecosystem.

**SEC. 123. BRAIN RESEARCH THROUGH ADVANCING INNOVATIVE NEUROTECHNOLOGIES INITIATIVE.**

The Foundation shall support research activities related to the Brain Research through Advancing Innovative Neurotechnologies Initiative. The Foundation is encouraged to work in conjunction with the Interagency Working Group on Neuroscience (IWGN) to determine how to use the data infrastructure of the Foundation and other applicable agencies to help neuroscientists collect, standardize, manage, and analyze the large amounts of data that will result from research attempting to understand how the brain functions.

**SEC. 124. NOYCE SCHOLARSHIP PROGRAM AMENDMENTS.**

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

(1) in subsection (a)(2)(B), by inserting “or bachelor’s” after “master’s”;

(2) in subsection (c)—

(A) by striking “and” at the end of paragraph (2)(B);

(B) in paragraph (3)—

(i) by inserting “for teachers with master’s degrees in their field” after “Teaching Fellowships”; and

(ii) by striking the period at the end of subparagraph (B) and inserting “; and”; and

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

“(4) in the case of National Science Foundation Master Teaching Fellowships for teachers with bachelor’s degrees in their field and working toward a master’s degree—

“(A) offering academic courses leading to a master’s degree and leadership training to prepare individuals to become master teachers in elementary and secondary schools; and

“(B) offering programs both during and after matriculation in the program for which the fellowship is received to enable fellows to become highly effective mathematics and science teachers, including mentoring, training, induction, and professional development activities, to fulfill the service requirements of this section, including the requirements of subsection (e), and to exchange ideas with others in their fields.”;

(3) in subsection (e), by striking “subsection (g)” and inserting “subsection (h)”;

(4) by redesignating subsections (g) through (i) as subsections (h) through (j), respectively; and

(5) by inserting after subsection (f) the following new subsection:

“(g) SUPPORT FOR MASTER TEACHING FELLOWS WHILE ENROLLED IN A MASTER’S DEGREE PROGRAM.—A National Science Foundation Master Teacher Fellow may receive a maximum of 1 year of fellowship support while enrolled in a master’s degree program as described in subsection (c)(4)(A), except that if such fellow is enrolled

in a part-time program, such amount shall be prorated according to the length of the program.”.

(b) DEFINITION.—Section 10(i)(5) of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n—1(i)(5)) is amended by inserting “computer science,” after “means a science,”.

**SEC. 125. INFORMAL STEM EDUCATION.**

(a) GRANTS.—The Director, through the Directorate for Education and Human Resources, shall continue to award competitive, merit-reviewed grants to support—

- (1) research and development of innovative out-of-school STEM learning and emerging STEM learning environments in order to improve STEM learning outcomes and engagement in STEM; and
- (2) research that advances the field of informal STEM education.

(b) USES OF FUNDS.—Activities supported by grants under this section may encompass a single STEM discipline, multiple STEM disciplines, or integrative STEM initiatives and shall include—

- (1) research and development that improves our understanding of learning and engagement in informal environments, including the role of informal environments in broadening participation in STEM; and
- (2) design and testing of innovative STEM learning models, programs, and other resources for informal learning environments to improve STEM learning outcomes and increase engagement for K-12 students, K-12 teachers, and the general public, including design and testing of the scalability of models, programs, and other resources.

**SEC. 126. EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH.**

The Foundation shall continue to operate a robust Experimental Program to Stimulate Competitive Research (EPSCoR). The EPSCoR program helps ensure that academic research institutions in more than half the States develop a strong research infrastructure and participate fully in federally funded research activities. The program should be a high priority for the Foundation.

## **TITLE II—SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS**

**SEC. 201. FINDINGS; SENSE OF CONGRESS.**

(a) FINDINGS.—Congress finds the following:

(1) According to the National Science Board’s Science and Engineering Indicators, the science and engineering workforce has shown sustained growth for more than half a century, and workers with science and engineering degrees tend to earn more than comparable workers in other fields.

(2) According to the Program for International Student Assessment 2012 results, America lags behind many other nations in STEM education. American students rank 21st in science and 26th in mathematics.

(3) Junior Achievement USA and ING found a decrease of 25 percent in the percentage of teenage students interested in STEM careers.

(4) According to a 2007 report from the Department of Labor, industries and firms dependent on a strong science and mathematics workforce have launched a variety of programs that target K-12 students and undergraduate and graduate students in STEM fields.

(5) The Federal Government spends nearly \$3 billion annually on STEM education related program and activities, but encouraging STEM education activities beyond the scope of the Federal Government, including privately sponsored competitions and programs in our schools, is crucial to the future technical and economic competitiveness of the United States.

(b) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) more effective coordination and adoption of performance measurement based on objective outcomes for federally supported STEM programs is needed;

(2) leveraging private and nonprofit investments in STEM education will be essential to strengthening the Federal STEM portfolio;

(3) strengthening the Federal STEM portfolio may require program consolidations and terminations, but such changes should be based on evidence with stakeholder input;

(4) coordinating STEM programs and activities across the Federal Government in order to limit duplication and engage stakeholders in STEM programs and related activities for which objective outcomes can be measured will bolster results of Federal STEM education programs, improve the return on taxpayers’

investments in STEM education programs, and in turn strengthen the United States economy; and

(5) as the Committee on STEM Education implements the 5-year Strategic Plan for Federal STEM education required under section 101(b)(5) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621(b)(5)), STEM education stakeholders must be engaged and outcome-based evaluation metrics should be considered in the coordination and consolidation efforts for the Federal STEM portfolio.

**SEC. 202. STEM EDUCATION ADVISORY PANEL.**

(a) **ESTABLISHMENT.**—The President shall establish or designate a STEM Education Advisory Panel that incorporates key stakeholders from the education and industry sectors. The co-chairs shall be members of the President’s Council of Advisors on Science and Technology.

(b) **QUALIFICATIONS.**—The Advisory Panel established or designated by the President under subsection (a) shall consist primarily of members from academic institutions, nonprofit organizations, and industry and shall include in-school, out-of-school, and informal educational practitioners. Members of the Advisory Panel shall be qualified to provide advice and information on STEM education research, development, training, implementation, interventions, professional development, or workforce needs or concerns. In selecting or designating an Advisory Panel, the President may also seek and give consideration to recommendations from the Congress, industry, the scientific community (including the National Academy of Sciences, scientific professional societies, and academia), State and local governments, and other appropriate organizations.

(c) **DUTIES.**—The Advisory Panel shall advise the President, the Committee on STEM Education, and the STEM Education Coordinating Office established under section 204 on matters relating to STEM education, and shall each year provide general guidance to every Federal agency with STEM education programs or activities, including in the preparation of requests for appropriations for activities related to STEM education. The Advisory Panel shall also assess and develop recommendations for—

(1) progress made in implementing the STEM education Strategic Plan required under section 101 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621), and any needs or opportunities to update the strategic plan;

(2) the management, coordination, and implementation of STEM education programs and activities across the Federal Government;

(3) the appropriateness of criteria used by Federal agencies to evaluate the effectiveness of Federal STEM education programs and activities;

(4) ways to leverage private and nonprofit STEM investments and encourage public-private partnerships to strengthen STEM education and help build the STEM workforce pipeline;

(5) ways to incorporate workforce needs into Federal STEM education programs, particularly for specific fields of national interest and areas experiencing high unemployment rates;

(6) ways to better vertically and horizontally integrate Federal STEM programs and activities from pre-K through graduate study and the workforce, and from in-school to out-of-school in order to improve transitions for students moving through the STEM pipeline;

(7) whether societal and workforce concerns are adequately addressed by current Federal STEM education programs and activities;

(8) the extent to which Federal STEM education programs and activities are contributing to recruitment and retention of women and underrepresented students in the STEM education and workforce pipeline; and

(9) ways to encourage geographic diversity in STEM education and the workforce pipeline.

(d) **REPORTS.**—The Advisory Panel shall report, not less frequently than once every 3 fiscal years, to the President and Congress on its assessments under subsection (c) and its recommendations for ways to improve Federal STEM education programs. The first report under this subsection shall be submitted within 1 year after the date of enactment of this Act.

(e) **TRAVEL EXPENSES OF NON-FEDERAL MEMBERS.**—Non-Federal members of the Advisory Panel, while attending meetings of the Advisory Panel or while otherwise serving at the request of the head of the Advisory Panel away from their homes or regular places of business, may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of title 5, United States Code, for individuals in the Government serving without pay. Nothing in this subsection shall be construed to prohibit members of the Advisory Panel who are officers or employ-

ees of the United States from being allowed travel expenses, including per diem in lieu of subsistence, in accordance with existing law.

**SEC. 203. COMMITTEE ON STEM EDUCATION.**

Section 101 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621) is amended—

(1) in the first subsection (b)—

(A) by redesignating paragraphs (3) through (6) as paragraphs (5) through (8), respectively;

(B) by inserting after paragraph (2) the following new paragraphs:

“(3) collaborate with the STEM Education Advisory Panel established under section 202 of the America COMPETES Reauthorization Act of 2015 and other outside stakeholders to ensure the engagement of the STEM education community;

“(4) review evaluation measures used for Federal STEM education programs;”; and

(C) in paragraph (8), as so redesignated by subparagraph (A) of this paragraph, by striking “, periodically update,”; and

(2) in the second subsection (b) and in subsection (c), by striking “subsection (b)(5)” and inserting “subsection (b)(7)”.

**SEC. 204. STEM EDUCATION COORDINATING OFFICE.**

(a) **ESTABLISHMENT.**—The Director of the National Science Foundation shall establish within the Directorate for Education and Human Resources a STEM Education Coordinating Office, which shall have a Director and staff that shall include career employees detailed from Federal agencies that fund STEM education programs and activities.

(b) **RESPONSIBILITIES.**—The STEM Education Coordinating Office shall—

(1) provide technical and administrative support to—

(A) the Committee on STEM Education, especially in its coordination of Federal STEM programs and strategic planning responsibilities;

(B) the Advisory Panel established under section 202; and

(C) Federal agencies with STEM education programs;

(2) periodically update and maintain the inventory of federally sponsored STEM education programs and activities established under section 101(b)(8) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621); and

(3) provide for dissemination of information on Federal STEM education programs and activities, as appropriate, to stakeholders in academia, industry, nonprofit organizations with expertise in STEM education, State and local educational agencies, and other STEM stakeholders.

(c) **REPORT.**—The Director of the STEM Education Coordinating Office shall transmit a report annually to Congress not later than 60 days after the submission of the President’s budget request. The annual report shall include—

(1) any updates to the inventory required under subsection (b)(2);

(2) a description of all consolidations and terminations of Federal STEM education programs implemented in the previous fiscal year, including an explanation of the reasons for consolidations and terminations;

(3) recommendations for consolidations and terminations of STEM education programs or activities in the upcoming fiscal year;

(4) a description of any significant new STEM Education public-private partnerships; and

(5) description of the progress made in carrying out the strategic plan required under section 101 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621), including a description of the outcome of any program assessments completed in the previous year.

(d) **RESPONSIBILITIES OF NSF.**—The Director of the National Science Foundation shall encourage and monitor the efforts of the STEM Education Coordinating Office to ensure that the Coordinating Office is carrying out its responsibilities under subsection (b) appropriately.

## **TITLE III—OFFICE OF SCIENCE AND TECHNOLOGY POLICY**

**SEC. 301. AUTHORIZATION OF APPROPRIATIONS.**

There are authorized to be appropriated for the Office of Science and Technology Policy—

(1) \$4,550,000 for fiscal year 2016; and

(2) \$4,550,000 for fiscal year 2017.



**SEC. 302. REGULATORY EFFICIENCY.**

(a) **SENSE OF CONGRESS.**—It is the sense of Congress that—

(1) high and increasing administrative burdens and costs in Federal research administration, particularly in the higher education sector where most federally sponsored research is performed, are eroding funds available to carry out basic scientific research;

(2) progress has been made over the last decade in streamlining the pre-award grant application process through Grants.gov, the Federal Government's website portal;

(3) post-award administrative costs have grown as Federal research agencies have continued to impose agency-unique compliance and reporting requirements on researchers and research institutions;

(4) facilities and administration costs at research universities can exceed 50 percent of the total value of Federal research grants, and it is estimated that nearly 30 percent of the funds invested annually in federally funded research is consumed by paperwork and other administrative processes required by Federal agencies; and

(5) it is a matter of critical importance to American competitiveness that administrative costs of federally funded research be streamlined so that a higher proportion of taxpayer dollars flow into direct research activities.

(b) **IN GENERAL.**—The Director of the Office of Science and Technology Policy shall establish a working group under the authority of the National Science and Technology Council, to include the Office of Management and Budget. The working group shall be responsible for reviewing Federal regulations affecting research and research universities and making recommendations on how to—

(1) harmonize, streamline, and eliminate duplicative Federal regulations and reporting requirements;

(2) minimize the regulatory burden on United States institutions of higher education performing federally funded research while maintaining accountability for Federal tax dollars; and

(3) identify and update specific regulations to refocus on performance-based goals rather than on process while still meeting the desired outcome.

(c) **STAKEHOLDER INPUT.**—In carrying out the responsibilities under subsection (b), the working group shall take into account input and recommendations from non-Federal stakeholders, including federally funded and nonfederally funded researchers, institutions of higher education, scientific disciplinary societies and associations, nonprofit research institutions, industry, including small businesses, federally funded research and development centers, and others with a stake in ensuring effectiveness, efficiency, and accountability in the performance of scientific research.

(d) **REPORT.**—Not later than 1 year after the date of enactment of this Act, and annually thereafter for 3 years, the Director shall report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on what steps have been taken to carry out the recommendations of the working group established under subsection (b).

**SEC. 303. COORDINATION OF INTERNATIONAL SCIENCE AND TECHNOLOGY PARTNERSHIPS.**

(a) **ESTABLISHMENT.**—The Director of the Office of Science and Technology Policy shall establish a body under the National Science and Technology Council with the responsibility to identify and coordinate international science and technology cooperation that can strengthen the United States science and technology enterprise, improve economic and national security, and support United States foreign policy goals.

(b) **NSTC BODY LEADERSHIP.**—The body established under subsection (a) shall be co-chaired by senior level officials from the Office of Science and Technology Policy and the Department of State.

(c) **RESPONSIBILITIES.**—The body established under subsection (a) shall—

(1) plan and coordinate interagency international science and technology cooperative research and training activities and partnerships supported or managed by Federal agencies and work with other National Science and Technology Council committees to help plan and coordinate the international component of national science and technology priorities;

(2) establish Federal priorities and policies for aligning, as appropriate, international science and technology cooperative research and training activities and partnerships supported or managed by Federal agencies with the foreign policy goals of the United States;

(3) identify opportunities for new international science and technology cooperative research and training partnerships that advance both the science and technology and the foreign policy priorities of the United States;

(4) in carrying out paragraph (3), solicit input and recommendations from non-Federal science and technology stakeholders, including universities, scientific and professional societies, industry, and relevant organizations and institutions; and

(5) identify broad issues that influence the ability of United States scientists and engineers to collaborate with foreign counterparts, including barriers to collaboration and access to scientific information.

(d) **REPORT TO CONGRESS.**—The Director of the Office of Science and Technology Policy shall transmit a report, to be updated every 2 years, to the Committee on Science, Space, and Technology and the Committee on Foreign Affairs of the House of Representatives, and to the Committee on Commerce, Science, and Transportation and the Committee on Foreign Relations of the Senate. The report shall also be made available to the public on the reporting agency's website. The report shall contain a description of—

(1) the priorities and policies established under subsection (c)(2);

(2) the ongoing and new partnerships established since the last update to the report;

(3) the means by which stakeholder input was received, as well as summary views of stakeholder input; and

(4) the issues influencing the ability of United States scientists and engineers to collaborate with foreign counterparts.

(e) **ADDITIONAL REPORTS TO CONGRESS.**—The Director of the Office of Science and Technology Policy shall transmit, not later than 60 days after the date of enactment of this Act and annually thereafter, to the Committee on Science, Space, and Technology and the Committee on Foreign Affairs of the House of Representatives, and to the Committee on Commerce, Science, and Transportation and the Committee on Foreign Relations of the Senate, a report that lists and describes all foreign travel by Office of Science and Technology Policy staff and detailees. Each report shall specify the dates of each trip, the purpose of the trip, Office of Science and Technology Policy participants on the trip, total Office of Science and Technology Policy costs associated with the trip, and details of all international meetings, including meeting participants and topics addressed.

#### **SEC. 304. ALTERNATIVE RESEARCH FUNDING MODELS.**

(a) **PILOT PROGRAM AUTHORITY.**—The heads of Federal science agencies, in consultation with the Director of the Office of Science and Technology Policy, shall conduct appropriate pilot programs to validate alternative research funding models, including—

(1) scientific breakthrough prize programs that are of strategic importance to the Nation and have the capacity to spur new economic growth; and

(2) novel mechanisms of funding including obtaining non-Federal funds through crowd source funding.

(b) **NON-FEDERAL PARTNERS.**—A pilot program may be conducted under this section through an agreement, grant, or contractual relationship with a non-Federal entity regarding the design, administration, and funding of the program.

(c) **PRIZE COMPETITION JUDGES.**—

(1) **REQUIREMENTS.**—Judges for a prize competition carried out under this section shall not be required to be Federal employees. An individual who serves as a judge for a prize competition carried out under this section who is not a Federal employee shall be required to sign an agreement, developed by the Office of Science and Technology Policy, with respect to nondisclosure, conflict of interest, and judging code of conduct requirements.

(2) **DISCLOSURE OF PERSONAL FINANCIAL INTERESTS.**—A judge for a prize competition with a total purse of \$10,000 or more, or for an aggregate of prize competitions with a total purse of \$50,000 or more, shall be required to disclose all personal financial interests.

(3) **REPORT TO CONGRESS.**—Not later than 30 days after the Office of Science and Technology Policy completes development of an agreement under paragraph (1), it shall transmit a report to Congress describing the requirements of such agreement.

(d) **PUBLIC NOTICE.**—The heads of Federal science agencies shall widely advertise prize competitions to be conducted under this section to ensure maximum participation.

(e) **DEFINITION.**—For purposes of this section, the term “Federal science agency” means—

(1) the National Aeronautics and Space Administration;

(2) the National Science Foundation;

(3) the National Institute of Standards and Technology; and

(4) the National Weather Service.

(f) REPORT TO CONGRESS.—Not later than 1 year after the date of enactment of this Act, and annually thereafter as part of the annual budget submission to Congress, the Director of the Office of Science and Technology Policy shall transmit to the Congress a report on programs identified and conducted under subsection (a).

**SEC. 305. AMENDMENTS TO PRIZE COMPETITIONS.**

Section 24 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719) is amended—

- (1) in subsection (c)—
  - (A) by inserting “competition” after “section, a prize”;
  - (B) by inserting “types” after “following”; and
  - (C) in paragraph (4), by striking “prizes” and inserting “prize competitions”;
- (2) in subsection (f)—
  - (A) by striking “in the Federal Register” and inserting “on a publicly accessible Government website, such as [www.challenge.gov](http://www.challenge.gov),”; and
  - (B) in paragraph (4), by striking “prize” and inserting “cash prize purse”;
- (3) in subsection (g), by striking “prize” and inserting “cash prize purse”;
- (4) in subsection (h), by inserting “prize” before “competition” both places it appears;
- (5) in subsection (i)—
  - (A) in paragraph (1)(B), by inserting “prize” before “competition”;
  - (B) in paragraph (2)(A), by inserting “prize” before “competition” both places it appears;
  - (C) by redesignating paragraph (3) as paragraph (4); and
  - (D) by inserting after paragraph (2) the following new paragraph:
 

“(3) WAIVER.—An agency may waive the requirement under paragraph (2). The annual report under subsection (p) shall include a list of such waivers granted during the preceding fiscal year, along with a detailed explanation of the reasons for granting the waivers.”;
- (6) in subsection (k)—
  - (A) in paragraph (2)(A), by inserting “prize” before “competition”; and
  - (B) in paragraph (3), by inserting “prize” before “competitions” both places it appears;
- (7) in subsection (l), by striking all after “may enter into” and inserting “a grant, contract, cooperative agreement, or other agreement with a private sector for-profit or nonprofit entity to administer the prize competition, subject to the provisions of this section.”;
- (8) in subsection (m)—
  - (A) by amending paragraph (1) to read as follows:
 

“(1) IN GENERAL.—Support for a prize competition under this section, including financial support for the design and administration of a prize competition or funds for a cash prize purse, may consist of Federal appropriated funds and funds provided by private sector for-profit and nonprofit entities. The head of an agency may accept funds from other Federal agencies, private sector for-profit entities, and nonprofit entities to support such prize competitions. The head of an agency may not give any special consideration to any private sector for-profit or nonprofit entity in return for a donation.”;
  - (B) in paragraph (2), by striking “prize awards” and inserting “cash prize purses”;
  - (C) in paragraph (3)(A)—
    - (i) by striking “No prize” and inserting “No prize competition”; and
    - (ii) by striking “the prize” and inserting “the cash prize purse”;
  - (D) in paragraph (3)(B), by striking “a prize” and inserting “a cash prize purse”;
  - (E) in paragraph (3)(B)(i), by inserting “competition” after “prize”;
  - (F) in paragraph (4)(A), by striking “a prize” and inserting “a cash prize purse”; and
  - (G) in paragraph (4)(B), by striking “cash prizes” and inserting “cash prize purses”;
- (9) in subsection (n), by inserting “for both for-profit and nonprofit entities,” after “contract vehicle”;
- (10) in subsection (o)(1), by striking “or providing a prize” and insert “a prize competition or providing a cash prize purse”; and
- (11) in subsection (p)(2)—
  - (A) in subparagraph (C), by striking “cash prizes” both places it occurs and inserting “cash prize purses”; and
  - (B) by adding at the end the following new subparagraph:

“(G) PLAN.—A description of crosscutting topical areas and agency-specific mission needs that may be the strongest opportunities for prize competitions during the upcoming 2 fiscal years.”.

**SEC. 306. UNITED STATES CHIEF TECHNOLOGY OFFICER.**

Title II of the National Science and Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6611 et seq.) is amended by adding at the end the following new section:

“UNITED STATES CHIEF TECHNOLOGY OFFICER

“SEC. 210. (a) APPOINTMENT.—The President may appoint a United States Chief Technology Officer. Not later than 1 year after the date of enactment of the America COMPETES Reauthorization Act of 2015, such officer shall be one of the Associate Directors of the Office of Science and Technology Policy.

“(b) DUTIES.—The duties of the United States Chief Technology Officer should include—

“(1) advising the President and the Director of the Office of Science and Technology Policy on Federal information systems, technology, data, and innovation policies and initiatives;

“(2) promoting an improved exchange of information among the Federal Government, the public, and Congress;

“(3) promoting the use of innovative technological approaches across the Federal Government to ensure a modern information technology infrastructure;

“(4) working with the Chief Technology Officers and Chief Information Officers of all Federal agencies to ensure the use of best technologies and security practices for information systems;

“(5) establishing a working group with such Officers to exchange best practices about information systems;

“(6) promoting transparency and accountability across the Federal Government for all technological implementation by working with agencies to ensure that each arm of the Federal Government, including the executive branch, makes its records open and accessible;

“(7) promoting security and privacy protection policies for all Federal information technology systems that are consistent with Federal law, regulations, and current best practices;

“(8) promoting technological interoperability of key Government functions;

“(9) in consultation with the Office of Management and Budget, providing an annual report to the President, the Director of the Office of Science and Technology Policy, and Congress on the current state of information systems of all Federal agencies, including—

“(A) the status of information systems, including potential technology and security concerns about these information systems in all Federal agencies;

“(B) a review of all Federal websites with third-party embedded tools that—

“(i) identifies each embedded tool, who it belongs to, and the data it collects; and

“(ii) addresses effects on cybersecurity and consumer privacy, including whether each website provides prominent notice to consumers about the presence of the tool and whether the consumer may opt-out of the tool;

“(C) the amount of money being spent on various technologies; and

“(D) technology recommendations and best practices; and

“(10) such other functions and activities as the President and Director of the Office of Science and Technology Policy may assign.

“(c) REPORT.—In the absence of a United States Chief Technology Officer, the Director of the Office of Science and Technology Policy shall be responsible for providing the report required under subsection (b)(9).”.

**SEC. 307. NATIONAL RESEARCH COUNCIL STUDY ON TECHNOLOGY FOR EMERGENCY NOTIFICATIONS ON UNIVERSITY CAMPUSES.**

(a) IN GENERAL.—Not later than 90 days after the date of enactment of this Act, the Director of the Office of Science and Technology Policy shall enter into an arrangement with the National Research Council to conduct and complete a study to identify and review technologies employed at institutions of higher education to provide notifications to students, faculty, and other personnel during emergency situations in accordance with the requirements of existing law. The study shall address—

(1) the timeliness of notifications during emergency situations provided by various technologies;

(2) the durability of such technologies in delivering such notifications to students, faculty, and other personnel; and

(3) the limitations exhibited by such technologies to successfully deliver notifications not more than 30 seconds after the institution of higher education transmits such notifications.

(b) **REPORT REQUIRED.**—Not later than 1 year after the date on which the National Research Council enters into the arrangement required by subsection (a), the Director of the Office of Science and Technology Policy shall submit to Congress a report on the study conducted under such subsection.

## **TITLE IV—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY**

### **SEC. 401. AUTHORIZATION OF APPROPRIATIONS.**

(a) **FISCAL YEAR 2016.**—

(1) **IN GENERAL.**—There are authorized to be appropriated to the Secretary of Commerce \$933,700,000 for the National Institute of Standards and Technology for fiscal year 2016.

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

(A) \$744,700,000 shall be for scientific and technical research and services laboratory activities;

(B) \$59,000,000 shall be for the construction and maintenance of facilities; and

(C) \$130,000,000 shall be for industrial technology services activities, of which \$125,000,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278I) and \$5,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(b) **FISCAL YEAR 2017.**—

(1) **IN GENERAL.**—There are authorized to be appropriated to the Secretary of Commerce \$933,700,000 for the National Institute of Standards and Technology for fiscal year 2017.

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

(A) \$744,700,000 shall be for scientific and technical research and services laboratory activities;

(B) \$59,000,000 shall be for the construction and maintenance of facilities; and

(C) \$130,000,000 shall be for industrial technology services activities, of which \$125,000,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278I) and \$5,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

### **SEC. 402. STANDARDS AND CONFORMITY ASSESSMENT.**

Section 2 of the National Institute of Standards and Technology Act (15 U.S.C. 272) is amended—

(1) in subsection (b)—

(A) in the matter preceding paragraph (1), by striking “authorized to take” and inserting “authorized to serve as the President’s principal adviser on standards policy pertaining to the Nation’s technological competitiveness and innovation ability and to take”;

(B) in paragraph (3), by striking “compare standards” and all that follows through “Federal Government” and inserting “facilitate standards-related information sharing and cooperation between Federal agencies”; and

(C) in paragraph (13), by striking “Federal, State, and local” and all that follows through “private sector” and inserting “technical standards activities and conformity assessment activities of Federal, State, and local governments with private sector”; and

(2) in subsection (c)—

(A) in paragraph (22), by striking “and” after the semicolon;

(B) by redesignating paragraph (23) as paragraph (25); and

(C) by inserting after paragraph (22) the following:

“(23) participate in and support scientific and technical conferences;

“(24) perform pre-competitive measurement science and technology research in partnership with institutions of higher education and industry to promote United States industrial competitiveness; and”.

**SEC. 403. VISITING COMMITTEE ON ADVANCED TECHNOLOGY.**

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 “not fewer than 11 members”;

(B) by striking “at least 10” and inserting “at least two-thirds”; and

(C) by adding at the end the following: “The Committee may consult with the National Research Council in making recommendations regarding general policy for the Institute.”; and

(2) in subsection (h)(1), by striking “, including the Program established under section 28,”.

**SEC. 404. POLICE AND SECURITY AUTHORITY.**

Section 15 of the National Institute of Standards and Technology Act (15 U.S.C. 278e) is amended—

(1) by striking “of the Government; and” and inserting “of the Government.”; and

(2) by striking “United States Code.” and inserting “United States Code; and

(i) the protection of Institute buildings and other plant facilities, equipment, and property, and of employees, associates, visitors, or other persons located therein or associated therewith, notwithstanding any other provision of law.”.

**SEC. 405. EDUCATION AND OUTREACH.**

The National Institute of Standards and Technology Act (15 U.S.C. 271 et seq.) is amended by striking sections 18, 19, and 19A and inserting the following:

**“SEC. 18. EDUCATION AND OUTREACH.**

“(a) IN GENERAL.—The Director may support, promote, and coordinate activities and efforts to enhance public awareness and understanding of measurement sciences, standards, and technology by the general public, industry, and academia in support of the Institute’s mission.

“(b) RESEARCH FELLOWSHIPS.—

“(1) IN GENERAL.—The Director may award research fellowships and other forms of financial and logistical assistance, including direct stipend awards, to—

“(A) students at institutions of higher education within the United States who show promise as present or future contributors to the mission of the Institute; and

“(B) United States citizens for research and technical activities of the Institute.

“(2) SELECTION.—The Director shall select persons to receive such fellowships and assistance on the basis of ability and of the relevance of the proposed work to the mission and programs of the Institute.

“(3) DEFINITION.—For the purposes of this subsection, financial and logistical assistance includes, notwithstanding section 1345 of title 31, United States Code, or any contrary provision of law, temporary housing and local transportation to and from the Institute facilities.

“(c) POST-DOCTORAL FELLOWSHIP PROGRAM.—The Director shall establish and conduct a post-doctoral fellowship program, subject to the availability of appropriations, that shall include not fewer than 20 fellows per fiscal year. In evaluating applications for fellowships under this subsection, the Director shall give consideration to the goal of promoting the participation of underrepresented students in research areas supported by the Institute.”.

**SEC. 406. PROGRAMMATIC PLANNING REPORT.**

Section 23(d) of the National Institute of Standards and Technology Act (15 U.S.C. 278i(d)) is amended by adding at the end the following: “The 3-year programmatic planning document shall also describe how the Director is addressing recommendations from the Visiting Committee on Advanced Technology established under section 10.”.

**SEC. 407. ASSESSMENTS BY THE NATIONAL RESEARCH COUNCIL.**

(a) NATIONAL ACADEMY OF SCIENCES REVIEW.—Not later than 6 months after the date of enactment of this Act, the Director of the National Institute of Standards and Technology shall enter into a contract with the National Academy of Sciences to conduct a single, comprehensive review of the Institute’s laboratory programs. The review shall—

(1) assess the technical merits and scientific caliber of the research conducted at the laboratories;

(2) examine the strengths and weaknesses of the 2010 laboratory reorganization on the Institute’s ability to fulfill its mission;

(3) evaluate how cross-cutting research and development activities are planned, coordinated, and executed across the laboratories; and

(4) assess how the laboratories are engaging industry, including the incorporation of industry need, into the research goals and objectives of the Institute.

(b) ADDITIONAL ASSESSMENTS.—Section 24 of the National Institute of Standards and Technology Act (15 U.S.C. 278j) is amended to read as follows:

**“SEC. 24. ASSESSMENTS BY THE NATIONAL RESEARCH COUNCIL.**

“(a) IN GENERAL.—The Institute shall contract with the National Research Council to perform and report on assessments of the technical quality and impact of the work conducted at Institute laboratories.

“(b) SCHEDULE.—Two laboratories shall be assessed under subsection (a) each year, and each laboratory shall be assessed at least once every 3 years.

“(c) SUMMARY REPORT.—Beginning in the year after the first assessment is conducted under subsection (a), and once every two years thereafter, the Institute shall contract with the National Research Council to prepare a report that summarizes the findings common across the individual assessment reports.

“(d) ADDITIONAL ASSESSMENTS.—The Institute, at the discretion of the Director, also may contract with the National Research Council to conduct additional assessments of Institute programs and projects that involve collaboration across the Institute laboratories and centers and assessments of selected scientific and technical topics.

“(e) CONSULTATION WITH VISITING COMMITTEE ON ADVANCED TECHNOLOGY.—The National Research Council may consult with the Visiting Committee on Advanced Technology established under section 10 in performing the assessments under this section.

“(f) REPORTS.—Not later than 30 days after the completion of each assessment, the Institute shall transmit the report on such assessment to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.”.

**SEC. 408. HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP.**

Section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) is amended to read as follows:

**“SEC. 25. HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP.**

“(a) ESTABLISHMENT AND PURPOSE.—

“(1) IN GENERAL.—The Secretary, through the Director and, if appropriate, through other officials, shall provide assistance for the creation and support of manufacturing extension centers, to be known as the ‘Hollings Manufacturing Extension Centers’, for the transfer of manufacturing technology and best business practices (in this Act referred to as the ‘Centers’). The program under this section shall be known as the ‘Hollings Manufacturing Extension Partnership’.

“(2) AFFILIATIONS.—Such Centers shall be affiliated with any United States-based public or nonprofit institution or organization, or group thereof, that applies for and is awarded financial assistance under this section.

“(3) OBJECTIVE.—The objective of the Centers is to enhance competitiveness, productivity, and technological performance in United States manufacturing through—

“(A) the transfer of manufacturing technology and techniques developed at the Institute to Centers and, through them, to manufacturing companies throughout the United States;

“(B) the participation of individuals from industry, institutions of higher education, State governments, other Federal agencies, and, when appropriate, the Institute in cooperative technology transfer activities;

“(C) efforts to make new manufacturing technology and processes usable by United States-based small and medium-sized companies;

“(D) the active dissemination of scientific, engineering, technical, and management information about manufacturing to industrial firms, including small and medium-sized manufacturing companies;

“(E) the utilization, when appropriate, of the expertise and capability that exists in Federal laboratories other than the Institute;

“(F) the provision to community colleges and area career and technical education schools of information about the job skills needed in small and medium-sized manufacturing businesses in the regions they serve; and

“(G) promoting and expanding certification systems offered through industry, associations, and local colleges, when appropriate.

“(b) ACTIVITIES.—The activities of the Centers shall include—

“(1) the establishment of automated manufacturing systems and other advanced production technologies, based on Institute-supported research, for the purpose of demonstrations and technology transfer;

“(2) the active transfer and dissemination of research findings and Center expertise to a wide range of companies and enterprises, particularly small and medium-sized manufacturers; and

“(3) the facilitation of collaborations and partnerships between small and medium-sized manufacturing companies and community colleges and area career and technical education schools to help such colleges and schools better understand the specific needs of manufacturers and to help manufacturers better understand the skill sets that students learn in the programs offered by such colleges and schools.

“(c) OPERATIONS.—

“(1) FINANCIAL SUPPORT.—The Secretary may provide financial support to any Center created under subsection (a). The Secretary may not provide to a Center more than 50 percent of the capital and annual operating and maintenance funds required to create and maintain such Center.

“(2) REGULATIONS.—The Secretary shall implement, review, and update the sections of the Code of Federal Regulations related to this section at least once every 3 years.

“(3) APPLICATION.—

“(A) IN GENERAL.—Any nonprofit institution, or consortium thereof, or State or local government, may submit to the Secretary an application for financial support under this section, in accordance with the procedures established by the Secretary.

“(B) COST SHARING.—In order to receive assistance under this section, an applicant for financial assistance under subparagraph (A) shall provide adequate assurances that non-Federal assets obtained from the applicant and the applicant's partnering organizations will be used as a funding source to meet not less than 50 percent of the costs incurred. For purposes of the preceding sentence, the costs incurred means the costs incurred in connection with the activities undertaken to improve the competitiveness, management, productivity, and technological performance of small and medium-sized manufacturing companies.

“(C) AGREEMENTS WITH OTHER ENTITIES.—In meeting the 50 percent requirement, it is anticipated that a Center will enter into agreements with other entities such as private industry, institutions of higher education, and State governments to accomplish programmatic objectives and access new and existing resources that will further the impact of the Federal investment made on behalf of small and medium-sized manufacturing companies.

“(D) LEGAL RIGHTS.—Each applicant under subparagraph (A) shall also submit a proposal for the allocation of the legal rights associated with any invention which may result from the proposed Center's activities.

“(4) MERIT REVIEW.—The Secretary shall subject each such application to merit review. In making a decision whether to approve such application and provide financial support under this section, the Secretary shall consider, at a minimum, the following:

“(A) The merits of the application, particularly those portions of the application regarding technology transfer, training and education, and adaptation of manufacturing technologies to the needs of particular industrial sectors.

“(B) The quality of service to be provided.

“(C) Geographical diversity and extent of service area.

“(D) The percentage of funding and amount of in-kind commitment from other sources.

“(5) EVALUATION.—

“(A) IN GENERAL.—Each Center that receives financial assistance under this section shall be evaluated during its third year of operation by an evaluation panel appointed by the Secretary.

“(B) COMPOSITION.—Each such evaluation panel shall be composed of private experts, none of whom shall be connected with the involved Center, and Federal officials.

“(C) CHAIR.—An official of the Institute shall chair the panel.

“(D) PERFORMANCE MEASUREMENT.—Each evaluation panel shall measure the involved Center's performance against the objectives specified in this section.

“(E) POSITIVE EVALUATION.—If the evaluation is positive, the Secretary may provide continued funding through the sixth year.



“(F) PROBATION.—The Secretary shall not provide funding unless the Center has received a positive evaluation. A Center that has not received a positive evaluation by the evaluation panel shall be notified by the panel of the deficiencies in its performance and shall be placed on probation for one year, after which time the panel shall reevaluate the Center. If the Center has not addressed the deficiencies identified by the panel, or shown a significant improvement in its performance, the Director shall conduct a new competition to select an operator for the Center or may close the Center.

“(G) ADDITIONAL FINANCIAL SUPPORT.—After the sixth year, a Center may receive additional financial support under this section if it has received a positive evaluation through an independent review, under procedures established by the Institute.

“(H) EIGHT-YEAR REVIEW.—A Center shall undergo an independent review in the 8th year of operation. Each evaluation panel shall measure the Center’s performance against the objectives specified in this section. A Center that has not received a positive evaluation as a result of an independent review shall be notified by the Program of the deficiencies in its performance and shall be placed on probation for one year, after which time the Program shall reevaluate the Center. If the Center has not addressed the deficiencies identified by the review, or shown a significant improvement in its performance, the Director shall conduct a new competition to select an operator for the Center or may close the Center.

“(I) RECOMPETITION.—If a recipient of a Center award has received financial assistance for 10 consecutive years, the Director shall conduct a new competition to select an operator for the Center consistent with the plan required in this Act. Incumbent Center operators in good standing shall be eligible to compete for the new award.

“(J) REPORTS.—

“(i) PLAN.—Not later than 180 days after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Director shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a plan as to how the Institute will conduct reviews, assessments, and reapplication competitions under this paragraph.

“(ii) INDEPENDENT ASSESSMENT.—The Director shall contract with an independent organization to perform an assessment of the implementation of the reapplication competition process under this paragraph within 3 years after the transmittal of the report under clause (i). The organization conducting the assessment under this clause may consult with the MEP Advisory Board.

“(iii) COMPARISON OF CENTERS.—Not later than 2 years after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Director shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report providing information on the first and second years of operations for centers operating from new competitions or recompetition as compared to longstanding centers. The report shall provide detail on the engagement in services provided by Centers and the characteristics of services provided, including volume and type of services, so that the Committees can evaluate whether the cost-sharing ratio has an effect on the services provided at Centers.

“(6) PATENT RIGHTS.—The provisions of chapter 18 of title 35, United States Code, shall apply, to the extent not inconsistent with this section, to the promotion of technology from research by Centers under this section except for contracts for such specific technology extension or transfer services as may be specified by statute or by the Director.

“(7) PROTECTION OF CENTER CLIENT CONFIDENTIAL INFORMATION.—Section 552 of title 5, United States Code, shall apply to the following information obtained by the Federal Government on a confidential basis in connection with the activities of any participant involved in the Hollings Manufacturing Extension Partnership:

“(A) Information on the business operation of any participant in a Hollings Manufacturing Extension Partnership program or of a client of a Center.

“(B) Trade secrets possessed by any client of a Center.

“(8) ADVISORY BOARDS.—Each Center’s advisory boards shall institute a conflict of interest policy, approved by the Director, that ensures the Board represents local small and medium-sized manufacturers in the Center’s region. Board Members may not serve as a vendor or provide services to the Center, nor may they serve on more than one Center’s oversight board simultaneously.

“(d) ACCEPTANCE OF FUNDS.—

“(1) IN GENERAL.—In addition to such sums as may be appropriated to the Secretary and Director to operate the Hollings Manufacturing Extension Partnership, the Secretary and Director also may accept funds from other Federal departments and agencies and, under section 2(c)(7), from the private sector for the purpose of strengthening United States manufacturing.

“(2) ALLOCATION OF FUNDS.—

“(A) FUNDS ACCEPTED FROM OTHER FEDERAL DEPARTMENTS OR AGENCIES.—The Director shall determine whether funds accepted from other Federal departments or agencies shall be counted in the calculation of the Federal share of capital and annual operating and maintenance costs under subsection (c).

“(B) FUNDS ACCEPTED FROM THE PRIVATE SECTOR.—Funds accepted from the private sector under section 2(c)(7), if allocated to a Center, may not be considered in the calculation of the Federal share under subsection (c) of this section.

“(e) MEP ADVISORY BOARD.—

“(1) ESTABLISHMENT.—There is established within the Institute a Manufacturing Extension Partnership Advisory Board (in this subsection referred to as the ‘MEP Advisory Board’).

“(2) MEMBERSHIP.—

“(A) IN GENERAL.—The MEP Advisory Board shall consist of not fewer than 10 members broadly representative of stakeholders, to be appointed by the Director. At least 2 members shall be employed by or on an advisory board for the Centers, at least 1 member shall represent a community college, and at least 5 other members shall be from United States small businesses in the manufacturing sector. No member shall be an employee of the Federal Government.

“(B) TERM.—Except as provided in subparagraph (C) or (D), the term of office of each member of the MEP Advisory Board shall be 3 years.

“(C) VACANCIES.—Any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term.

“(D) SERVING CONSECUTIVE TERMS.—Any person who has completed two consecutive full terms of service on the MEP Advisory Board shall thereafter be ineligible for appointment during the one-year period following the expiration of the second such term.

“(3) MEETINGS.—The MEP Advisory Board shall meet not less than 2 times annually and shall provide to the Director—

“(A) advice on Hollings Manufacturing Extension Partnership programs, plans, and policies;

“(B) assessments of the soundness of Hollings Manufacturing Extension Partnership plans and strategies; and

“(C) assessments of current performance against Hollings Manufacturing Extension Partnership program plans.

“(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.

“(5) REPORT.—The MEP Advisory Board shall transmit an annual report to the Secretary for transmittal to Congress within 30 days after the submission to Congress of the President’s annual budget request in each year. Such report shall address the status of the program established pursuant to this section and comment on the relevant sections of the programmatic planning document and updates thereto transmitted to Congress by the Director under subsections (c) and (d) of section 23.

“(f) COMPETITIVE GRANT PROGRAM.—

“(1) ESTABLISHMENT.—The Director shall establish, within the Hollings Manufacturing Extension Partnership, under this section and section 26, a program of competitive awards among participants described in paragraph (2) for the purposes described in paragraph (3).

“(2) PARTICIPANTS.—Participants receiving awards under this subsection shall be the Centers, or a consortium of such Centers.

“(3) PURPOSE.—The purpose of the program under this subsection is to add capabilities to the Hollings Manufacturing Extension Partnership, including the development of projects to solve new or emerging manufacturing problems as determined by the Director, in consultation with the Director of the Hollings Manufacturing Extension Partnership program, the MEP Advisory Board, and small and medium-sized manufacturers. One or more themes for the competition may be identified, which may vary from year to year, depending on the needs of manufacturers and the success of previous competitions. Centers may be reimbursed for costs incurred under the program.

“(4) APPLICATIONS.—Applications for awards under this subsection shall be submitted in such manner, at such time, and containing such information as the Director shall require, in consultation with the MEP Advisory Board.

“(5) SELECTION.—Awards under this subsection shall be peer reviewed and competitively awarded. The Director shall endeavor to have broad geographic diversity among selected proposals. The Director shall select proposals to receive awards that will—

“(A) improve the competitiveness of industries in the region in which the Center or Centers are located;

“(B) create jobs or train newly hired employees; and

“(C) promote the transfer and commercialization of research and technology from institutions of higher education, national laboratories, and non-profit research institutes.

“(6) PROGRAM CONTRIBUTION.—Recipients of awards under this subsection shall not be required to provide a matching contribution.

“(7) GLOBAL MARKETPLACE PROJECTS.—In making awards under this subsection, the Director, in consultation with the MEP Advisory Board and the Secretary, may take into consideration whether an application has significant potential for enhancing the competitiveness of small and medium-sized United States manufacturers in the global marketplace.

“(8) DURATION.—Awards under this subsection shall last no longer than 3 years.

“(g) EVALUATION OF OBSTACLES UNIQUE TO SMALL MANUFACTURERS.—The Director shall—

“(1) evaluate obstacles that are unique to small manufacturers that prevent such manufacturers from effectively competing in the global market;

“(2) implement a comprehensive plan to train the Centers to address such obstacles; and

“(3) facilitate improved communication between the Centers to assist such manufacturers in implementing appropriate, targeted solutions to such obstacles.

“(h) DEFINITIONS.—In this section—

“(1) the term ‘area career and technical education school’ has the meaning given such term in section 3 of the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (20 U.S.C. 2302); and

“(2) 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. 409. ELIMINATION OF OBSOLETE REPORTS.

Section 28 of the National Institute of Standards and Technology Act (15 U.S.C. 278n) is amended—

(1) by striking subsection (g); and

(2) in subsection (k)—

(A) in paragraph (3), by inserting “and” after the semicolon at the end;

(B) in paragraph (4)(B), by striking “; and” at the end and inserting a period; and

(C) by striking paragraph (5).

#### SEC. 410. MODIFICATIONS TO GRANTS AND COOPERATIVE AGREEMENTS.

Section 8(a) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3706(a)) is amended by striking “The total amount of any such grant or cooperative agreement may not exceed 75 percent of the total cost of the program.”.

#### SEC. 411. INFORMATION SYSTEMS STANDARDS CONSULTATION.

Section 20(c)(1) of the National Institute of Standards and Technology Act (15 U.S.C. 278g—3(c)(1)) is amended by striking “the National Security Agency.”.

**SEC. 412. UNITED STATES-ISRAELI COOPERATION.**

It is the Sense of Congress that—

- (1) partnerships that facilitate basic scientific research between the United States and Israel advance technology development, innovation, and commercialization leading to growth in various sectors, including manufacturing, and creating benefits for both nations;
- (2) joint research and development agreements carried out through government organizations like the National Institute of Standards and Technology support these efforts;
- (3) partnerships between the United States and Israel that further the basic scientific enterprise should be encouraged; and
- (4) the National Institute of Standards and Technology should continue to facilitate scientific collaborations between Israel and United States' technical agencies working in measurement science and standardization.

**TITLE V—DEPARTMENT OF ENERGY SCIENCE****SEC. 501. MISSION.**

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

“(c) MISSION.—The mission of the Office of Science shall be the delivery of scientific discoveries, capabilities, and major scientific tools to transform the understanding of nature and to advance the energy, economic, and national security of the United States. In support of this mission, the Director shall carry out programs on basic energy sciences, advanced scientific computing research, high energy physics, biological and environmental research, fusion energy sciences, and nuclear physics, including as provided under subtitle A of title V of the America COMPETES Reauthorization Act of 2015, through activities focused on—

- “(1) fundamental scientific discoveries through the study of matter and energy;
- “(2) science in the national interest, including—
  - “(A) advancing an agenda for American energy security through research on energy production, storage, transmission, efficiency, and use; and
  - “(B) advancing our understanding of the Earth’s climate through research in atmospheric and environmental sciences; 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 materials science.

“(d) COORDINATION WITH OTHER DEPARTMENT OF ENERGY PROGRAMS.—The Under Secretary for Science and Energy shall ensure the coordination of Office of Science activities and programs with other activities of the Department.”.

**SEC. 502. BASIC ENERGY SCIENCES.**

(a) PROGRAM.—The Director shall carry out a program in basic energy sciences, including materials sciences and engineering, chemical sciences, physical biosciences, and geosciences, for the purpose of providing the scientific foundations for new energy technologies.

(b) MISSION.—The mission of the program described in subsection (a) shall be to support fundamental research to understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels in order to provide the foundations for new energy technologies and to support Department missions in energy, environment, and national security.

(c) BASIC ENERGY SCIENCES USER FACILITIES.—The Director shall carry out a sub-program for the development, 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—

- (1) x-ray light sources;
- (2) neutron sources;
- (3) nanoscale science research centers; and
- (4) other facilities the Director considers appropriate, consistent with section 209 of the Department of Energy Organization Act (42 U.S.C. 7139).

(d) LIGHT SOURCE LEADERSHIP INITIATIVE.—

(1) **ESTABLISHMENT.**—In support of the subprogram authorized in subsection (c), the Director shall establish an initiative to sustain and advance global leadership of light source user facilities.

(2) **LEADERSHIP STRATEGY.**—Not later than 9 months after the date of enactment of this Act, and biennially thereafter, the Director shall prepare, in consultation with relevant stakeholders, and submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a light source leadership strategy that—

(A) identifies, prioritizes, and describes plans for the development, construction, and operation of light sources over the next decade;

(B) describes plans for optimizing management and use of existing light source facilities; and

(C) assesses the international outlook for light source user facilities and describes plans for United States cooperation in such projects.

(3) **ADVISORY COMMITTEE FEEDBACK AND RECOMMENDATIONS.**—Not later than 45 days after submission of the strategy described in paragraph (2), the Basic Energy Sciences Advisory Committee shall provide the Director, the Committee on Science, Space, and Technology of the House of Representatives, and the Committee on Energy and Natural Resources of the Senate a report of the Advisory Committee's analyses, findings, and recommendations for improving the strategy, including a review of the most recent budget request for the initiative.

(4) **PROPOSED BUDGET.**—The Director shall transmit annually to Congress a proposed budget corresponding to the activities identified in the strategy.

(e) **ACCELERATOR RESEARCH AND DEVELOPMENT.**—The Director shall carry out research and development on advanced accelerator and storage ring 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.

(f) **ENERGY FRONTIER RESEARCH CENTERS.**—

(1) **IN GENERAL.**—The Director shall carry out a 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.

(2) **COLLABORATIONS.**—A collaboration receiving an award 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. An Energy Frontier Research Center already in existence and supported by the Director 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.

(B) **REAPPLICATION.**—After the end of the period described in subparagraph (A), an awardee may reapply for selection for a second period of 5 years on a competitive, merit-reviewed basis.

(C) **TERMINATION.**—Consistent with the existing authorities of the Department, the Director may terminate an underperforming center for cause during the performance period.

(4) **NO FUNDING FOR CONSTRUCTION.**—No funding provided pursuant to this subsection may be used for the construction of new buildings or facilities.

#### **SEC. 503. ADVANCED SCIENTIFIC COMPUTING RESEARCH.**

(a) **PROGRAM.**—The Director shall carry out a research, development, and demonstration 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) **FACILITIES.**—The Director, as part of the program described in subsection (a), shall develop and maintain world-class computing and network facilities for science and deliver critical research in applied mathematics, computer science, and advanced networking to support the Department's missions.

(c) **DEFINITIONS.**—Section 2 of the Department of Energy High-End Computing Revitalization Act of 2004 (15 U.S.C. 5541) is amended by striking paragraphs (1) through (5) and inserting the following:

“(1) **CO-DESIGN.**—The term ‘co-design’ means the joint development of application algorithms, models, and codes with computer technology architectures and operating systems to maximize effective use of high-end computing systems.

“(2) **DEPARTMENT.**—The term ‘Department’ means the Department of Energy.

“(3) **EXASCALE.**—The term ‘exascale’ means computing system performance at or near 10 to the 18th power floating point operations per second.

“(4) HIGH-END COMPUTING SYSTEM.—The term ‘high-end computing system’ means a computing system with performance that substantially exceeds that of systems that are commonly available for advanced scientific and engineering applications.

“(5) INSTITUTION OF HIGHER EDUCATION.—The term ‘institution of higher education’ has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

“(6) LEADERSHIP SYSTEM.—The term ‘leadership system’ means a high-end computing system that is among the most advanced in the world in terms of performance in solving scientific and engineering problems.

“(7) NATIONAL LABORATORY.—The term ‘National Laboratory’ means any one of the seventeen laboratories owned by the Department.

“(8) SECRETARY.—The term ‘Secretary’ means the Secretary of Energy.

“(9) SOFTWARE TECHNOLOGY.—The term ‘software technology’ includes optimal algorithms, programming environments, tools, languages, and operating systems for high-end computing systems.”.

(d) DEPARTMENT OF ENERGY HIGH-END COMPUTING RESEARCH AND DEVELOPMENT PROGRAM.—Section 3 of the Department of Energy High-End Computing Revitalization Act of 2004 (15 U.S.C. 5542) is amended—

(1) in subsection (a)—

(A) in paragraph (1), by striking “program” and inserting “coordinated program across the Department”;

(B) by striking “and” at the end of paragraph (1);

(C) by striking the period at the end of paragraph (2) and inserting “; and”;

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

“(3) partner with universities, National Laboratories, and industry to ensure the broadest possible application of the technology developed in this program to other challenges in science, engineering, medicine, and industry.”;

(2) in subsection (b)(2), by striking “vector” and all that follows through “architectures” and inserting “computer technologies that show promise of substantial reductions in power requirements and substantial gains in parallelism of multicore processors, concurrency, memory and storage, bandwidth, and reliability”; and

(3) by striking subsection (d) and inserting the following:

“(d) EXASCALE COMPUTING PROGRAM.—

“(1) IN GENERAL.—The Secretary shall conduct a coordinated research program to develop exascale computing systems to advance the missions of the Department.

“(2) EXECUTION.—The Secretary shall, through competitive merit review, establish two or more National Laboratory-industry-university partnerships to conduct integrated research, development, and engineering of multiple exascale architectures, and—

“(A) conduct mission-related co-design activities in developing such exascale platforms;

“(B) develop those advancements in hardware and software technology required to fully realize the potential of an exascale production system in addressing Department target applications and solving scientific problems involving predictive modeling and simulation and large-scale data analytics and management; and

“(C) explore the use of exascale computing technologies to advance a broad range of science and engineering.

“(3) ADMINISTRATION.—In carrying out this program, the Secretary shall—

“(A) provide, on a competitive, merit-reviewed basis, access for researchers in United States industry, institutions of higher education, National Laboratories, and other Federal agencies to these exascale systems, as appropriate; and

“(B) conduct outreach programs to increase the readiness for the use of such platforms by domestic industries, including manufacturers.

“(4) REPORTS.—

“(A) INTEGRATED STRATEGY AND PROGRAM MANAGEMENT PLAN.—The Secretary shall submit to Congress, not later than 90 days after the date of enactment of the America COMPETES Reauthorization Act of 2015, a report outlining an integrated strategy and program management plan, including target dates for prototypical and production exascale platforms, interim milestones to reaching these targets, functional requirements, roles and responsibilities of National Laboratories and industry, acquisition strategy, and estimated resources required, to achieve this exascale system capability. The report shall include the Secretary’s plan for Departmental

organization to manage and execute the Exascale Computing Program, including definition of the roles and responsibilities within the Department to ensure an integrated program across the Department. The report shall also include a plan for ensuring balance and prioritizing across ASCR sub-programs in a flat or slow-growth budget environment.

“(B) STATUS REPORTS.—At the time of the budget submission of the Department for each fiscal year, the Secretary shall submit a report to Congress that describes the status of milestones and costs in achieving the objectives of the exascale computing program.

“(C) EXASCALE MERIT REPORT.—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—

“(i) the proposed facility’s cost projections and capabilities to significantly accelerate the development of new energy technologies;

“(ii) technical risks and challenges that must be overcome to achieve successful completion and operation of the facility; and

“(iii) an independent assessment of the scientific and technological advances expected from such a facility relative to those expected from a comparable investment in expanded research and applications at terascale-class and petascale-class computing facilities, including an evaluation of where investments should be made in the system software and algorithms to enable these advances.”.

#### SEC. 504. HIGH ENERGY PHYSICS.

(a) PROGRAM.—The Director shall carry out a research program on the fundamental constituents of matter and energy and the nature of space and time.

(b) SENSE OF CONGRESS.—It is the sense of the Congress that—

(1) the Director should incorporate the findings and recommendations of the Particle Physics Project Prioritization Panel’s report entitled “Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context”, into the Department’s planning process as part of the program described in subsection (a);

(2) the Director should prioritize domestically hosted research projects that will maintain the United States position as a global leader in particle physics and attract the world’s most talented physicists and foreign investment for international collaboration; and

(3) the nations that lead in particle physics by hosting international teams dedicated to a common scientific goal attract the world’s best talent and inspire future generations of physicists and technologists.

(c) 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 include collaborations with the National Science Foundation or international collaborations.

(d) 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, which may include collaborations with the National Aeronautics and Space Administration or the National Science Foundation, or international collaborations.

(e) ACCELERATOR RESEARCH AND DEVELOPMENT.—The Director shall carry out research and development in advanced accelerator concepts and technologies, including laser technologies, to reduce the necessary scope and cost for the next generation of particle accelerators. The Director shall ensure access to national laboratory accelerator facilities, infrastructure, and technology for users and developers of accelerators that advance applications in energy and the environment, medicine, industry, national security, and discovery science.

(f) INTERNATIONAL COLLABORATION.—The Director, as practicable and in coordination with other appropriate Federal agencies as necessary, shall ensure the access of United States researchers to the most advanced accelerator facilities and research capabilities in the world, including the Large Hadron Collider.

#### SEC. 505. BIOLOGICAL AND ENVIRONMENTAL RESEARCH.

(a) PROGRAM.—The Director shall carry out a program of research, development, and demonstration in the areas of biological systems science and climate and environmental science to support the energy and environmental missions of the Department.

(b) PRIORITY RESEARCH.—In carrying out this section, the Director shall prioritize fundamental research on biological systems and genomics science with the greatest potential to enable scientific discovery.

(c) ASSESSMENT.—Not later than 12 months after the date of enactment of this Act, the Comptroller General shall submit a report to Congress identifying climate

science-related initiatives under this section that overlap or duplicate initiatives of other Federal agencies and the extent of such overlap or duplication.

(d) **LIMITATION.**—The Director shall not approve new climate science-related initiatives to be carried out through the Office of Science without making a determination that such work is unique and not duplicative of work by other Federal agencies. Not later than 3 months after receiving the assessment required under subsection (c), the Director shall cease those climate science-related initiatives identified in the assessment as overlapping or duplicative, unless the Director justifies that such work is critical to achieving American energy security.

(e) **LOW DOSE RADIATION RESEARCH PROGRAM.**—

(1) **IN GENERAL.**—The Director of the Department of Energy Office of Science shall carry out a research program on low dose radiation. The purpose of the program is to enhance the scientific understanding of and reduce uncertainties associated with the effects of exposure to low dose radiation in order to inform improved risk management methods.

(2) **STUDY.**—Not later than 60 days after the date of enactment of this Act, the Director shall enter into an agreement with the National Academies to conduct a study assessing the current status and development of a long-term strategy for low dose radiation research. Such study shall be completed not later than 18 months after the date of enactment of this Act. The study shall be conducted in coordination with Federal agencies that perform ionizing radiation effects research and shall leverage the most current studies in this field. Such study shall—

(A) identify current scientific challenges for understanding the long-term effects of ionizing radiation;

(B) assess the status of current low dose radiation research in the United States and internationally;

(C) formulate overall scientific goals for the future of low-dose radiation research in the United States;

(D) recommend a long-term strategic and prioritized research agenda to address scientific research goals for overcoming the identified scientific challenges in coordination with other research efforts;

(E) define the essential components of a research program that would address this research agenda within the universities and the National Laboratories; and

(F) assess the cost-benefit effectiveness of such a program.

(3) **RESEARCH PLAN.**—Not later than 90 days after the completion of the study performed under paragraph (2) the Secretary of Energy shall deliver to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a 5-year research plan that responds to the study's findings and recommendations and identifies and prioritizes research needs.

(4) **DEFINITION.**—In this subsection, the term “low dose radiation” means a radiation dose of less than 100 millisieverts.

(5) **RULE OF CONSTRUCTION.**—Nothing in this subsection shall be construed to subject any research carried out by the Director under the research program under this subsection to any limitations described in section 977(e) of the Energy Policy Act of 2005 (42 U.S.C. 16317(e)).

#### **SEC. 506. FUSION ENERGY.**

(a) **PROGRAM.**—The Director shall carry out a fusion energy sciences research program to expand the fundamental understanding of plasmas and matter at very high temperatures and densities and to build the scientific foundation necessary to enable fusion power.

(b) **FUSION MATERIALS RESEARCH AND DEVELOPMENT.**—As part of the activities authorized in section 978 of the Energy Policy Act of 2005 (42 U.S.C. 16318)—

(1) 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 demonstrate materials that can endure the neutron, plasma, and heat fluxes expected in a fusion power system; and

(2) the Secretary shall—

(A) provide an assessment of the need for a facility or facilities that can examine and test potential fusion and next generation fission materials and other enabling technologies relevant to the development of fusion power; and

(B) provide an assessment of whether a single new facility that substantially addresses magnetic 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.



## (c) TOKAMAK RESEARCH AND DEVELOPMENT.—

(1) IN GENERAL.—As part of the program described in subsection (a), the Director shall support research and development activities and facility operations to optimize the tokamak approach to fusion energy.

## (2) ITER.—

(A) REPORT.—Not later than 1 year after the date of enactment of this Act, the Secretary shall submit to Congress a report providing an assessment of—

(i) the most recent schedule for ITER that has been approved by the ITER Council; and

(ii) progress of the ITER Council and the ITER Director General toward implementation of the recommendations of the Third Biennial International Organization Management Assessment Report.

(B) FAIRNESS IN COMPETITION FOR SOLICITATIONS FOR INTERNATIONAL PROJECT ACTIVITIES.—Section 33 of the Atomic Energy Act of 1954 (42 U.S.C. 2053) is amended by adding at the end the following: “For purposes of this section, with respect to international research projects, the term ‘private facilities or laboratories’ shall refer to facilities or laboratories located in the United States.”.

(C) SENSE OF CONGRESS.—It is the sense of Congress that the United States should support a robust, diverse fusion program. It is further the sense of Congress that developing the scientific basis for fusion, providing research results key to the success of ITER, and training the next generation of fusion scientists are of critical importance to the United States and should in no way be diminished by participation of the United States in the ITER project.

(d) 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, laser, and pulsed power fusion systems.

## (e) ALTERNATIVE AND ENABLING CONCEPTS.—

(1) IN GENERAL.—As part of the program described in subsection (a), the Director shall support research and development activities and facility operations at United States universities, national laboratories, and private facilities for a portfolio of alternative and enabling fusion energy concepts that may provide solutions to significant challenges to the establishment of a commercial magnetic fusion power plant, prioritized based on the ability of the United States to play a leadership role in the international fusion research community. Fusion energy concepts and activities explored under this paragraph may include—

(A) high magnetic field approaches facilitated by high temperature superconductors;

(B) advanced stellarator concepts;

(C) non-tokamak confinement configurations operating at low magnetic fields;

(D) magnetized target fusion energy concepts;

(E) liquid metals to address issues associated with fusion plasma interactions with the inner wall of the encasing device;

(F) immersion blankets for heat management and fuel breeding;

(G) advanced scientific computing activities; and

(H) other promising fusion energy concepts identified by the Director.

(2) COORDINATION WITH ARPA-E.—The Under Secretary and the Director shall coordinate with the Director of the Advanced Research Projects Agency–Energy (in this paragraph referred to as “ARPA-E”) to—

(A) assess the potential for any fusion energy project supported by ARPA-E to represent a promising approach to a commercially viable fusion power plant;

(B) determine whether the results of any fusion energy project supported by ARPA-E merit the support of follow-on research activities carried out by the Office of Science; and

(C) avoid unintentional duplication of activities.

(f) GENERAL PLASMA SCIENCE AND APPLICATIONS.—Not later than 2 years after the date of enactment of this Act, the Secretary shall provide to Congress an assessment of opportunities in which the United States can provide world-leading contributions to advancing plasma science and non-fusion energy applications, and identify opportunities for partnering with other Federal agencies both within and outside of the Department of Energy.

## (g) IDENTIFICATION OF PRIORITIES.—

(1) REPORT.—Not later than 2 years after the date of enactment of this Act, the Secretary shall transmit to Congress a report on the Department’s proposed

fusion energy research and development activities over the following 10 years under at least 3 realistic budget scenarios, including a scenario based on 3 percent annual growth in the non-ITER portion of the budget for fusion energy research and development activities. The report shall—

(A) identify specific areas of fusion energy research and enabling technology development in which the United States can and should establish or solidify a lead in the global fusion energy development effort;

(B) identify priorities for initiation of facility construction and facility decommissioning under each of those scenarios; and

(C) assess the ability of the United States fusion workforce to carry out the activities identified in subparagraphs (A) and (B), including the adequacy of college and university programs to train the leaders and workers of the next generation of fusion energy researchers.

(2) PROCESS.—In order to develop the report required under paragraph (1), the Secretary shall leverage best practices and lessons learned from the process used to develop the most recent report of the Particle Physics Project Prioritization Panel of the High Energy Physics Advisory Panel. No member of the Fusion Energy Sciences Advisory Committee shall be excluded from participating in developing or voting on final approval of the report required under paragraph (1).

#### **SEC. 507. NUCLEAR PHYSICS.**

(a) PROGRAM.—The Director shall carry out a program of experimental and theoretical research, and support associated facilities, to discover, explore, and understand all forms of nuclear matter.

(b) 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, medical, industrial, or other purposes. In making this determination, the Secretary shall—

(1) ensure that, as has been the policy of the United States since the publication in 1965 of Federal Register notice 30 Fed. Reg. 3247, isotope production activities do not compete with private industry unless critical national interests necessitate the Federal Government's involvement;

(2) ensure that activities undertaken pursuant to this section, to the extent practicable, promote the growth of a robust domestic isotope production industry; and

(3) consider any relevant recommendations made by Federal advisory committees, the National Academies, and interagency working groups in which the Department participates.

#### **SEC. 508. 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) APPROACH.—In carrying out this section, the Director shall utilize all available approaches and mechanisms, including capital line items, minor construction projects, energy savings performance contracts, utility energy service contracts, alternative financing, and expense funding, as appropriate.

#### **SEC. 509. DOMESTIC MANUFACTURING.**

Not later than 1 year after the date of enactment of this Act, the Secretary shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on the current ability of domestic manufacturers to meet the procurement requirements for major ongoing projects funded by the Office of Science of the Department, including a calculation of the percentage of equipment acquired from domestic manufacturers for this purpose.

#### **SEC. 510. AUTHORIZATION OF APPROPRIATIONS.**

(a) FISCAL YEAR 2016.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2016 \$5,339,800,000, of which—

(1) \$1,850,000,000 shall be for Basic Energy Science;

(2) \$788,000,000 shall be for High Energy Physics;

(3) \$550,000,000 shall be for Biological and Environmental Research;

- (4) \$624,700,000 shall be for Nuclear Physics;
  - (5) \$621,000,000 shall be for Advanced Scientific Computing Research;
  - (6) \$488,000,000 shall be for Fusion Energy Sciences;
  - (7) \$113,600,000 shall be for Science Laboratories Infrastructure;
  - (8) \$181,000,000 shall be for Science Program Direction;
  - (9) \$103,000,000 shall be for Safeguards and Security; and
  - (10) \$20,500,000 shall be for Workforce Development for Teachers and Scientists.
- (b) FISCAL YEAR 2017.—There are authorized to be appropriated to the Secretary for the Office of Science for fiscal year 2017 \$5,339,800,000, of which—
- (1) \$1,850,000,000 shall be for Basic Energy Science;
  - (2) \$788,000,000 shall be for High Energy Physics;
  - (3) \$550,000,000 shall be for Biological and Environmental Research;
  - (4) \$624,700,000 shall be for Nuclear Physics;
  - (5) \$621,000,000 shall be for Advanced Scientific Computing Research;
  - (6) \$488,000,000 shall be for Fusion Energy Sciences;
  - (7) \$113,600,000 shall be for Science Laboratories Infrastructure;
  - (8) \$181,000,000 shall be for Science Program Direction;
  - (9) \$103,000,000 shall be for Safeguards and Security; and
  - (10) \$20,500,000 shall be for Workforce Development for Teachers and Scientists.

**SEC. 511. DEFINITIONS.**

In this title—

- (1) the term “Department” means the Department of Energy;
- (2) the term “Director” means the Director of the Office of Science of the Department; and
- (3) the term “Secretary” means the Secretary of Energy.

## **TITLE VI—DEPARTMENT OF ENERGY APPLIED RESEARCH AND DEVELOPMENT**

### **Subtitle A—Crosscutting Research and Development**

**SEC. 601. CROSSCUTTING RESEARCH AND DEVELOPMENT.**

(a) CROSSCUTTING RESEARCH AND DEVELOPMENT.—The Secretary shall, through the Under Secretary for Science and Energy, utilize the capabilities of the Department to identify strategic opportunities for collaborative research, development, demonstration, and commercial application of innovative science and technologies for—

- (1) advancing the understanding of the energy-water-land use nexus;
- (2) modernizing the electric grid by improving energy transmission and distribution systems security and resiliency;
- (3) utilizing supercritical carbon dioxide in electric power generation;
- (4) subsurface technology and engineering;
- (5) high performance computing;
- (6) cybersecurity; and
- (7) critical challenges identified through comprehensive energy studies, evaluations, and reviews.

(b) CROSSCUTTING APPROACHES.—To the maximum extent practicable, the Secretary shall seek to leverage existing programs, and consolidate and coordinate activities, throughout the Department to promote collaboration and crosscutting approaches within programs.

(c) ADDITIONAL ACTIONS.—The Secretary shall—

- (1) prioritize activities that promote the utilization of all affordable domestic resources;
- (2) develop a rigorous and realistic planning, evaluation, and technical assessment framework for setting objective, long-term strategic goals and evaluating progress that ensures the integrity and independence to insulate planning from political influence and the flexibility to adapt to market dynamics;
- (3) ensure that activities shall be undertaken in a manner that does not duplicate other activities within the Department or other Federal Government activities; and

- (4) identify programs that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.

**SEC. 602. STRATEGIC RESEARCH PORTFOLIO ANALYSIS AND COORDINATION PLAN.**

Section 994 of Energy Policy Act of 2005 (42 U.S.C. 16358) is amended to read as follows:

**“SEC. 994. STRATEGIC RESEARCH PORTFOLIO ANALYSIS AND COORDINATION PLAN.**

“(a) **IN GENERAL.**—The Secretary shall periodically review all of the science and technology activities of the Department in a strategic framework that takes into account the frontiers of science to which the Department can contribute, the national needs relevant to the Department’s statutory missions, and global energy dynamics.

“(b) **COORDINATION ANALYSIS AND PLAN.**—As part of the review under subsection (a), the Secretary shall develop a plan to improve coordination and collaboration in research, development, demonstration, and commercial application activities across Department organizational boundaries.

“(c) **PLAN CONTENTS.**—The plan shall describe—

“(1) cross-cutting scientific and technical issues and research questions that span more than one program or major office of the Department;

“(2) how the applied technology programs of the Department are coordinating their activities, and addressing those questions;

“(3) ways in which the technical interchange within the Department, particularly between the Office of Science and the applied technology programs, can be enhanced, including limited ways in which the research agendas of the Office of Science and the applied programs can better interact and assist each other;

“(4) a description of how the Secretary will ensure that the Department’s overall research agenda include, in addition to fundamental, curiosity-driven research, fundamental research related to topics of concern to the applied programs, and applications in Departmental technology programs of research results generated by fundamental, curiosity-driven research;

“(5) critical assessments of any ongoing programs that have experienced subpar performance or cost over-runs of 10 percent or more over one or more years; and

“(6) activities that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.

“(d) **PLAN TRANSMITTAL.**—Not later than 1 year after the date of enactment of the America COMPETES Reauthorization Act of 2015, and every 4 years thereafter, the Secretary shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate the results of the review under subsection (a) and the coordination plan under subsection (b).”.

**SEC. 603. STRATEGY FOR FACILITIES AND INFRASTRUCTURE.**

(a) **AMENDMENTS.**—Section 993 of the Energy Policy Act of 2005 (42 U.S.C. 16357) is amended—

(1) by amending the section heading to read as follows: “**STRATEGY FOR FACILITIES AND INFRASTRUCTURE**”; and

(2) in subsection (b)(1), by striking “2008” and inserting “2018”.

(b) **TABLE OF CONTENTS AMENDMENT.**—The item relating to section 993 in the table of contents of the Energy Policy Act of 2005 is amended to read as follows:

“Sec. 993. Strategy for facilities and infrastructure.”.

## Subtitle B—Electricity Delivery and Energy Reliability Research and Development

**SEC. 611. DISTRIBUTED ENERGY AND ELECTRIC ENERGY SYSTEMS.**

Section 921 of the Energy Policy Act of 2005 (42 U.S.C. 16211) is amended to read as follows:

**“SEC. 921. DISTRIBUTED ENERGY AND ELECTRIC ENERGY SYSTEMS.**

“(a) **IN GENERAL.**—The Secretary shall carry out programs of research, development, demonstration, and commercial application on distributed energy resources and systems reliability and efficiency, to improve the reliability and efficiency of distributed energy resources and systems, integrating advanced energy technologies with grid connectivity, including activities described in this subtitle. The programs

shall address advanced energy technologies and systems and advanced grid security, resiliency, and reliability technologies.

“(b) OBJECTIVES.—To the maximum extent practicable, the Secretary shall seek to—

- “(1) leverage existing programs;
- “(2) consolidate and coordinate activities throughout the Department to promote collaboration and crosscutting approaches;
- “(3) ensure activities are undertaken in a manner that does not duplicate other activities within the Department or other Federal Government activities; and
- “(4) identify programs that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.”.

**SEC. 612. ELECTRIC TRANSMISSION AND DISTRIBUTION RESEARCH AND DEVELOPMENT.**

(a) AMENDMENTS.—Section 925 of the Energy Policy Act of 2005 (42 U.S.C. 16215) is amended—

(1) by amending the section heading to read as follows: “**ELECTRIC TRANSMISSION AND DISTRIBUTION RESEARCH AND DEVELOPMENT**”;

(2) by amending subsection (a) to read as follows:

“(a) PROGRAM.—The Secretary shall establish a comprehensive research, development, and demonstration program to ensure the reliability, efficiency, and environmental integrity of electrical transmission and distribution systems, which shall include innovations for—

- “(1) advanced energy delivery technologies, energy storage technologies, materials, and systems;
- “(2) advanced grid reliability and efficiency technology development;
- “(3) technologies contributing to significant load reductions;
- “(4) advanced metering, load management, and control technologies;
- “(5) technologies to enhance existing grid components;
- “(6) the development and use of high-temperature superconductors to—
  - “(A) enhance the reliability, operational flexibility, or power-carrying capability of electric transmission or distribution systems; or
  - “(B) increase the efficiency of electric energy generation, transmission, distribution, or storage systems;
- “(7) integration of power systems, including systems to deliver high-quality electric power, electric power reliability, and combined heat and power;
- “(8) supply of electricity to the power grid by small scale, distributed, and residential-based power generators;
- “(9) the development and use of advanced grid design, operation, and planning tools; and
- “(10) any other infrastructure technologies, as appropriate.”; and

(3) by amending subsection (c) to read as follows:

“(c) IMPLEMENTATION.—

“(1) CONSORTIUM.—The Secretary shall consider implementing the program under this section using a consortium of participants from industry, institutions of higher education, and National Laboratories.

“(2) OBJECTIVES.—To the maximum extent practicable the Secretary shall seek to—

- “(A) leverage existing programs;
- “(B) consolidate and coordinate activities, throughout the Department to promote collaboration and crosscutting approaches;
- “(C) ensure activities are undertaken in a manner that does not duplicate other activities within the Department or other Federal Government activities; and
- “(D) identify programs that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.”.

(b) TABLE OF CONTENTS AMENDMENT.—The item relating to section 925 in the table of contents of the Energy Policy Act of 2005 is amended to read as follows:

“Sec. 925. Electric transmission and distribution research and development.”.

## Subtitle C—Nuclear Energy Research and Development

**SEC. 621. OBJECTIVES.**

Section 951 of the Energy Policy Act of 2005 (42 U.S.C. 16271) is amended—

(1) by amending subsection (a) to read as follows:

“(a) IN GENERAL.—The Secretary shall conduct programs of civilian nuclear energy research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall take into consideration the following objectives:

“(1) Enhancing nuclear power’s viability as part of the United States energy portfolio.

“(2) Reducing used nuclear fuel and nuclear waste products generated by civilian nuclear energy.

“(3) Supporting technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty.

“(4) Providing the technical means to reduce the likelihood of nuclear proliferation.

“(5) Maintaining a cadre of nuclear scientists and engineers.

“(6) Maintaining National Laboratory and university nuclear programs, including their infrastructure.

“(7) Supporting both individual researchers and multidisciplinary teams of researchers to pioneer new approaches in nuclear energy, science, and technology.

“(8) Developing, planning, constructing, acquiring, and operating special equipment and facilities for the use of researchers.

“(9) Supporting technology transfer and other appropriate activities to assist the nuclear energy industry, and other users of nuclear science and engineering, including activities addressing reliability, availability, productivity, component aging, safety, and security of nuclear power plants.

“(10) Reducing the environmental impact of nuclear energy-related activities.

“(11) Researching and developing technologies and processes to meet Federal and State requirements and standards for nuclear power systems.”;

(2) by striking subsections (b) through (d); and

(3) by redesignating subsection (e) as subsection (b).

#### SEC. 622. PROGRAM OBJECTIVES STUDY.

Section 951 of the Energy Policy Act of 2005 (42 U.S.C. 16271) is further amended by adding at the end the following new subsection:

“(c) PROGRAM OBJECTIVES STUDY.—In furtherance of the program objectives listed in subsection (a) of this section, the Government Accountability Office shall, within one year after the date of enactment of this subsection, transmit to the Congress a report on the results of a study on the scientific and technical merit of major Federal and State requirements and standards, including moratoria, that delay or impede the further development and commercialization of nuclear power, and how the Department can assist in overcoming such delays or impediments.”.

#### SEC. 623. NUCLEAR ENERGY RESEARCH AND DEVELOPMENT PROGRAMS.

Section 952 of the Energy Policy Act of 2005 (42 U.S.C. 16272) is amended by striking subsections (c) through (e) and inserting the following:

“(c) REACTOR CONCEPTS.—

“(1) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application to advance nuclear power systems as well as technologies to sustain currently deployed systems.

“(2) DESIGNS AND TECHNOLOGIES.—In conducting the program under this subsection, the Secretary shall examine advanced reactor designs and nuclear technologies, including those that—

“(A) have higher efficiency, lower cost, and improved safety compared to reactors in operation as of the date of enactment of the America COMPETES Reauthorization Act of 2015;

“(B) utilize passive safety features;

“(C) minimize proliferation risks;

“(D) substantially reduce production of high-level waste per unit of output;

“(E) increase the life and sustainability of reactor systems currently deployed;

“(F) use improved instrumentation;

“(G) are capable of producing large-scale quantities of hydrogen or process heat;

“(H) minimize water usage or use alternatives to water as a cooling mechanism; or

“(I) use nuclear energy as part of an integrated energy system.

“(3) INTERNATIONAL COOPERATION.—In carrying out the program under this subsection, the Secretary shall seek opportunities to enhance the progress of the program through international cooperation through such organizations as the

Generation IV International Forum or any other international collaboration the Secretary considers appropriate.

“(4) EXCEPTIONS.—No funds authorized to be appropriated to carry out the activities described in this subsection shall be used to fund the activities authorized under sections 641 through 645.”.

**SEC. 624. SMALL MODULAR REACTOR PROGRAM.**

Section 952 of the Energy Policy Act of 2005 (42 U.S.C. 16272) is further amended by adding at the end the following new subsection:

“(d) SMALL MODULAR REACTOR PROGRAM.—

“(1) IN GENERAL.—The Secretary shall carry out a small modular reactor program to promote research, development, demonstration, and commercial application of small modular reactors, including through cost-shared projects for commercial application of reactor systems designs.

“(2) CONSULTATION.—The Secretary shall consult with and utilize the expertise of the Secretary of the Navy in establishing and carrying out such program.

“(3) ADDITIONAL ACTIVITIES.—Activities may also include development of advanced computer modeling and simulation tools, by Federal and non-Federal entities, which demonstrate and validate new design capabilities of innovative small modular reactor designs.

“(4) DEFINITION.—For the purposes of this subsection, the term ‘small modular reactor’ means a nuclear reactor meeting generally accepted industry standards—

“(A) with a rated capacity of less than 300 electrical megawatts;

“(B) with respect to which most parts can be factory assembled and shipped as modules to a reactor plant site for assembly; and

“(C) that can be constructed and operated in combination with similar reactors at a single site.”.

**SEC. 625. FUEL CYCLE RESEARCH AND DEVELOPMENT.**

(a) AMENDMENTS.—Section 953 of the Energy Policy Act of 2005 (42 U.S.C. 16273) is amended—

(1) in the section heading by striking “ADVANCED FUEL CYCLE INITIATIVE” and inserting “FUEL CYCLE RESEARCH AND DEVELOPMENT”;

(2) by striking subsection (a);

(3) by redesignating subsections (b) through (d) as subsections (d) through (f), respectively; and

(4) by inserting before subsection (d), as so redesignated by paragraph (3) of this subsection, the following new subsections:

“(a) IN GENERAL.—The Secretary shall conduct a fuel cycle research, development, demonstration, and commercial application program (referred to in this section as the ‘program’) on fuel cycle options that improve uranium resource utilization, maximize energy generation, minimize nuclear waste creation, improve safety, mitigate risk of proliferation, and improve waste management in support of a national strategy for spent nuclear fuel and the reactor concepts research, development, demonstration, and commercial application program under section 952(c).

“(b) FUEL CYCLE OPTIONS.—Under this section the Secretary may consider implementing the following initiatives:

“(1) OPEN CYCLE.—Developing fuels, including the use of nonuranium materials and alternate claddings, for use in reactors that increase energy generation, improve safety performance and margins, and minimize the amount of nuclear waste produced in an open fuel cycle.

“(2) RECYCLE.—Developing advanced recycling technologies, including advanced reactor concepts to improve resource utilization, reduce proliferation risks, and minimize radiotoxicity, decay heat, and mass and volume of nuclear waste to the greatest extent possible.

“(3) ADVANCED STORAGE METHODS.—Developing advanced storage technologies for both onsite and long-term storage that substantially prolong the effective life of current storage devices or that substantially improve upon existing nuclear waste storage technologies and methods, including repositories.

“(4) FAST TEST REACTOR.—Investigating the potential research benefits of a fast test reactor user facility to conduct experiments on fuels and materials related to fuel forms and fuel cycles that will increase fuel utilization, reduce proliferation risks, and reduce nuclear waste products.

“(5) ADVANCED REACTOR INNOVATION.—Developing an advanced reactor innovation testbed where national laboratories, universities, and industry can address advanced reactor design challenges to enable construction and operation of privately funded reactor prototypes to resolve technical uncertainty for United States-based designs for future domestic and international markets.

- “(6) OTHER TECHNOLOGIES.—Developing any other technology or initiative that the Secretary determines is likely to advance the objectives of the program.
- “(c) ADDITIONAL ADVANCED RECYCLING AND CROSSCUTTING ACTIVITIES.—In addition to and in support of the specific initiatives described in paragraphs (1) through (5) of subsection (b), the Secretary may support the following activities:
- “(1) Development and testing of integrated process flow sheets for advanced nuclear fuel recycling processes.
- “(2) Research to characterize the byproducts and waste streams resulting from fuel recycling processes.
- “(3) Research and development on reactor concepts or transmutation technologies that improve resource utilization or reduce the radiotoxicity of waste streams.
- “(4) Research and development on waste treatment processes and separations technologies, advanced waste forms, and quantification of proliferation risks.
- “(5) Identification and evaluation of test and experimental facilities necessary to successfully implement the advanced fuel cycle initiative.
- “(6) Advancement of fuel cycle-related modeling and simulation capabilities.
- “(7) Research to understand the behavior of high-burnup fuels.”.
- (b) CONFORMING AMENDMENT.—The item relating to section 953 in the table of contents of the Energy Policy Act of 2005 is amended to read as follows:

“Sec. 953. Fuel cycle research and development.”.

**SEC. 626. NUCLEAR ENERGY ENABLING TECHNOLOGIES PROGRAM.**

(a) AMENDMENT.—Subtitle E of title IX of the Energy Policy Act of 2005 (42 U.S.C. 16271 et seq.) is amended by adding at the end the following new section:

**“SEC. 958. NUCLEAR ENERGY ENABLING TECHNOLOGIES.**

“(a) IN GENERAL.—The Secretary shall conduct a program to support the integration of activities undertaken through the reactor concepts research, development, demonstration, and commercial application program under section 952(c) and the fuel cycle research and development program under section 953, and support crosscutting nuclear energy concepts. Activities commenced under this section shall be concentrated on broadly applicable research and development focus areas.

“(b) ACTIVITIES.—Activities conducted under this section may include research involving—

- “(1) advanced reactor materials;
- “(2) advanced radiation mitigation methods;
- “(3) advanced proliferation and security risk assessment methods;
- “(4) advanced sensors and instrumentation;
- “(5) high performance computation modeling, including multiphysics, multi-dimensional modeling simulation for nuclear energy systems, and continued development of advanced modeling simulation capabilities through national laboratory, industry, and university partnerships for operations and safety performance improvements of light water reactors for currently deployed and near-term reactors and advanced reactors and for the development of small modular reactors; and
- “(6) any crosscutting technology or transformative concept aimed at establishing substantial and revolutionary enhancements in the performance of future nuclear energy systems that the Secretary considers relevant and appropriate to the purpose of this section.

“(c) REPORT.—The Secretary shall submit, as part of the annual budget submission of the Department, a report on the activities of the program conducted under this section, which shall include a brief evaluation of each activity’s progress.”.

(b) CONFORMING AMENDMENT.—The table of contents of the Energy Policy Act of 2005 is amended by adding at the end of the items for subtitle E of title IX the following new item:

“Sec. 958. Nuclear energy enabling technologies.”.

**SEC. 627. TECHNICAL STANDARDS COLLABORATION.**

(a) IN GENERAL.—The Director of the National Institute of Standards and Technology shall establish a nuclear energy standards committee (in this section referred to as the “technical standards committee”) to facilitate and support, consistent with the National Technology Transfer and Advancement Act of 1995, the development or revision of technical standards for new and existing nuclear power plants and advanced nuclear technologies.

(b) MEMBERSHIP.—

- (1) IN GENERAL.—The technical standards committee shall include representatives from appropriate Federal agencies and the private sector, and be open to materially affected organizations involved in the development or application of nuclear energy-related standards.



(2) CO-CHAIRS.—The technical standards committee shall be co-chaired by a representative from the National Institute of Standards and Technology and a representative from a private sector standards organization.

(c) DUTIES.—The technical standards committee shall, in cooperation with appropriate Federal agencies—

(1) perform a needs assessment to identify and evaluate the technical standards that are needed to support nuclear energy, including those needed to support new and existing nuclear power plants and advanced nuclear technologies, including developing the technical basis for regulatory frameworks for advanced reactors;

(2) formulate, coordinate, and recommend priorities for the development of new technical standards and the revision of existing technical standards to address the needs identified under paragraph (1);

(3) facilitate and support collaboration and cooperation among standards developers to address the needs and priorities identified under paragraphs (1) and (2);

(4) as appropriate, coordinate with other national, regional, or international efforts on nuclear energy-related technical standards in order to avoid conflict and duplication and to ensure global compatibility; and

(5) promote the establishment and maintenance of a database of nuclear energy-related technical standards.

(d) AUTHORIZATION OF APPROPRIATIONS.—To the extent provided for in advance by appropriations Acts, the Secretary may transfer to the Director of the National Institute of Standards and Technology not to exceed \$1,000,000 for fiscal year 2016 for the Secretary of Commerce to carry out this section from amounts appropriated for nuclear energy research and development within the Nuclear Energy Enabling Technologies account for the Department.

#### **SEC. 628. AVAILABLE FACILITIES DATABASE.**

The Secretary shall prepare a database of non-Federal user facilities receiving Federal funds that may be used for unclassified nuclear energy research. The Secretary shall make this database accessible on the Department's website.

#### **SEC. 629. NUCLEAR WASTE DISPOSAL.**

To the extent consistent with the requirements of current law, the Department shall be responsible for disposal of high-level radioactive waste or spent nuclear fuel generated by reactors under the programs authorized in this subtitle, or the amendments made by this subtitle.

## **Subtitle D—Energy Efficiency and Renewable Energy Research and Development**

#### **SEC. 641. ENERGY EFFICIENCY.**

Section 911 of the Energy Policy Act of 2005 (42 U.S.C. 16191) is amended to read as follows:

#### **“SEC. 911. ENERGY EFFICIENCY.**

“(a) OBJECTIVES.—The Secretary shall conduct programs of energy efficiency research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall prioritize activities that industry by itself is not likely to undertake because of technical challenges or regulatory uncertainty, and take into consideration the following objectives:

“(1) Increasing energy efficiency.

“(2) Reducing the cost of energy.

“(3) Reducing the environmental impact of energy-related activities.

“(b) PROGRAMS.—Programs under this subtitle shall include research, development, demonstration, and commercial application of—

“(1) innovative, affordable technologies to improve the energy efficiency and environmental performance of vehicles, including weight and drag reduction technologies, technologies, modeling, and simulation for increasing vehicle connectivity and automation, and whole-vehicle design optimization;

“(2) cost-effective technologies, for new construction and retrofit, to improve the energy efficiency and environmental performance of buildings, using a whole-buildings approach;

“(3) advanced technologies to improve the energy efficiency, environmental performance, and process efficiency of energy-intensive and waste-intensive industries;

“(4) technologies to improve the energy efficiency of appliances and mechanical systems for buildings in extreme climates, including cogeneration, trigeneration, and polygeneration units;  
 “(5) advanced battery technologies; and  
 “(6) fuel cell and hydrogen technologies.”.

**SEC. 642. NEXT GENERATION LIGHTING INITIATIVE.**

Section 912 of the Energy Policy Act of 2005 (42 U.S.C. 16192) and the item relating thereto in the table of contents of that Act are repealed.

**SEC. 643. BUILDING STANDARDS.**

Section 914 of the Energy Policy Act of 2005 (42 U.S.C. 16194) is amended by striking subsection (c).

**SEC. 644. SECONDARY ELECTRIC VEHICLE BATTERY USE PROGRAM.**

Section 915 of the Energy Policy Act of 2005 (42 U.S.C. 16195) and the item relating thereto in the table of contents of that Act are repealed.

**SEC. 645. NETWORK FOR MANUFACTURING INNOVATION PROGRAM.**

To the extent provided for in advance by appropriations Acts, the Secretary may transfer to the National Institute of Standards and Technology up to \$150,000,000 for the period encompassing fiscal years 2015 through 2017 from amounts appropriated for advanced manufacturing research and development under this subtitle (and the amendments made by this subtitle) for the Secretary of Commerce to carry out the Network for Manufacturing Innovation Program authorized under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

**SEC. 646. ADVANCED ENERGY TECHNOLOGY TRANSFER CENTERS.**

Section 917 of the Energy Policy Act of 2005 (42 U.S.C. 16197) is amended—

- (1) in subsection (a)—
  - (A) by inserting “and” at the end of paragraph (2)(B);
  - (B) by striking “; and” at the end of paragraph (3) and inserting a period;
- and
- (C) by striking paragraph (4);
- (2) in subsection (b)—
  - (A) by striking paragraph (1);
  - (B) by redesignating paragraphs (2) through (5) as paragraphs (1) through (4), respectively; and
  - (C) by striking paragraph (6);
- (3) by amending subsection (g) to read as follows:
 

“(g) PROHIBITION.—None of the funds awarded under this section may be used for the construction of facilities or the deployment of commercially available technologies.”; and
- (4) by striking subsection (i).

**SEC. 647. RENEWABLE ENERGY.**

Section 931 of the Energy Policy Act of 2005 (42 U.S.C. 16231) is amended to read as follows:

**“SEC. 931. RENEWABLE ENERGY.**

**“(a) IN GENERAL.—**

**“(1) OBJECTIVES.—**The Secretary shall conduct programs of renewable energy research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall prioritize discovery research and development and take into consideration the following objectives:

**“(A) Increasing the conversion efficiency of all forms of renewable energy through improved technologies.**

**“(B) Decreasing the cost of renewable energy generation and delivery.**

**“(C) Promoting the diversity of the energy supply.**

**“(D) Decreasing the dependence of the United States on foreign mineral resources.**

**“(E) Decreasing the environmental impact of renewable energy-related activities.**

**“(F) Increasing the export of renewable generation technologies from the United States.**

**“(2) PROGRAMS.—**

**“(A) SOLAR ENERGY.—**The Secretary shall conduct a program of research, development, demonstration, and commercial application for solar energy, including innovations in—

**“(i) photovoltaics;**

**“(ii) solar heating;**

**“(iii) concentrating solar power;**

- “(iv) lighting systems that integrate sunlight and electrical lighting in complement to each other; and
- “(v) development of technologies that can be easily integrated into new and existing buildings.

“(B) WIND ENERGY.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for wind energy, including innovations in—

- “(i) low speed wind energy;
- “(ii) testing and verification technologies;
- “(iii) distributed wind energy generation; and
- “(iv) transformational technologies for harnessing wind energy.

“(C) GEOTHERMAL.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for geothermal energy, including technologies for—

- “(i) improving detection of geothermal resources;
- “(ii) decreasing drilling costs;
- “(iii) decreasing maintenance costs through improved materials;
- “(iv) increasing the potential for other revenue sources, such as mineral production; and
- “(v) increasing the understanding of reservoir life cycle and management.

“(D) HYDROPOWER.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for technologies that enable the development of new and incremental hydropower capacity, including:

- “(i) Advanced technologies to enhance environmental performance and yield greater energy efficiencies.
- “(ii) Ocean energy, including wave energy.

“(E) MISCELLANEOUS PROJECTS.—The Secretary shall conduct research, development, demonstration, and commercial application programs for—

- “(i) the combined use of renewable energy technologies with one another and with other energy technologies, including the combined use of renewable power and fossil technologies;
- “(ii) renewable energy technologies for cogeneration of hydrogen and electricity; and
- “(iii) kinetic hydro turbines.

“(b) RURAL DEMONSTRATION PROJECTS.—In carrying out this section, the Secretary, in consultation with the Secretary of Agriculture, shall give priority to demonstrations that assist in delivering electricity to rural and remote locations including—

- “(1) advanced renewable power technology, including combined use with fossil technologies;
- “(2) biomass; and
- “(3) geothermal energy systems.

“(c) ANALYSIS AND EVALUATION.—

“(1) IN GENERAL.—The Secretary shall conduct analysis and evaluation in support of the renewable energy programs under this subtitle. These activities shall be used to guide budget and program decisions, and shall include—

- “(A) economic and technical analysis of renewable energy potential, including resource assessment;
- “(B) analysis of past program performance, both in terms of technical advances and in market introduction of renewable energy;
- “(C) assessment of domestic and international market drivers, including the impacts of any Federal, State, or local grants, loans, loan guarantees, tax incentives, statutory or regulatory requirements, or other government initiatives; and
- “(D) any other analysis or evaluation that the Secretary considers appropriate.

“(2) FUNDING.—The Secretary may designate up to 1 percent of the funds appropriated for carrying out this subtitle for analysis and evaluation activities under this subsection.

“(3) SUBMITTAL TO CONGRESS.—This analysis and evaluation shall be submitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate at least 30 days before each annual budget request is submitted to Congress.”

**SEC. 648. BIOENERGY PROGRAM.**

Section 932 of the Energy Policy Act of 2005 (42 U.S.C. 16232) is amended to read as follows:

**“SEC. 932. BIOENERGY PROGRAM.**

“(a) PROGRAM.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for bioenergy, including innovations in—

“(1) biopower energy systems;

“(2) biofuels;

“(3) bioproducts;

“(4) integrated biorefineries that may produce biopower, biofuels, and bioproducts; and

“(5) cross-cutting research and development in feedstocks.

“(b) BIOFUELS AND BIOPRODUCTS.—The goals of the biofuels and bioproducts programs shall be to develop, in partnership with industry and institutions of higher education—

“(1) advanced biochemical and thermochemical conversion technologies capable of making fuels from lignocellulosic feedstocks that are price-competitive with fossil-based fuels and fully compatible with either internal combustion engines or fuel cell-powered vehicles;

“(2) advanced conversion of biomass to biofuels and bioproducts as part of integrated biorefineries based on either biochemical processes, thermochemical processes, or hybrids of these processes; and

“(3) other advanced processes that will enable the development of cost-effective bioproducts, including biofuels.

“(c) RETROFIT TECHNOLOGIES FOR THE DEVELOPMENT OF ETHANOL FROM CELLULOSIC MATERIALS.—The Secretary shall establish a program of research, development, demonstration, and commercial application for technologies and processes to enable biorefineries that exclusively use corn grain or corn starch as a feedstock to produce ethanol to be retrofitted to accept a range of biomass, including lignocellulosic feedstocks.

“(d) LIMITATIONS.—None of the funds authorized for carrying out this section may be used to fund commercial biofuels production for defense purposes.

“(e) DEFINITIONS.—In this section:

“(1) BIOMASS.—The term ‘biomass’ means—

“(A) any organic material grown for the purpose of being converted to energy;

“(B) any organic byproduct of agriculture (including wastes from food production and processing) that can be converted into energy; or

“(C) any waste material that can be converted to energy, is segregated from other waste materials, and is derived from—

“(i) any of the following forest-related resources: mill residues, precommercial thinnings, slash, brush, or otherwise nonmerchantable material;

“(ii) wood waste materials, including waste pallets, crates, dunnage, manufacturing and construction wood wastes (other than pressure-treated, chemically treated, or painted wood wastes), and landscape or right-of-way tree trimmings, but not including municipal solid waste, gas derived from the biodegradation of municipal solid waste, or paper that is commonly recycled; or

“(iii) solids derived from waste water treatment processes.

“(2) LIGNOCELLULOSIC FEEDSTOCK.—The term ‘lignocellulosic feedstock’ means any portion of a plant or coproduct from conversion, including crops, trees, forest residues, grasses, and agricultural residues not specifically grown for food, including from barley grain, rapeseed, rice bran, rice hulls, rice straw, soybean matter, cornstover, and sugarcane bagasse.”.

**SEC. 649. CONCENTRATING SOLAR POWER RESEARCH PROGRAM.**

Section 934 of the Energy Policy Act of 2005 (42 U.S.C. 16234) and the item relating thereto in the table of contents of that Act are repealed.

**SEC. 650. RENEWABLE ENERGY IN PUBLIC BUILDINGS.**

Section 935 of the Energy Policy Act of 2005 (42 U.S.C. 16235) and the item relating thereto in the table of contents of that Act are repealed.

## Subtitle E—Fossil Energy Research and Development

### SEC. 661. FOSSIL ENERGY.

Section 961 of Energy Policy Act of 2005 (42 U.S.C. 16291) is amended to read as follows:

#### “SEC. 961. FOSSIL ENERGY.

“(a) IN GENERAL.—The Secretary shall carry out research, development, demonstration, and commercial application programs in fossil energy, including activities under this subtitle, with the goal of improving the efficiency, effectiveness, and environmental performance of fossil energy production, upgrading, conversion, and consumption. Such programs shall take into consideration the following objectives:

- “(1) Increasing the energy conversion efficiency of all forms of fossil energy through improved technologies.
- “(2) Decreasing the cost of all fossil energy production, generation, and delivery.
- “(3) Promoting diversity of energy supply.
- “(4) Decreasing the dependence of the United States on foreign energy supplies.
- “(5) Decreasing the environmental impact of energy-related activities.
- “(6) Increasing the export of fossil energy-related equipment, technology, and services from the United States.

“(b) OBJECTIVES.—To the maximum extent practicable, the Secretary shall seek to—

- “(1) leverage existing programs;
- “(2) consolidate and coordinate activities throughout the Department to promote collaboration and crosscutting approaches;
- “(3) ensure activities are undertaken in a manner that does not duplicate other activities within the Department or other Federal Government activities; and
- “(4) identify programs that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.

#### “(c) LIMITATIONS.—

- “(1) USES.—None of the funds authorized for carrying out this section may be used for Fossil Energy Environmental Restoration.
- “(2) INSTITUTIONS OF HIGHER EDUCATION.—Not less than 20 percent of the funds appropriated for carrying out section 964 of this Act for each fiscal year shall be dedicated to research and development carried out at institutions of higher education.
- “(3) USE FOR REGULATORY ASSESSMENTS OR DETERMINATIONS.—The results of any research, development, demonstration, or commercial application projects or activities of the Department authorized under this subtitle may not be used for regulatory assessments or determinations by Federal regulatory authorities.

#### “(d) ASSESSMENTS.—

- “(1) CONSTRAINTS AGAINST BRINGING RESOURCES TO MARKET.—Not later than 1 year after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Secretary shall transmit to Congress an assessment of the technical, institutional, policy, and regulatory constraints to bringing new domestic fossil resources to market.
- “(2) TECHNOLOGY CAPABILITIES.—Not later than 2 years after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Secretary shall transmit to Congress a long-term assessment of existing and projected technological capabilities for expanded production from domestic unconventional oil, gas, and methane reserves.”.

### SEC. 662. COAL RESEARCH, DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION PROGRAMS.

(a) IN GENERAL.—Section 962 of the Energy Policy Act of 2005 (42 U.S.C. 16292) is amended—

- (1) in subsection (a)—
  - (A) in paragraph (10), by striking “and” at the end;
  - (B) in paragraph (11), by striking the period at the end and inserting a semicolon; and
  - (C) by adding at the end the following:
    - “(12) specific additional programs to address water use and reuse;

“(13) the testing, including the construction of testing facilities, of high temperature materials for use in advanced systems for combustion or use of coal; and

“(14) innovations to application of existing coal conversion systems designed to increase efficiency of conversion, flexibility of operation, and other modifications to address existing usage requirements.”;

(2) by redesignating subsections (b) through (d) as subsections (c) through (e), respectively;

(3) by inserting after subsection (a) the following:

“(b) TRANSFORMATIONAL COAL TECHNOLOGY PROGRAM.—

“(1) IN GENERAL.—As part of the program established under subsection (a), the Secretary may carry out a program designed to undertake research, development, demonstration, and commercial application of technologies, including the accelerated development of—

“(A) chemical looping technology;

“(B) supercritical carbon dioxide power generation cycles;

“(C) pressurized oxycombustion, including new and retrofit technologies;

and

“(D) other technologies that are characterized by the use of—

“(i) alternative energy cycles;

“(ii) thermionic devices using waste heat;

“(iii) fuel cells;

“(iv) replacement of chemical processes with biotechnology;

“(v) nanotechnology;

“(vi) new materials in applications (other than extending cycles to higher temperature and pressure), such as membranes or ceramics;

“(vii) carbon utilization, such as in construction materials, using low quality energy to reconvert back to a fuel, or manufactured food;

“(viii) advanced gas separation concepts; and

“(ix) other technologies, including—

“(I) modular, manufactured components; and

“(II) innovative production or research techniques, such as using 3-D printer systems, for the production of early research and development prototypes.

“(2) COST SHARE.—In carrying out the program described in paragraph (1), the Secretary shall enter into partnerships with private entities to share the costs of carrying out the program. The Secretary may reduce the non-Federal cost share requirement if the Secretary determines that the reduction is necessary and appropriate considering the technological risks involved in the project.”; and

(4) in subsection (c) (as so redesignated) by striking paragraph (1) and inserting the following:

“(1) IN GENERAL.—In carrying out programs authorized by this section, the Secretary shall identify cost and performance goals for coal-based technologies that would permit the continued cost-competitive use of coal for the production of electricity, chemical feedstocks, transportation fuels, and other marketable products.”.

(b) ADVISORY COMMITTEE; AUTHORIZATION OF APPROPRIATIONS.—Section 963 of the Energy Policy Act of 2005 (42 U.S.C. 16293) is amended—

(1) by amending paragraph (6) of subsection (c) to read as follows:

“(6) ADVISORY COMMITTEE.—

“(A) IN GENERAL.—Subject to subparagraph (B), the Secretary shall establish an advisory committee to undertake, not less frequently than once every 3 years, a review and prepare a report on the progress being made by the Department of Energy to achieve the goals described in subsections (a) and (b) of section 962 and subsection (b) of this section.

“(B) MEMBERSHIP REQUIREMENTS.—Members of the advisory committee established under subparagraph (A) shall be appointed by the Secretary.”; and

(2) by amending subsection (d) to read as follows:

“(d) STUDY OF CARBON DIOXIDE PIPELINES.—Not later than 1 year after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Secretary shall transmit to Congress the results of a study to assess the cost and feasibility of engineering, permitting, building, maintaining, regulating, and insuring a national system of carbon dioxide pipelines.”.

#### SEC. 663. HIGH EFFICIENCY GAS TURBINES RESEARCH AND DEVELOPMENT.

(a) IN GENERAL.—The Secretary, through the Office of Fossil Energy, shall carry out a multiyear, multiphase program of research, development, demonstration, and

commercial application to innovate technologies to maximize the efficiency of gas turbines used in power generation systems.

(b) PROGRAM ELEMENTS.—The program under this section shall—

(1) support innovative engineering and detailed gas turbine design for megawatt-scale and utility-scale electric power generation, including—

(A) high temperature materials, including superalloys, coatings, and ceramics;

(B) improved heat transfer capability;

(C) manufacturing technology required to construct complex three-dimensional geometry parts with improved aerodynamic capability;

(D) combustion technology to produce higher firing temperature while lowering nitrogen oxide and carbon monoxide emissions per unit of output;

(E) advanced controls and systems integration;

(F) advanced high performance compressor technology; and

(G) validation facilities for the testing of components and subsystems;

(2) include technology demonstration through component testing, subscale testing, and full scale testing in existing fleets;

(3) include field demonstrations of the developed technology elements so as to demonstrate technical and economic feasibility; and

(4) assess overall combined cycle and simple cycle system performance.

(c) PROGRAM GOALS.—The goals of the multiphase program established under subsection (a) shall be—

(1) in phase I—

(A) to develop the conceptual design of advanced high efficiency gas turbines that can achieve at least 62 percent combined cycle efficiency or 47 percent simple cycle efficiency on a lower heating value basis; and

(B) to develop and demonstrate the technology required for advanced high efficiency gas turbines that can achieve at least 62 percent combined cycle efficiency or 47 percent simple cycle efficiency on a lower heating value basis; and

(2) in phase II, to develop the conceptual design for advanced high efficiency gas turbines that can achieve at least 65 percent combined cycle efficiency or 50 percent simple cycle efficiency on a lower heating value basis.

(d) PROPOSALS.—Within 180 days after the date of enactment of this Act, the Secretary shall solicit grant and contract proposals from industry, small businesses, universities, and other appropriate parties for conducting activities under this section. In selecting proposals, the Secretary shall emphasize—

(1) the extent to which the proposal will stimulate the creation or increased retention of jobs in the United States; and

(2) the extent to which the proposal will promote and enhance United States technology leadership.

(e) COMPETITIVE AWARDS.—The provision of funding under this section shall be on a competitive basis with an emphasis on technical merit.

(f) COST SHARING.—Section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352) shall apply to an award of financial assistance made under this section.

## Subtitle F—Advanced Research Projects Agency–Energy

### SEC. 671. ARPA-E AMENDMENTS.

Section 5012 of the America COMPETES Act (42 U.S.C. 16538) is amended—

(1) by amending paragraph (1) of subsection (c) to read as follows:

“(1) IN GENERAL.—The goals of ARPA-E shall be to enhance the economic and energy security of the United States and to ensure that the United States maintains a technological lead through the development of advanced energy technologies.”;

(2) in subsection (i)(1), by inserting “ARPA-E shall not provide funding for a project unless the prospective grantee demonstrates sufficient attempts to secure private financing or indicates that the project is not independently commercially viable.” after “relevant research agencies.”;

(3) in subsection (l)(1), by inserting “and once every 6 years thereafter,” after “operation for 6 years,”; and

(4) by redesignating subsection (n) as subsection (o) and inserting after subsection (m) the following new subsection:

“(n) PROTECTION OF PROPRIETARY INFORMATION.—

“(1) IN GENERAL.—The following categories of information collected by the Advanced Research Projects Agency–Energy from recipients of financial assistance

awards shall be considered privileged and confidential and not subject to disclosure pursuant to section 552 of title 5, United States Code:

“(A) Plans for commercialization of technologies developed under the award, including business plans, technology to market plans, market studies, and cost and performance models.

“(B) Investments provided to an awardee from third parties, such as venture capital, hedge fund, or private equity firms, including amounts and percentage of ownership of the awardee provided in return for such investments.

“(C) Additional financial support that the awardee plans to invest or has invested into the technology developed under the award, or that the awardee is seeking from third parties.

“(D) Revenue from the licensing or sale of new products or services resulting from the research conducted under the award.

“(2) EFFECT OF SUBSECTION.—Nothing in this subsection affects—

“(A) the authority of the Secretary to use information without publicly disclosing such information; or

“(B) the responsibility of the Secretary to transmit information to Congress as required by law.”.

## Subtitle G—Authorization of Appropriations

### SEC. 681. AUTHORIZATION OF APPROPRIATIONS.

(a) ELECTRICITY DELIVERY AND ENERGY RELIABILITY RESEARCH AND DEVELOPMENT.—There are authorized to be appropriated to the Secretary for research, development, demonstration, and commercial application for electrical delivery and energy reliability technology activities within the Office of Electricity \$113,000,000 for each of fiscal years 2016 and 2017.

(b) NUCLEAR ENERGY.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary for research, development, demonstration, and commercial application for nuclear energy technology activities within the Office of Nuclear Energy \$504,600,000 for each of fiscal years 2016 and 2017.

(2) LIMITATION.—Any amounts made available pursuant to the authorization of appropriations under paragraph (1) shall not be derived from the Nuclear Waste Fund established under section 302(c) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10222(c)).

(c) ENERGY EFFICIENCY AND RENEWABLE ENERGY.—There are authorized to be appropriated to the Secretary for research, development, demonstration, and commercial application for energy efficiency and renewable energy technology activities within the Office of Energy Efficiency and Renewable Energy \$1,198,500,000 for each of fiscal years 2016 and 2017.

(d) FOSSIL ENERGY.—There are authorized to be appropriated to the Secretary for research, development, demonstration, and commercial application for fossil energy technology activities within the Office of Fossil Energy \$605,000,000 for each of fiscal years 2016 and 2017.

(e) ARPA-E.—There are authorized to be appropriated to the Secretary for the Advanced Research Projects Agency–Energy \$140,000,000 for each of fiscal years 2016 and 2017.

## Subtitle H—Definitions

### SEC. 691. DEFINITIONS.

In this title—

(1) the term “Department” means the Department of Energy; and

(2) the term “Secretary” means the Secretary of Energy.



## TITLE VII—DEPARTMENT OF ENERGY TECHNOLOGY TRANSFER

### Subtitle A—In General

#### SEC. 701. DEFINITIONS.

In this title:

- (1) DEPARTMENT.—The term “Department” means the Department of Energy.
- (2) NATIONAL LABORATORY.—The term “National Laboratory” means a Department of Energy nonmilitary national laboratory, including—
  - (A) Ames Laboratory;
  - (B) Argonne National Laboratory;
  - (C) Brookhaven National Laboratory;
  - (D) Fermi National Accelerator Laboratory;
  - (E) Idaho National Laboratory;
  - (F) Lawrence Berkeley National Laboratory;
  - (G) National Energy Technology Laboratory;
  - (H) National Renewable Energy Laboratory;
  - (I) Oak Ridge National Laboratory;
  - (J) Pacific Northwest National Laboratory;
  - (K) Princeton Plasma Physics Laboratory;
  - (L) Savannah River National Laboratory;
  - (M) Stanford Linear Accelerator Center;
  - (N) Thomas Jefferson National Accelerator Facility; and
  - (O) any laboratory operated by the National Nuclear Security Administration, but only with respect to the civilian energy activities thereof.
- (3) SECRETARY.—The term “Secretary” means the Secretary of Energy.

#### SEC. 702. SAVINGS CLAUSE.

Nothing in this title or an amendment made by this title abrogates or otherwise affects the primary responsibilities of any National Laboratory to the Department.

## Subtitle B—Innovation Management at Department of Energy

#### SEC. 711. UNDER SECRETARY FOR SCIENCE AND ENERGY.

(a) IN GENERAL.—Section 202(b) of the Department of Energy Organization Act (42 U.S.C. 7132(b)) is amended—

- (1) by striking “Under Secretary for Science” each place it appears and inserting “Under Secretary for Science and Energy”; and
- (2) in paragraph (4)—
  - (A) in subparagraph (F), by striking “and” at the end;
  - (B) in subparagraph (G), by striking the period at the end and inserting a semicolon; and
  - (C) by inserting after subparagraph (G) the following:
    - “(H) establish appropriate linkages between offices under the jurisdiction of the Under Secretary; and
    - “(I) perform such functions and duties as the Secretary shall prescribe, consistent with this section.”.

(b) CONFORMING AMENDMENTS.—

- (1) Section 3164(b)(1) of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381a(b)(1)) is amended by striking “Under Secretary for Science” and inserting “Under Secretary for Science and Energy”.
- (2) Section 641(h)(2) of the United States Energy Storage Competitiveness Act of 2007 (42 U.S.C. 17231(h)(2)) is amended by striking “Under Secretary for Science” and inserting “Under Secretary for Science and Energy”.

#### SEC. 712. TECHNOLOGY TRANSFER AND TRANSITIONS ASSESSMENT.

Not later than 1 year after the date of enactment of this Act, and annually thereafter, the Secretary shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report which shall include—

- (1) an assessment of the Department’s current ability to carry out the goals of section 1001 of the Energy Policy Act of 2005 (42 U.S.C. 16391), including

an assessment of the role and effectiveness of the Director of the Office of Technology Transitions; and

(2) recommended departmental policy changes and legislative changes to section 1001 of the Energy Policy Act of 2005 (42 U.S.C. 16391) to improve the Department's ability to successfully transfer new energy technologies to the private sector.

**SEC. 713. SENSE OF CONGRESS.**

It is the sense of the Congress that the Secretary should encourage the National Laboratories and federally funded research and development centers to inform small businesses of the opportunities and resources that exist pursuant to this title.

**SEC. 714. NUCLEAR ENERGY INNOVATION.**

Not later than 180 days after the date of enactment of this Act, the Secretary, in consultation with the National Laboratories, relevant Federal agencies, and other stakeholders, shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report assessing the Department's capabilities to authorize, host, and oversee privately funded fusion and non-light water reactor prototypes and related demonstration facilities at Department-owned sites. For purposes of this report, the Secretary shall consider the Department's capabilities to facilitate privately-funded prototypes up to 20 megawatts thermal output. The report shall address the following:

- (1) The Department's safety review and oversight capabilities.
- (2) Potential sites capable of hosting research, development, and demonstration of prototype reactors and related facilities for the purpose of reducing technical risk.
- (3) The Department's and National Laboratories' existing physical and technical capabilities relevant to research, development, and oversight.
- (4) The efficacy of the Department's available contractual mechanisms, including cooperative research and development agreements, work for others agreements, and agreements for commercializing technology.
- (5) Potential cost structures related to physical security, decommissioning, liability, and other long-term project costs.
- (6) Other challenges or considerations identified by the Secretary, including issues related to potential cases of demonstration reactors up to 2 gigawatts of thermal output.

## **Subtitle C—Cross-Sector Partnerships and Grant Competitiveness**

**SEC. 721. AGREEMENTS FOR COMMERCIALIZING TECHNOLOGY PILOT PROGRAM.**

(a) **IN GENERAL.**—The Secretary shall carry out the Agreements for Commercializing Technology pilot program of the Department, as announced by the Secretary on December 8, 2011, in accordance with this section.

(b) **TERMS.**—Each agreement entered into pursuant to the pilot program referred to in subsection (a) shall provide to the contractor of the applicable National Laboratory, to the maximum extent determined to be appropriate by the Secretary, increased authority to negotiate contract terms, such as intellectual property rights, payment structures, performance guarantees, and multiparty collaborations.

(c) **ELIGIBILITY.**—

(1) **IN GENERAL.**—Any director of a National Laboratory may enter into an agreement pursuant to the pilot program referred to in subsection (a).

(2) **AGREEMENTS WITH NON-FEDERAL ENTITIES.**—To carry out paragraph (1) and subject to paragraph (3), the Secretary shall permit the directors of the National Laboratories to execute agreements with a non-Federal entity, including a non-Federal entity already receiving Federal funding that will be used to support activities under agreements executed pursuant to paragraph (1), provided that such funding is solely used to carry out the purposes of the Federal award.

(3) **RESTRICTION.**—The requirements of chapter 18 of title 35, United States Code (commonly known as the “Bayh-Dole Act”) shall apply if—

(A) the agreement is a funding agreement (as that term is defined in section 201 of that title); and

(B) at least 1 of the parties to the funding agreement is eligible to receive rights under that chapter.

(d) **SUBMISSION TO SECRETARY.**—Each affected director of a National Laboratory shall submit to the Secretary, with respect to each agreement entered into under this section—

- (1) a summary of information relating to the relevant project;
- (2) the total estimated costs of the project;
- (3) estimated commencement and completion dates of the project; and
- (4) other documentation determined to be appropriate by the Secretary.
- (e) CERTIFICATION.—The Secretary shall require the contractor of the affected National Laboratory to certify that each activity carried out under a project for which an agreement is entered into under this section—
  - (1) is not in direct competition with the private sector; and
  - (2) does not present, or minimizes, any apparent conflict of interest, and avoids or neutralizes any actual conflict of interest, as a result of the agreement under this section.
- (f) EXTENSION.—The pilot program referred to in subsection (a) shall be extended until October 31, 2017.
- (g) REPORTS.—
  - (1) OVERALL ASSESSMENT.—Not later than 60 days after the date described in subsection (f), the Secretary, in coordination with directors of the National Laboratories, shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report that—
    - (A) assesses the overall effectiveness of the pilot program referred to in subsection (a);
    - (B) identifies opportunities to improve the effectiveness of the pilot program;
    - (C) assesses the potential for program activities to interfere with the responsibilities of the National Laboratories to the Department; and
    - (D) provides a recommendation regarding the future of the pilot program.
  - (2) TRANSPARENCY.—The Secretary, in coordination with directors of the National Laboratories, shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an annual report that accounts for all incidences of, and provides a justification for, non-Federal entities using funds derived from a Federal contract or award to carry out agreements pursuant to this section.

**SEC. 722. PUBLIC-PRIVATE PARTNERSHIPS FOR COMMERCIALIZATION.**

- (a) IN GENERAL.—Subject to subsections (b) and (c), the Secretary shall delegate to directors of the National Laboratories signature authority with respect to any agreement described in subsection (b) the total cost of which (including the National Laboratory contributions and project recipient cost share) is less than \$1,000,000.
- (b) AGREEMENTS.—Subsection (a) applies to—
  - (1) a cooperative research and development agreement;
  - (2) a non-Federal work-for-others agreement; and
  - (3) any other agreement determined to be appropriate by the Secretary, in collaboration with the directors of the National Laboratories.
- (c) ADMINISTRATION.—
  - (1) ACCOUNTABILITY.—The director of the affected National Laboratory and the affected contractor shall carry out an agreement under this section in accordance with applicable policies of the Department, including by ensuring that the agreement does not compromise any national security, economic, or environmental interest of the United States.
  - (2) CERTIFICATION.—The director of the affected National Laboratory and the affected contractor shall certify that each activity carried out under a project for which an agreement is entered into under this section does not present, or minimizes, any apparent conflict of interest, and avoids or neutralizes any actual conflict of interest, as a result of the agreement under this section.
  - (3) AVAILABILITY OF RECORDS.—On entering an agreement under this section, the director of a National Laboratory shall submit to the Secretary for monitoring and review all records of the National Laboratory relating to the agreement.
  - (4) RATES.—The director of a National Laboratory may charge higher rates for services performed under a partnership agreement entered into pursuant to this section, regardless of the full cost of recovery, if such funds are used exclusively to support further research and development activities at the respective National Laboratory.
- (d) EXCEPTION.—This section does not apply to any agreement with a majority foreign-owned company.
- (e) CONFORMING AMENDMENT.—Section 12 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a) is amended—
  - (1) in subsection (a)—

(A) by redesignating paragraphs (1) and (2) as subparagraphs (A) and (B), respectively, and indenting the subparagraphs appropriately;

(B) by striking “Each Federal agency” and inserting the following:

“(1) IN GENERAL.—Except as provided in paragraph (2), each Federal agency”; and

(C) by adding at the end the following:

“(2) EXCEPTION.—Notwithstanding paragraph (1), in accordance with section 722(a) of the America COMPETES Reauthorization Act of 2015, approval by the Secretary of Energy shall not be required for any technology transfer agreement proposed to be entered into by a National Laboratory of the Department of Energy, the total cost of which (including the National Laboratory contributions and project recipient cost share) is less than \$1,000,000.”; and

(2) in subsection (b), by striking “subsection (a)(1)” each place it appears and inserting “subsection (a)(1)(A)”.

**SEC. 723. INCLUSION OF EARLY-STAGE TECHNOLOGY DEMONSTRATION IN AUTHORIZED TECHNOLOGY TRANSFER ACTIVITIES.**

Section 1001 of the Energy Policy Act of 2005 (42 U.S.C. 16391) is amended by—

(1) redesignating subsection (g) as subsection (h); and

(2) inserting after subsection (f) the following:

“(g) EARLY-STAGE TECHNOLOGY DEMONSTRATION.—The Secretary shall permit the directors of the National Laboratories to use funds authorized to support technology transfer within the Department to carry out early-stage and pre-commercial technology demonstration activities to remove technology barriers that limit private sector interest and demonstrate potential commercial applications of any research and technologies arising from National Laboratory activities.”.

**SEC. 724. FUNDING COMPETITIVENESS FOR INSTITUTIONS OF HIGHER EDUCATION AND OTHER NONPROFIT INSTITUTIONS.**

Section 988(b) of the Energy Policy Act of 2005 (42 U.S.C. 16352(b)) is amended—

(1) in paragraph (1), by striking “Except as provided in paragraphs (2) and (3)” and inserting “Except as provided in paragraphs (2), (3), and (4)”;

(2) by adding at the end the following:

“(4) EXEMPTION FOR INSTITUTIONS OF HIGHER EDUCATION AND OTHER NON-PROFIT INSTITUTIONS.—

“(A) IN GENERAL.—Paragraph (1) shall not apply to a research or development activity performed by an institution of higher education or nonprofit institution (as defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703)).

“(B) TERMINATION DATE.—The exemption under subparagraph (A) shall apply during the 6-year period beginning on the date of enactment of this paragraph.”.

**SEC. 725. PARTICIPATION IN THE INNOVATION CORPS PROGRAM.**

The Secretary may enter into an agreement with the Director of the National Science Foundation to enable researchers funded by the Department to participate in the National Science Foundation Innovation Corps program.

## Subtitle D—Assessment of Impact

**SEC. 731. REPORT BY GOVERNMENT ACCOUNTABILITY OFFICE.**

Not later than 3 years after the date of enactment of this Act, the Comptroller General of the United States shall submit to Congress a report—

(1) describing the results of the projects developed under sections 721, 722, and 723, including information regarding—

(A) partnerships initiated as a result of those projects and the potential linkages presented by those partnerships with respect to national priorities and other taxpayer-funded research; and

(B) whether the activities carried out under those projects result in—

(i) fiscal savings;

(ii) expansion of National Laboratory capabilities;

(iii) increased efficiency of technology transfers; or

(iv) an increase in general efficiency of the National Laboratory system; and

(2) assess the scale, scope, efficacy, and impact of the Department’s efforts to promote technology transfer and private sector engagement at the National Laboratories, and make recommendations on how the Department can improve these activities.

## TITLE VIII—SENSE OF CONGRESS

### SEC. 801. SENSE OF CONGRESS.

It is the sense of Congress that climate change is real.

### COMMITTEE STATEMENT AND VIEWS

#### PURPOSE AND SUMMARY

The purpose of H.R. 1806, the “America COMPETES Reauthorization Act of 2015,” is to provide for technological innovation through the prioritization of Federal investment in basic research and fundamental scientific discovery, and make reforms to Federal science policy to ensure future United States economic competitiveness and security.

The bill reauthorizes the National Science Foundation (NSF), the coordination of Federal STEM education programs, the White House Office of Science and Technology Policy (OSTP), the National Institute of Standards and Technology (NIST), the Department of Energy Office of Science (DOE SC) and DOE’s applied energy research and development programs. The bill also authorizes changes to improve technology transfer from the DOE’s national laboratories to the private sector.

#### BACKGROUND AND NEED FOR LEGISLATION

Federal policies that focus on scientific and technological advancement have been a recurring subject of congressional attention since the founding of the United States. Among the major post-World War II legislation in this area are the National Science Foundation Act of 1950 (P.L. 81–507), the Atomic Energy Act of 1954 (P.L. 83–703), the Department of Energy Organization Act of 1977 (P.L. 95–91), the Energy Policy Act of 1992 (P.L. 102–486), the Energy Policy Act of 2005 (P.L. 109–58), and the Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96–480).

In 2007, Congress passed and the President signed into law, the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science (COMPETES) Act (P.L. 110–69), which was based on President George W. Bush’s American Competitiveness Initiative (ACI). The centerpiece of the ACI was the prioritization of basic research in the physical sciences and engineering. Physical sciences research develops and advances knowledge and technologies that are used by scientists in nearly every other field. The ACI called for strengthening Federal investments in these areas by reallocating existing Federal resources to three innovation-enabling basic research agencies: NSF, NIST core lab research and facilities, and DOE SC.

In 2010, Congress passed and the President signed into law, the America COMPETES Reauthorization Act of 2010 (P.L. 111–358). This authorization expired at the end of 2014, thereby necessitating a reauthorization of agencies included in this Act.

#### *National Science Foundation (NSF)*

The NSF is the primary source of Federal funding for non-medical basic research and a significant contributor to many fields of scientific endeavor. Through more than 11,700 annual competitive awards, chosen through a merit-review process, NSF supports the

work of over 356,500 scientists, engineers, educators and students at universities, laboratories and field sites across the United States and internationally.

*Coordination of STEM education programs and activities*

The Federal government spends nearly \$3 billion across fourteen Federal agencies on STEM education programs each year. These programs are operated and funded primarily through the NSF, the Department of Education and the Department of Health and Human Services. The America COMPETES Reauthorization Act of 2010 included a number of requirements for the review and coordination of Federal STEM programs. The Act required the National Science and Technology Council, an interagency group led by OSTP, to form a Committee on STEM (CoSTEM) to review Federal STEM education activities to ensure they are not duplicative, and develop and implement a 5-year strategic plan. CoSTEM released an inventory of Federal STEM programs in December 2011 and the final strategic plan in May 2013.

*Office of Science and Technology Policy (OSTP)*

The National Science and Technology Policy, Organization, and Priorities Act of 1976 (P.L. 94–282) authorized the establishment of OSTP to advise the President on science and technology policy issues. OSTP also leads interagency efforts to develop and implement science and technology budgets and to coordinate science education efforts.

*National Institute of Standards and Technology (NIST)*

NIST is a non-regulatory agency within the Department of Commerce. Originally founded in 1901 as the National Bureau of Standards, NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve quality of life in the United States.

*Department of Energy Science*

The Office of Science within the Department of Energy is the largest Federal sponsor of basic research in the physical sciences, supporting 22,000 researchers at 17 national laboratories and more than 300 universities, and conducting research in high performance computing, basic energy sciences, biological and environmental research, high energy physics, fusion energy, and nuclear physics.

*Department of Energy Applied Research and Development*

The Department of Energy conducts applied research and development programs in nuclear energy, energy efficiency and renewable energy, electricity, and fossil energy, and manages the Advanced Research Projects Agency—Energy (ARPA-E). The Department spends close to \$3 billion on applied energy R&D, conducting research, development, demonstration and commercial application programs in national labs, universities, and in partnership with the private sector.

*Department of Energy Technology Transfer*

The Department of Energy owns 17 national laboratories, sixteen of which are Federally funded research and development centers (FFRDCs). These facilities provide unique scientific research capabilities critical to the Department's mission and keep the United States' competitive in technology development by providing opportunities for collaboration with the private sector. The legislation corrects institutional inefficiencies that mitigate the effectiveness of the national laboratories to transfer research know-how and work products to the private sector.

## LEGISLATIVE HISTORY

During the 113th and 114th Congresses, the House Committee on Science, Space, and Technology held 44 hearings relevant to the activities authorized in this bill.

On February 6, 2013, the Full Committee held a hearing entitled, "American Competitiveness: The Role of Research and Development." The purpose of this hearing was to help outline ways to ensure that America continues to be the leader of global innovation. The hearing examined the positive impact of today's R&D and looked forward to potential breakthrough innovations in the future. Witnesses included Mr. Richard Templeton, President and CEO, Texas Instruments; Dr. Shirley Ann Jackson, President, Rensselaer Polytechnic Institute; and Dr. Charles Vest, President, National Academy of Engineering.

On February 13, 2013, the Subcommittee on Energy held a hearing entitled, "American Energy Outlook: Technology, Market, and Policy Drivers." The purpose of this hearing was to receive testimony regarding the current state of the U.S. energy markets, projected trends, and the impact of technology development on the U.S. energy sector. Witnesses included The Honorable Adam Sieminski, Administrator, Energy Information Administration (EIA), U.S. Department of Energy; Mr. Robert McNally, President, The Rapidan Group; and Ms. Lisa Jacobson, President, Business Council for Sustainable Energy.

On February 28, 2013, the Subcommittee on Oversight held a hearing entitled, "Top Challenges for Science Agencies: Reports from the Inspectors General—Part 1." The purpose of this hearing was to provide Members of the Subcommittee the opportunity to receive testimony on the most serious performance and management challenges facing the National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF), and the Department of Commerce (DOC) from the perspective of the Inspectors General of the respective agency. Witnesses included Mr. Paul K. Martin, Inspector General, National Aeronautics and Space Administration (NASA), Office of Inspector General; Ms. Allison C. Lerner, Inspector General, National Science Foundation (NSF), Office of Inspector General; and Mr. Dave Smith, Deputy Inspector General, U.S. Department of Commerce (DOC), Office of Inspector General.

On March 5, 2013, the Subcommittee on Research held a hearing entitled, "Scientific Integrity & Transparency." The purpose of this hearing was to help Members understand the problem of access to underlying data from published research funded by the Federal

government, and why access to this underlying data is vital to scientific integrity and transparency for peer reviewed research. Witnesses included Dr. Bruce Alberts, Editor-in-Chief, Science Magazine and Professor Emeritus of Biochemistry and Biophysics, University of California—San Francisco; Dr. Victoria Stodden, Assistant Professor of Statistics, Columbia University; Dr. Stanley Young, Assistant Director for Bioinformatics, National Institutes of Statistical Sciences; and Mr. Sayeed Choudhury, Associate Dean for Research Data Management at Johns Hopkins University and Hodson Director of the Digital Research and Curation Center.

On March 13, 2013, the Subcommittee on Energy held a hearing entitled, “Federal Financial Support for Energy Technologies: Assessing Costs and Benefits.” The purpose of this hearing was to receive testimony regarding various forms of Federal financial support for the development and production of fuels and energy technologies, including tax incentives, loan guarantees, and direct spending on research, development, demonstration and commercialization activities. Witnesses included Dr. Terry Dinan, Senior Analyst, Congressional Budget Office; Ms. Mary Hutzler, Distinguished Senior Fellow, Institute for Energy Research; and Mr. Malcolm Woolf, Senior Vice President Policy & Government Affairs, Advanced Energy Economy.

On March 13, 2013, the Subcommittee on Research held a hearing entitled, “STEM Education: Industry and Philanthropic Initiatives.” The purpose of the hearing was to review industry and philanthropic STEM education initiatives to ensure there is no duplication of efforts and proper leveraging with Federal, industry, and philanthropic STEM education initiatives. Witnesses included Ms. Shelly Esque, President, Intel Foundation; Vice President, Legal and Corporate Affairs; and Director, Corporate Affairs Group, Intel Corporation; Dr. Bob Smith, Vice President and Chief Technology Officer, Engineering and Technology, Honeywell Aerospace; Dr. Vince Bertram, President and Chief Executive Officer, Project Lead the Way; and Ms. Andrea Ingram, Vice President of Education and Guest Services, Museum of Science and Industry.

On March 14, 2013, the Subcommittee on Oversight held a hearing entitled, “Top Challenges for Science Agencies: Reports from the Inspectors General—Part 2.” The purpose of this hearing was to receive testimony on the most serious performance and management challenges facing the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of the Interior (DOI), from the perspective of the Inspectors General of each agency. Witnesses included Mr. Gregory H. Friedman, Inspector General, U.S. Department of Energy, Office of Inspector General; Mr. Arthur A. Elkins, Jr., Inspector General, U.S. Environmental Protection Agency, Office of Inspector General; and Ms. Mary L. Kendall, Deputy Inspector General, U.S. Department of the Interior, Office of Inspector General.

On March 20, 2013, the Subcommittee on Technology held a hearing entitled, “Examining the Effectiveness of NIST Laboratories.” The purpose of this hearing was to examine how the work conducted at National Institute of Standards and Technology’s (NIST) laboratories is aligned with the promotion of American innovation and industrial competitiveness. Witnesses included Dr. Willie E. May, Associate Director for Laboratory Programs, Na-



tional Institute of Standards and Technology; and Dr. Ross B. Corotis, Denver Business Challenge Professor, University of Colorado at Boulder; Member, Laboratory Assessments Board, National Research Council of the National Academy of Sciences.

On April 16, 2013, the Subcommittees on Energy and Oversight held a joint hearing entitled, “Assessing the Efficiency and Effectiveness of Wind Energy Incentives.” The purpose of this hearing was to look specifically at the efficiency and effectiveness of Federal incentives for onshore and offshore wind technology. Witnesses included Mr. Frank Rusco, Director, Natural Resources and the Environment, Government Accountability Office; Dr. Robert Michaels, Professor of Economics, Mihaylo College of Business and Economics, California State University, Fullerton; Ms. Audra Parker, President and Chief Executive Officer, Alliance to Protect Nantucket Sound; and Mr. Robert Gramlich, Interim Chief Executive Officer and Senior Vice President for Policy, American Wind Energy Association.

On April 17, 2013, the Full Committee held a hearing entitled, “A Review of the President’s FY 2014 Budget Request for Science Agencies.” The purpose of this hearing was to review President Obama’s proposed fiscal year 2014 (FY14) budget request for programs and science agencies under the Committee’s jurisdiction. The witness was The Honorable John Holdren, Director, Office of Science and Technology Policy, Executive Office of the President.

On April 17, 2013, the Subcommittee on Research held a hearing entitled, “An Overview of the National Science Foundation Budget for Fiscal Year 2014.” The purpose of this hearing was to review the Administration’s fiscal year 2014 (FY14) budget request for the National Science Foundation. The witnesses were The Honorable Cora Marrett, Acting Director, National Science Foundation; and The Honorable Dan Arvizu, Chairman, National Science Board.

On April 18, 2013, the Subcommittee on Technology held a hearing entitled, “An Overview of the Fiscal Year 2014 Budget Proposal at the National Institute of Standards and Technology (NIST).” The purpose of this hearing was to examine the Administration’s proposed fiscal year 2014 (FY14) budget request for the National Institute of Standards and Technology (NIST). The witness was The Honorable Patrick Gallagher, Under Secretary of Commerce for Standards and Technology; Director, National Institute of Standards and Technology.

On April 24, 2013, the Subcommittees on Research and Technology held a hearing entitled, “Next Generation Computing and Big Data Analytics.” The purpose of this hearing was to examine how advancements in information technology and data analytics enable private and public sector organizations to utilize mass volumes of data to provide greater value to their customers and citizens, spurring new product and service innovations. Witnesses included Dr. David McQueeney, Vice President, Technical Strategy and Worldwide Operations, IBM Research; Dr. Michael Rappa, Director, Institute for Advanced Analytics, Distinguished University Professor, North Carolina State University; and Dr. Farnam Jahanian, Assistant Director for the Computer and Information Science and Engineering (CISE) Directorate, National Science Foundation.

On April 26, 2013, the Subcommittees on Energy and Environment held a joint hearing entitled, “A Review of Federal Hydraulic Fracturing Research Activities.” The purpose of this hearing was to review agencies’ hydraulic fracturing-related efforts, with a primary focus on examining progress under Executive Order 13605 and the associated interagency Memorandum of Understanding (MOU) and steering committee. Witnesses included Dr. Kevin Teichman, Senior Science Advisor, Office of Research and Development, Environmental Protection Agency; Mr. Guido DeHoratiis, Acting Deputy Assistant Secretary for Oil and Gas, Office of Fossil Energy, Department of Energy; Dr. David Russ, Regional Executive, Northeast Area, U.S. Geological Survey; and Dr. Robin Ikeda, Acting Director, Agency for Toxic Substances and Disease Registry, Department of Health and Human Services.

On May 21, 2013, the Subcommittees on Research and Technology held a hearing entitled, “The Current and Future Applications of Biometric Technologies.” The purpose of the hearing was to examine the current development and state of biometric technologies, and the challenges of adopting biometric technology. Witnesses included Dr. Charles H. Romine, Director, Information Technology Laboratory, National Institute of Standards and Technology; Mr. John Mears, Board Member, International Biometrics and Identification Association; and Dr. Stephanie Schuckers, Director, Center for Identification Technology Research.

On May 22, 2013, the Subcommittee on Energy held a hearing entitled “America’s Next Generation Supercomputer: The Exascale Challenge.” The purpose of the hearing was to examine high performance computing research and development challenges and opportunities, specifically as they relate to exascale computing. The hearing also explored advanced scientific computing research and additionally examined draft legislation directing the Department of Energy (DOE) to develop an exascale computing system. Witnesses included Dr. Roscoe Giles, Chairman, Advanced Scientific Computing Advisory Committee; Dr. Rick Stevens, Associate Laboratory Director for Computing, Environment and Life Sciences, Argonne National Laboratory; Ms. Dona Crawford, Associate Director for Computation, Lawrence Livermore National Laboratory; and Dr. Daniel Reed, Vice President for Research and Economic Development, University of Iowa.

On June 4, 2013, the Full Committee held a hearing entitled, “STEM Education: The Administration’s Proposed Reorganization.” The purpose of this hearing was to review the Administration’s proposed consolidation and re-organization of Federal science, technology, engineering, and mathematics (STEM) programs. Witnesses included The Honorable John Holdren, Director, Office of Science and Technology Policy (OSTP), Executive Office of the President; Dr. Joan Ferrini-Mundy, Assistant Director, Directorate for Education and Human Resources, National Science Foundation (NSF); and Mr. Leland D. Melvin, Associate Administrator for Education, National Aeronautics and Space Administration (NASA).

On June 18, 2013, the Full Committee held a hearing entitled, “Department of Energy Science & Technology Priorities.” The purpose of this hearing was to examine the Department of Energy’s (DOE) science and technology priorities and related management and policy challenges, with an emphasis on how these factors influ-

ence research, development, demonstration and commercialization activities within the overall mission of the Department. The witness was The Honorable Ernest Moniz, Secretary, U.S. Department of Energy.

On July 10, 2013, the Subcommittee on Research and Technology held a hearing entitled, “Strategic Planning for National Manufacturing Competitiveness.” The purpose of this hearing was to examine proposed legislation, H.R. 2447, the “American Manufacturing Competitiveness Act” that would modify an existing report required by the America COMPETES Reauthorization of 2010 by directing the National Science and Technology Council’s Committee on Technology to lead other agencies and stakeholders in developing a national manufacturing competitiveness strategy every four years. Witnesses included Dr. Jonathan Rich, Chairman and CEO, Berry Plastics, Inc.; Ms. Deborah Wince-Smith, President and CEO, Council on Competitiveness; and Mr. Zach Mottl, Chief Alignment Officer, Atlas Tool and Die Works, Inc.

On July 11, 2013, the Subcommittee on Energy held a hearing entitled “Oversight and Management of Department of Energy National Laboratories and Science Activities.” The purpose of this hearing was to examine the Department of Energy’s (DOE) oversight and management of science and technology activities, particularly as they relate to enhancing the efficiency and effectiveness of the National Laboratory System. Witnesses included Mr. Matthew Stepp, Senior Policy Analyst, Information Technology and Innovation Foundation; Mr. Jack Spencer, Senior Research Fellow, The Heritage Foundation; Dr. Thom Mason, Director, Oak Ridge National Laboratory; and Dr. Dan Arvizu, Director, National Renewable Energy Laboratory.

On July 24, 2013, the Subcommittee on Research and Technology held a hearing entitled, “Improving Technology Transfer at Universities, Research Institutes and National Laboratories.” The purpose of this hearing was to look at innovative approaches to technology transfer at universities, research institutes, and national laboratories, and on potential improvements to the Small Business Technology Transfer (STTR) program. Witnesses included Dr. Brian R. Wamhoff, Vice President of Research & Development, Co-founder, HemoShear, LLC; Dr. Elizabeth Hart-Wells, Assistant Vice President for Research, Associate Director of the Burton D. Morgan Center for Entrepreneurship, Purdue University; and Dr. Erik Lium, Assistant Vice Chancellor, Office of Innovation, Technology & Alliances, University of California, San Francisco.

On July 25, 2013, the Subcommittee on Energy held a hearing entitled, “The Future of Coal: Utilizing America’s Abundant Energy Resources.” The purpose of this hearing was to examine coal-related technology challenges and opportunities, with an emphasis on enhancing the effectiveness and impact of Department of Energy research and development (R&D) activities, including DOE’s R&D priorities as well as Federal government and private industry investments. Witnesses included Mr. Chris Smith, Acting Assistant Secretary for Fossil Energy, Department of Energy; Mr. Ben Yamagata, Executive Director, Coal Utilization Research Council; Mr. Don Collins, Chief Executive Officer, Western Research Institute; and Ms. Judi Greenwald, Vice President, Center for Climate and Energy Solutions.

On July 31, 2013, the Subcommittee on Research and Technology held a hearing entitled, “The Frontiers of Human Brain Research.” The purpose of this hearing was to understand the frontiers and challenges of brain science research, including its potential and limitations for curing brain diseases and rehabilitating those with brain-related injuries and disorders. The hearing will also aim to understand any policy implications from this research, including any implications for the America COMPETES reauthorization. Witnesses included Dr. Story Landis, Director of National Institute of Neurological Disorders and Stroke, National Institutes of Health; Mr. Michael McLoughlin, Deputy Business Area Executive, Research and Exploratory Development at Applied Physics Laboratory, Johns Hopkins University; U.S. Air Force Master Sergeant Joseph Deslauriers Jr.; Dr. Marcus Raichle, Professor of Radiology, Neurology, Neurobiology and Biomedical Engineering, Washington University; and Dr. Gene Robinson, Director, Institute for Genomic Biology, Swanlund Chair, Center for Advanced Study Professor in Entomology and Neuroscience, University of Illinois, Urbana-Champaign University.

On September 10, 2013, the Subcommittee on Research and Technology held a hearing entitled, “Examining Federal Advanced Manufacturing Programs.” The purpose of this hearing was to examine Federal advanced manufacturing programs, with a focus on research and development programs at the National Institute of Standards and Technology. Witnesses included Dr. Alan Taub, Professor, Material Science & Engineering, University of Michigan; Dr. Thomas M. Baer, Stanford Photonics Research Center, Stanford University; and Mr. Mark Muro, Senior Fellow and Policy Director, Metropolitan Policy Program, Brookings Institution.

On October 29, 2013, the Subcommittees on Energy and Environment held a joint hearing entitled, “EPA Power Plant Regulations: Is the Technology Ready?” The purpose of this hearing was to examine what considerations the EPA relied in making its selection of best system of emissions reductions in the proposed New Source Performance Standards (NSPS) for electric generating units (EGUs) and to answer the question: Has carbon capture and storage technology been “adequately demonstrated?” Witnesses included The Honorable Charles McConnell, Executive Director, Energy & Environment Initiative, Rice University; Dr. Richard Bajura, Director, National Research Center for Coal and Energy, West Virginia University; Mr. Kurt Waltzer, Managing Director, The Clean Air Task Force; and Mr. Roger Martella, Partner, Environmental Practice Group, Sidley Austin.

On October 30, 2013, the Subcommittee on Energy held a hearing entitled, “Providing the Tools for Scientific Discovery and Basic Energy Research: the Department of Energy Science Mission.” The purpose of this hearing was to examine challenges and opportunities in setting priorities for the DOE’s basic research mission as well as the execution of these fundamental science programs and activities within the Office of Science (SC). Witnesses included Dr. Pat Dehmer, Deputy Director for Science Programs, Office of Science, Department of Energy; Dr. Horst Simon, Deputy Director, Lawrence Berkeley National Lab; and Dr. John Hemminger, Chairman, Basic Energy Sciences Advisory Committee, Department of Energy.

On November 13, 2013, the Subcommittee on Research and Technology held a hearing entitled, “Keeping America FIRST: Federal Investments in Research, Science, and Technology at NSF, NIST, OSTP and Interagency STEM Programs.” The purpose of this hearing was to examine the fundamental science and research activities at the National Science Foundation (NSF), National Institutes for Standards and Technology (NIST), and the Office of Science and Technology Policy (OSTP). The coordination of Science, Technology, Engineering and Mathematics (STEM) education programs across several Federal agencies were also examined during this hearing. Witnesses included Dr. Richard Buckius, Vice President for Research, Purdue University; Dr. Daniel Sarewitz, Co-Director, Consortium for Science, Policy & Outcomes, Professor of Science and Society, Arizona State University; Dr. Timothy Killeen, President, The Research Foundation for SUNY, Vice Chancellor for Research, SUNY System Administration; and Mr. James Brown, Executive Director, STEM Education Coalition.

On December 12, 2013, the Subcommittee on Research and Technology held a hearing entitled, “Building a Network for Manufacturing Innovation.” The purpose of the hearing was to examine the need for a manufacturing innovation network and to review H.R. 2996, the “Revitalize American Manufacturing and Innovation Act of 2013.” Witnesses included The Honorable Tom Reed, Member, U.S. House of Representatives; The Honorable Joseph P. Kennedy III, Member, U.S. House of Representatives; Mr. Jonathan Davis, Global Vice President of Advocacy, SEMI; Dr. Richard A. Aubrecht, Vice Chairman of the Board, Vice President, Strategy & Technology, Moog Inc.; Dr. Stephan Biller, Chief Scientist Manufacturing Technology, GE Global Research; and Dr. Stan A. Veuger, Resident Scholar, American Enterprise Institute for Public Policy Research.

On January 9, 2014, the Subcommittee on Research and Technology held a hearing entitled, “Private Sector Programs that Engage Students in STEM.” The purpose of this hearing was to review science, technology, engineering and mathematics (STEM) education initiatives developed and conducted by private organizations to learn what is being done by these organizations and industry to support STEM education and to ensure the Federal government can leverage, not duplicate, these initiatives. Witnesses were Mr. Dean Kamen, Founder, For Inspiration and Recognition of Science and Technology (FIRST), Founder and President, DEKA Research & Development Corporation; Mr. Hadi Partovi, Co-founder and CEO, Code.org; Dr. Kemi Jona, Director, Office of STEM Education Partnerships, Research Professor, Learning Sciences and Computer Sciences, Northwestern University; Dr. Phillip Cornwell, Vice President for Academic Affairs, Professor of Mechanical Engineering, Rose-Hulman Institute of Technology; Ms. Ellana Crew, 12th Grade teacher, South River High School, Edgewater, Maryland; Mr. Brian Morris, 12th Grade teacher, Chantilly Academy, Chantilly, Virginia; Mr. Daniel Nette, 11th Grade teacher, George Mason High School, Falls Church, Virginia; and Mr. Vishnu Rachakonda, 12th Grade teacher, Eleanor Roosevelt High School, Greenbelt, Maryland.

On March 6, 2014, the Subcommittees on Research and Technology and Oversight held a joint hearing entitled, “Can Tech-

nology Protect Americans from International Cybercriminals?” The purpose of the hearing was to examine the current state of technology and standards to protect Americans from international cybercriminals. The hearing will also address the evolution of cyber-attacks against the U.S. industry from rogue hackers to sophisticated international crime syndicates and foreign governments, including the origination point of many of these crimes. Witnesses were Dr. Charles H. Romine, Director, Information Technology Laboratory, National Institute of Standards and Technology; Mr. Bob Russo, General Manager, Payment Card Industry Security Standards Council, LLC; Mr. Randy Vanderhoof, Executive Director, Smart Card Alliance; Mr. Justin Brookman, Director, Consumer Privacy, Center for Democracy & Technology; and Mr. Steven Chabinsky, Senior Vice President of Legal Affairs, CrowdStrike, Inc.; Former Deputy Assistant Director, Federal Bureau of Investigation—Cyber Division.

On March 12, 2014, the Subcommittees on Energy and Environment held a joint hearing entitled, “Science of Capture and Storage: Understanding EPA’s Carbon Rules.” The purpose of this hearing was to explore the basis for the Environmental Protection Agency’s (EPA) conclusion that carbon capture and storage systems (CCS) are adequately demonstrated as a technology for controlling carbon dioxide emissions in full-scale commercial power plants, and to examine the EPA’s rationale in proposing New Source Performance Standards (NSPS) for commercial power plants. Witnesses were Robert G. Hilton, Vice President, Power Technologies for Government Affairs, Alstom Power Inc.; Robert C. Trautz, Senior Project Manager, Electric Power Research Institute; Scott Miller, General Manager and CEO, City Utilities of Springfield, Missouri, American Public Power Association; David Hawkins, Director of Climate Change Programs, Natural Resources Defense Council; and Janet McCabe, Acting Assistant Administrator, Office of Air and Radiation, U.S. Environmental Protection Agency.

On March 26, 2014, the Full Committee held a hearing entitled, “A Review of the President’s Fiscal Year 2015 Budget Request for Science Agencies.” The purpose of this hearing was to review President Obama’s proposed fiscal year 2015 (FY15) budget request for programs and science agencies under the Committee’s jurisdiction. The witness was The Honorable John Holdren, Director, Office of Science and Technology Policy, Executive Office of the President.

On April 9, 2014, the Subcommittee on Research and Technology held a hearing entitled, “Prizes to Spur Innovation and Technology Breakthroughs.” The purpose of the hearing was to examine the role of prizes funded by the private sector and Federal science agencies in spurring technical innovation. Witnesses included Mr. Christopher Frangione, Vice President of Prize Development, XPRIZE; Mr. Donnie Wilson, Founder and CEO, Elastec American Marine; Mr. Narinder Singh, Co-Founder and Chief Strategy Officer, Appirio and President, TopCoder; and Dr. Sharon Moe, President, American Society of Nephrology.

On April 10, 2014, the Full Committee held a hearing entitled, “Department of Energy Science and Technology Priorities.” The purpose of this hearing was to examine the Department of Energy’s (DOE) science and technology priorities, emphasizing how these factors influence research, development, demonstration and com-

mercialization activities and budgets within the overall mission of the Department. The witness was The Honorable Ernest Moniz, Secretary, Department of Energy.

On June 10, 2014, the Subcommittee on Energy held a hearing entitled, “A Review of the P5: The U.S. Vision for Particle Physics After Discovery of the Higgs Boson.” The purpose of the hearing was to examine the Particle Physics Project Prioritization Panel’s (P5’s) strategic plan for United States’ particle physics vis-à-vis other countries just released last month. Witnesses included Dr. Steve Ritz, P5 Chair and Professor, University of California, Santa Cruz; Dr. Persis Drell, Director Emerita, SLAC National Laboratory; Dr. Nigel Lockyer, Director, Fermi National Accelerator Laboratory; and Dr. Natalie Roe, Director, Physics Division, Lawrence Berkeley National Laboratory.

On June 12, 2014, the Subcommittees on Research and Technology and Oversight held a joint hearing entitled, “Reducing the Administrative Workload for Federally Funded Research.” The purpose of this hearing was to examine concerns raised and policy actions recommended in the National Science Board’s report (“Reducing Investigators’ Administrative Workload for Federally Funded Research”) to eliminate or modify ineffective regulations, harmonize and streamline requirements, and increase efficiency and effectiveness for universities receiving Federal funds. Witnesses included Dr. Arthur Bienenstock, Chairman, Task Force on Administrative Burden, National Science Board; Dr. Susan Wyatt Sedwick, Chair, Federal Demonstration Partnership; President, FDP Foundation; Dr. Gina Lee-Glauser, Vice President for Research, Syracuse University, Office of Research; and The Honorable Allison Lerner, Inspector General, National Science Foundation, Office of Inspector General.

On July 11, 2014, the Subcommittee on Energy held a hearing entitled, “Fusion Energy: The World’s Most Complex Energy Project.” The purpose of this hearing was to examine the Fusion Energy Science (FES) program within the Department of Energy’s (DOE’s) Office of Science, focusing on the United States’ involvement in the International Thermonuclear Experimental Reactor (ITER) project located in Cadarache, France, as well as its current operating status. Witnesses included Dr. Frank Rusco, Director, Natural Resources and Environment, GAO; Dr. Pat Dehmer, Deputy Director for Science Programs, DOE; Dr. Robert Iotti, ITER Council Chair; and Dr. Ned Sauthoff, Director, U.S. ITER Project, Oak Ridge National Laboratory.

On July 17, 2014, the Subcommittee on Research and Technology held a hearing entitled, “Policies to Spur Innovative Medical Breakthroughs from Laboratories to Patients.” The purpose of this hearing was to explore public and private sector efforts in basic, applied, translational, and clinical scientific research for medical breakthroughs discovered through interdisciplinary biomedical R&D combined with chemistry, physics, mathematics, computing, and engineering. Witnesses included Dr. Harold Varmus, Director, National Cancer Institute (NCI) at the National Institutes of Health (NIH); Dr. Marc Tessier-Lavigne, President and Carson Family Professor, Laboratory of Brain Development and Repair, The Rockefeller University; Dr. Jay Keasling, Hubbard Howe Jr. Distinguished Professor of Biochemical Engineering, University of

California, Berkeley; Professor, Department of Chemical & Biomolecular Engineering, University of California, Berkeley; Professor, Department of Bioengineering, University of California, Berkeley; Director, Synthetic Biology Engineering Research Center; and Dr. Craig Venter, Founder, Chairman, and Chief Executive Officer, J. Craig Venter Institute, Synthetic Genomics, Inc., and Human Longevity, Inc.

On December 11, 2014, the Subcommittee on Energy held a hearing entitled, “The Future of Nuclear Energy.” The purpose of this hearing was to discuss the next generation of reactor designs, the DOE’s support through its Office of Nuclear Energy (NE), and challenges for private investment in new nuclear energy technology. Witnesses included The Honorable Peter Lyons, Assistant Secretary, Office of Nuclear Energy, U.S. Department of Energy; Dr. Ashley Finan, Senior Project Manager, Energy Innovation Project, Clean Air Task Force; Mr. Mike McGough, Chief Commercial Officer, NuScale Power; Dr. Leslie Dewan, Co-founder and Chief Executive Officer, Transatomic Power; and Mr. Daniel Lipman, Executive Director, Policy Development, Nuclear Energy Institute.

On January 28, 2015, the Subcommittee on Energy held a hearing entitled, “Super Computing and American Technology Leadership.” The purpose of this hearing was to assess the Advanced Scientific Computing Research (ASCR) program within the U.S. Department of Energy’s (DOE) Office of Science as a mechanism to support technological advancement in the United States. This hearing will focus on high performance computing (HPC) facilities’ unique ability to accelerate innovation and inform the Committee regarding the applications and benefits from sustained investment in the ASCR program. Witnesses included Mr. Norman Augustine, Board Member, Bipartisan Policy Center; Dr. Roscoe Giles, Chairman, DOE Advanced Scientific Computing Advisory Committee; Mr. David Turek, Vice President, Technical Computing, IBM; and Dr. James Crowley, Executive Director, Society for Industrial and Applied Mathematics.

On February 3, 2015, the Subcommittees on Oversight and Research and Technology held a joint hearing entitled, “NSF’s Oversight of the NEON Project and Other Major Research Facilities Developed Under Cooperative Agreements.” The purpose of the hearing was to review the National Science Foundation’s (NSF) oversight and management of the National Ecological Observatory Network Project (NEON Project) and other major research facilities developed under cooperative agreements. Witnesses included Dr. Richard Buckius, Chief Operating Officer, National Science Foundation; Dr. James P. Collins, Chairman, National Ecological Observatory Network; and Ms. Kate Manuel, Legislative Attorney, Congressional Research Service.

On February 25, 2015, the Full Committee held a hearing entitled, “An Overview of the Budget Proposal for the Department of Energy for Fiscal Year 2016.” The purpose of this hearing was to examine the Department of Energy’s science and technology priorities and their impact on the allocation of funding within the Department’s research, development, demonstration, and commercialization activities. The witness was The Honorable Ernest Moniz, Secretary, U.S. Department of Energy.



On March 24, 2015, the Subcommittee on Energy held a hearing entitled, “Department of Energy Oversight: Office of Energy Efficiency and Renewable Energy.” The purpose of this hearing was to conduct oversight of the Department of Energy’s \$2.72 billion request for FY 2016 for the Office of Energy Efficiency and Renewable Energy (EERE) technology research, development, demonstration, and commercialization activities. Witnesses included The Honorable David Danielson, Assistant Secretary, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy (DOE); Mr. Nick Loris, Herbert and Joyce Morgan Fellow, Heritage Foundation; Dr. Veronique de Rugy, Senior Research Fellow, Mercatus Center, George Mason University; and Ms. Ruth McCormick, Director of Federal and State Affairs, Business Council for Sustainable Energy (BCSE).

In the 113th Congress, H.R. 4186, “Frontiers in Innovation, Research, Science, and Technology Act of 2014,” was introduced by Representative Larry Bucshon on March 10, 2014. On March 13, 2014, the Subcommittee on Research and Technology reported H.R. 4186, as amended, to the Full Committee by a voice vote. On May 21, 2014, the House Science, Space and Technology Committee held a mark-up session on H.R. 4186. On May 28, Chairman Lamar Smith moved that the Committee favorably report H.R. 4186, as amended, to the House. The motion was agreed to by voice vote.

In the 114th Congress, on April 15, 2015, H.R. 1806 was introduced by Representative Lamar Smith, with Mr. Lucas, Mrs. Comstock, Mr. Weber of Texas, Mr. Moolenaar, Mr. Palazzo, Mr. Hultgren, Mr. Knight, Mr. Babin, and Mr. Loudermilk.

#### COMMITTEE VIEWS

#### TITLE I—NATIONAL SCIENCE FOUNDATION

##### *NSF Research and Related Activities*

The Committee recommends \$6,186,300,000 for Research and Related Activities (R&RA) at NSF for fiscal years 2016 and 2017, which is \$252,650,000 above fiscal year 2015 and the same as the request for fiscal year 2016.

The Committee authorizes funding under the R&RA by directorate or office. The Committee prioritizes funding in the areas of math, physics, chemistry, materials, astronomy, engineering, computer science and biology. The Committee believes that strategic investments in these physical science areas are essential if the United States is to remain a global leader in science and innovation. Authorizing funding by directorate brings the Foundation in line with the way Congress authorizes or appropriates funding for the majority of other major Federal science agencies and programs by subject matter, including the National Institutes of Health, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the Department of Energy, and the Department of Defense.

The Committee believes the authorized level for the Directorate for Geosciences supports priority science in the national interest including basic research to improve forecasting of severe weather events, earthquakes, pioneering geology aimed at discovery of new oil and gas resources, hydrology and biochemistry to assure safe, adequate drinking water supplies for our communities, and STEM

education activities. The Committee expects that within the amount provided for Geosciences, the Foundation will fund the International Ocean Discovery Program at the requested level of \$48,000,000.

The Committee's recommended authorization level for Integrative Activities includes the fully requested amount in fiscal year 2016 for the Experimental Program to Stimulate Competitive Research (EPSCoR). The Committee supports the fully requested amount in fiscal year 2016 for Graduate Research Fellowships (GRF), and encourages NSF to consider funding fellows through multiple directorates.

Longstanding congressional concerns persist about the merit of activities funded through NSF's Directorate for Social, Behavioral, and Economic (SBE) Sciences. In order to address these concerns, NSF must ensure that SBE awards are consistent with NSF's scientific quality standards and aligned to national interests, as required by Sec. 106. The Committee recognizes the intrinsic value in SBE sciences and the direct responsiveness of SBE activities to Committee priorities, including cybersecurity, disaster response, Understanding the Brain (UtB) and the collection of data for STEM education indicators.

#### *NSF Education and Human Resources*

In order to comply with Budget Control Act spending limitations, H.R. 1806 maintains current funding of \$866,000,000 for the Education and Human Resources (EHR) Directorate. The Committee expects the directorate to support high-value research that measurably increases student interest, engagement and attainment in science, technology, engineering, and mathematics including computer science (STEM) fields at all levels of education. This includes support for programs identified in other provisions of the legislation that encourage girls and underrepresented students to participate in STEM subjects in grades K–8, support for students participating in informal STEM programs including privately sponsored STEM-related competitions, and a review of existing STEM education programs for duplication and outcome-oriented effectiveness. The Committee supports informal education and ensuring all EHR grants are in the national interest consistent with Sec. 106 and can be appropriately evaluated for outcome-oriented effectiveness.

#### *Duplicative research*

The Committee is concerned about duplicative research programs across the National Science Foundation directorates and other Federal agencies, particularly in the areas of climate change, sustainability, and energy. The Committee's authorization does not include funding for the Science, Engineering, and Education for Sustainability (SEES) program in fiscal year 2016 or fiscal year 2017. The Committee understands that NSF intended to sunset SEES after fiscal year 2016. Although the Committee supports the broad goals of NSF's proposed new Risk and Resilience research program, the Committee is concerned that the scope of the proposed research is unclear and potentially duplicative of other hazards research programs at NSF. The Committee urges NSF to better articulate the research goals of this program, and provide an update to the Com-

mittee on how the program's research is different or complementary to existing research at NSF.

*Interdisciplinary research*

The Committee strongly supports interdisciplinary research and encourages the National Science Foundation to continue to support cross-directorate collaborations and research programs that address critical challenges to national security, economic competitiveness, and the health and welfare of Americans. The Committee believes that within the recommended authorization, NSF continues to have the resources, funding mechanisms and tools it needs to support these efforts.

*Astronomical Sciences Portfolio Review*

U.S.-based astronomy facilities continue to make groundbreaking discoveries and maintain excellent world-class scientific research even as operating budgets have been continually constrained. The Committee expects NSF to provide regular updates on the status of the ground-based telescope divestments recommended by the Astronomical Portfolio Review Committee. The Committee strongly supports all efforts by NSF to work with private, as well as state and local government partners to continue use of these facilities for scientific research and education. NSF shall not implement any final divestment of infrastructure without first reporting such actions to the Committee and ensuring that they are carried out in accordance with any relevant reprogramming requirements.

*NSF headquarters relocation*

The Committee understands that NSF intends to move forward on relocating the Foundation's headquarters to Alexandria, Virginia, including a funding request of \$30,770,000 for relocation associated costs in fiscal year 2016 with no estimate yet available for fiscal year 2017 costs. The Committee expects that Fiscal Year 2016 expenditures for headquarters relocation will come from the existing funding level for Agency Operations and Award Management Account. The Committee directs NSF to provide periodic updates to the Committee on the status of the relocation and any events that may affect the schedule or cost of the relocation.

*Science in the national interest*

The Committee believes that throughout its history NSF has played an integral part in funding breakthrough discoveries in fields as diverse as mathematics, physics, chemistry, computer science, engineering and biology. However, the Committee has expressed concern that NSF has approved a number of grants for which the scientific merits and national interest are not obvious. Sec. 106 ensures that NSF funding is transparent and accountable, requiring that NSF's public announcement of a grant award be accompanied by a non-technical explanation of the project's scientific merits and national interest. This language is consistent with a new policy announced by NSF in January 2015, emphasizing that the title and abstract for each funded grant should act as the public justification for NSF funding. It should explain how the project serves the national interest and is consistent with the NSF mission, as set forth in the 1950 legislation that created the Founda-

tion (P.L. 81–507) and enumerated in Sec 106. The Committee believes that this may include undertaking international scientific partnerships and research activities that further the interests of the United States.

*Major multi-user research facility construction and management*

The Committee understands that the Foundation has commissioned a study by the National Academy of Public Administration (NAPA) to evaluate and make recommendations on the Foundation's use of cooperative agreements for construction and management of major multi-user research facilities. The Committee expects to receive timely updates on the progress of this report and a written report to the Committee on the Foundation's response to its recommendations, in addition to the report to Congress required in Sec. 108.

*Management fees*

The Committee believes that the limitation on management fee awards based on financial resources in Sec. 108 only applies to resources that may be available for covering business and overhead expenses related to the cooperative agreement for which a management fee is sought.

*Antarctic facilities*

The Committee is very interested in recommendations made by the U.S. Antarctic Blue Ribbon Panel on how to improve and streamline logistical capabilities to more efficiently support world-class Antarctic science. The Committee understands the NSF intends to release a plan by the end of calendar year 2015, and expects the Foundation to provide the Committee with timely updates on the progress and details of that plan.

*Office of Inspector General*

The Committee recommends \$15,160,000 for the NSF Office of Inspector General (OIG) in fiscal year 2016 and fiscal year 2017, an increase of \$730,000 over fiscal year 2015. The Committee supports the OIG in continuing audits and reviews that ensure taxpayer money is spent effectively and efficiently. The Committee also remains interested in the OIG's efforts to reach consensus with NSF on the accountability and cost surveillance measures most appropriate for the management of large cooperative agreements. The OIG shall keep the Committee apprised of any changes agreed to or agreements reached with NSF on this topic throughout the fiscal year.

*Graduate student support*

The Committee intends the term graduate student to apply to both master's degree and doctoral students. The workshop or roundtable convened through NSF's agreement with the National Research Council shall be broadly representative of a variety of models of support for both master's degree and doctoral students.

*Review of education programs*

Since the fiscal year 2014 budget request was presented to Congress, the Administration has been working to streamline and con-

solidate the Federal STEM education portfolio. H.R. 1806 requires NSF to review its STEM education programs and support to ensure there is no duplication of effort and to ensure every program is being adequately assessed and evaluated for outcome-oriented effectiveness.

## TITLE II—SCIENCE, TECHNOLOGY, ENGINEERING, MATHEMATICS

H.R. 1806 defines “STEM education” to mean education in the subjects of science, technology, engineering and mathematics, including computer science. The definition recognizes the value of the computing and information technology fields in all aspects of STEM. This definition applies to references to STEM education throughout the entire bill, including Title II.

H.R. 1806 establishes an Advisory Panel of outside stakeholders to provide expert input on the Federal STEM education portfolio. Strengthening the Federal STEM portfolio requires greater coordination among the agencies with STEM education programs and may require program consolidations and terminations. The Advisory Panel is responsible for assessing ways to vertically and horizontally integrate Federal STEM programs and activities into the educational pipeline, and the Committee encourages including the evaluation of methods to scale up and disseminate successful programs and terminate and consolidate ineffective programs and programs with overlapping objectives.

The Advisory Panel, the Committee on STEM Education (CoSTEM), and the coordinating office will work to identify the evaluation methods for the Federal STEM education portfolio and ways to manage, coordinate, eliminate duplication and consolidate the Federal STEM portfolio so that it best serves the needs of taxpayers.

The Committee believes that establishing the coordinating office at the National Science Foundation will take advantage of the Foundation’s expertise in STEM education. The Committee notes that the Foundation is the largest outlet for STEM education support among the fourteen Federal agencies that administer STEM programs. The Foundation is required to establish an office with a director but should rely on detailees from other agencies to carry out its activities. The Foundation has played an important role in CoSTEM since its inception and should continue to play a role in the strategic planning process.

## TITLE III—OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Title III of H.R. 1806 authorizes programs within the Office of Science and Technology Policy (OSTP). This includes three bills the Committee marked-up on March 4, 2015. Those bills, H.R. 1119, the Research and Development Efficiency Act, H.R. 1156, the International Science and Technology Cooperation Act of 2015, and H.R. 1162 the Science Prize Competitions Act, passed the Committee by voice vote.

### *U.S. Chief Technology Officer*

Reflecting the Committee’s long-term interest and work to promote security and privacy protection policies for Federal informa-

tion systems, Title III requires the Presidentially-appointed U.S. Chief Technology Officer (USCTO) to be one of the Associate Directors (AD) within OSTP, and identifies certain key responsibilities and reporting requirements of the USCTO.

Congressional oversight plays an important role in ensuring transparency and accountability within the Federal government. During the 113th Congress, on multiple occasions, OSTP declined the Committee's invitations to the USCTO to testify at a hearing before the Committee on issues related to HealthCare.gov. OSTP cited the lack of Senate-confirmation as one of the reasons for declining the invitations. Further, although the USCTO is located organizationally within OSTP, and the USCTO's salary, and that of his staff, comes from OSTP, the Committee was informed by the OSTP Director that the USCTO does not report to him, raising questions about the accountability, oversight, and activities of this seemingly autonomous czar-like position. The Committee asserts its jurisdiction over this position and intends to oversee its functions.

The USCTO is a relatively new position created by President Obama with no official job description. Sec. 306 brings transparency to the role of the USCTO by designating the position as one of the already-established Associate Director positions within OSTP. Since all OSTP ADs are Senate-confirmed, this ensures that the USCTO will be available to testify before Congress in the future, much like President Obama's first USCTO, who held the position of both USCTO and Associate Director for Technology at OSTP.

#### TITLE IV—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

H.R. 1806 authorizes funding levels for the National Institute of Standards and Technology (NIST) includes an eight percent increase for NIST's six laboratory units in the Scientific and Technical Research and Services (STRS) account. The Committee intends for the NIST labs to conduct fundamental scientific research supporting the Institute's standards and measurement work. NIST facilitates the transition and makes possible the adoption of new discoveries, technologies, and other innovations into the commercial marketplace. Any applied research supporting lab-to-market strategies or targeting technology commercialization should be directed through the Industrial Technology Services account (ITS).

Under ITS, the Manufacturing Extension Partnership (MEP) program helps small and medium manufacturers connect to tools, technology and best practices. This legislation changes the current cost share requirements to encourage smaller manufacturers to use MEP services. NIST will inform the Committee at regular intervals about the effect of this change on attracting more small manufacturing companies to use MEP services.

The Revitalize American Manufacturing and Innovation Act, enacted last year (P.L. 113–235), authorizes up to \$5,000,000 per year for up to ten years for NIST to administer a Network for Manufacturing Innovation (NMI) program and set forth requirements and safeguards for the NMI competitive selection process to assure merit-based decisions and insulation from political influence. Under the new law, up to \$250,000,000 over ten years was authorized to

be transferred from Department of Energy's Energy Efficiency and Renewable Energy account (advanced manufacturing) to the Secretary of Commerce. H.R. 1806 reiterates the NMI funding levels and program requirements of the bipartisan legislation enacted in the 113th Congress.

H.R. 1806 updates policies and programs for NIST to ensure the Institute will continue its education programs, to allow the National Academies and the Visiting Committee on Advanced Technology to communicate, and to strengthen the MEP program.

## TITLE V—DEPARTMENT OF ENERGY OFFICE OF SCIENCE

### *Basic Energy Sciences*

The Committee urges the Basic Energy Sciences (BES) program within the Office of Science to aggressively pursue a strategy to maintain and expand upon its world-class, open-access user facilities, including x-ray light sources, neutron sources, and nanoscale science research centers. The Committee recognizes that these facilities uniquely enable research to provide useful information and revolutionary discovery about the atomic structure and dynamics in materials.

The next transformative breakthroughs in innovative energy technologies will likely arise from a strong foundation in basic research, for which BES provides critical support. Therefore H.R. 1806 prioritizes BES funding and supports construction of the Linac Coherent Light Source-II and the Advanced Photon Source upgrade. The Committee recognizes the importance of the BES contribution to the exascale computing program through its Computational Materials Sciences activities. The Committee supports the first full year of operations of the National Synchrotron Light Source-II (NSLS-II).

The Energy Frontier Research Centers (EFRCs) will continue to support Office of Science's basic research mission by convening talented groups of researchers to confront fundamental challenges for potentially transformative energy technologies. The Committee acknowledges the contributions of the following reports: the Grand Challenges report of the Department's Basic Energy Sciences Advisory Committee, the report of the Department's Basic Energy Sciences Advisory Committee entitled "From Quanta to the Continuum: Opportunities for Mesoscale Science," and the Basic Energy Sciences Basic Research Needs workshop report.

### *Advanced Scientific Computing Research*

The Committee recognizes that high performance computing (HPC) modeling supports nearly every area of technological advancement and encourages the Department to develop next generation computing facilities through its Advanced Scientific Computing Research (ASCR) program within the Office of Science. High performance computation keeps the United States competitive in the global market for scientific research and development and, therefore, is another priority funding area in H.R. 1806.

H.R. 1806 provides the Department of Energy with statutory authority to build and operate first-of-a-kind computing systems incorporating increased resiliency features and optimized power requirements. The next generation of high performance computing fa-

cilities, also known as exascale computing systems, will require new developments in hardware and software. The capabilities provided by exascale computing systems will be unique above current capabilities and serve as a mechanism to greatly enhance scientific research and support the United States nuclear weapons stockpile stewardship responsibility within the Department of Energy.

#### *High Energy Physics*

The Committee supports the Particle Physics Projects Prioritization Panel's report entitled "Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context." The Committee encourages the High Energy Physics (HEP) program within the Office of Science to work towards regaining the United States' global leadership position in neutrino science and anticipates the completion of the Long Baseline Neutrino Facility (LBNF). The Committee also recognizes the importance of continued support for smaller-scale projects, including the Dark Energy Spectroscopic Instrument (DESI) and upgrades such as the Proton Improvement Plan II (PIP-II).

#### *Biological and Environmental Research*

The Committee recognizes the importance of the Biological and Environmental Research (BER) program's mission to support basic research and scientific user facilities to increase the knowledge base for complex biological and environmental systems. The Committee is concerned, however, about the trend within BER towards increased emphasis on climate modeling seemingly at the expense of physical science programs, including genomic and radiological sciences.

H.R. 1806 rebalances these priorities by requiring increased accountability and transparency for BER's climate modeling budget and authorizes a plan for Biological Systems Science to execute a comprehensive research program on low dose radiation. The Committee recognizes the Department's unique capabilities to research the intersection of biological systems and radiological sciences necessary to execute a comprehensive program on low dose radiation research. The Joint Genome Institute (JGI) will continue to provide genome sequence data and analysis techniques to researchers.

#### *Fusion Energy Sciences*

The Committee disapproves of the Department's request to cut the Fusion Energy Sciences (FES) program below fiscal year 2015 spending levels. The Committee supports the FES mission to expand the fundamental understanding of the behavior of plasmas and matter at very high temperatures. Additionally, the Committee recognizes the monumental challenges and questions of physics associated with controlling plasmas, generating and manipulating very strong electromagnetic fields, and developing materials that can withstand extreme conditions.

The Committee anticipates the new schedule and baseline for the ITER project expected in November, 2015, and recognizes the inherent challenges associated with managing a complex international project of its scale. The Committee asserts the need to maintain domestic fusion science capabilities and establish a con-



sensus plan throughout the fusion research community moving forward.

#### *Nuclear Physics*

The Committee acknowledges the uniqueness of the Nuclear Physics (NP) program's support for fundamental nuclear science, including the Nuclear Theory subprogram which increases the knowledge base that will ultimately identify new frontiers for future experiments. H.R. 1806 supports the operation of user facilities such as the Argonne Tandem Linac Accelerator System (ATLAS), including the Californium Rare Ion Breeder Upgrade (CARIBU) and the construction of the Facility for Rare Isotope Beams (FRIB), a new user facility to support research on aspects of the nuclear structure and nuclear astrophysics.

The Committee encourages NP to continue its research efforts to explore novel concepts and rare decay processes relevant for the production of critical isotopes that support medical applications among other things.

### TITLE VI—DEPARTMENT OF ENERGY APPLIED RESEARCH AND DEVELOPMENT

#### *Crosscutting research and development*

The Committee recognizes the value of targeted crosscutting research and development, and supports Department of Energy efforts to foster greater cooperation and coordination between the Office of Science and the applied energy research programs. In accordance with the Department's FY 2016 budget request, this legislation authorizes specific strategic opportunities for crosscutting R&D in the energy-water-land use nexus, modernizing the electric grid through improving transmission systems security and resiliency, subsurface technology and engineering, the utilization of supercritical CO<sub>2</sub> for power generation, high performance computing, and cybersecurity.

The Committee also acknowledges the need for long-term planning within the Department, as well as strategic analysis of existing research portfolios. This legislation requires the Department to prepare a report addressing further opportunities for crosscutting R&D, opportunities to increase coordination and reduce duplication of research efforts, critical assessments of poor performing programs, and activities that may be more effectively left to States, industry, non-profits, or institutions of higher education. This report is required to be delivered within one year of the enactment of this act, and every four years thereafter. The Committee recommends the report also be delivered to the House Committee on Energy and Commerce.

#### *Electricity Delivery and Energy Reliability research and development*

H.R. 1806 authorizes R&D on distributed energy, electric systems, and electric transmission and distribution within the Department of Energy's Office of Electricity Delivery and Energy Reliability (OE). The Committee recognizes the importance of existing programs within OE focusing on energy storage, energy transmission and reliability, and smart grid systems research, as well as

OE's lead role in cybersecurity and grid modernization crosscutting research and development. The Committee finds that due to the diversity of the thousands of utilities that provide power to the electric grid, federally funded research and development fills a vital role.

H.R. 1806 authorizes \$113,000,000, an increase of \$5,300,000 for electricity R&D programs in the Office of Electricity Delivery and Energy Reliability. The Committee recommends that the Department prioritize research and development in energy storage and energy delivery systems by recommending \$20,000,000 for programs in Energy Storage and \$47,000,000 for cybersecurity for energy delivery systems. The Committee encourages OE to prioritize research and development within the smart grid R&D and clean energy transmission program areas, recommending \$16,000,000 and \$30,000,000 for each respective program area.

#### *Nuclear Energy research and development*

The Committee finds that advancement of next generation nuclear energy technology in the United States is heavily impacted by the Nuclear Regulatory Commission's (NRC's or the Commission's) licensing structure. The NRC's light-water reactor centric regulatory structure is not adequately prepared to license non-light water technologies. The Commission has not dedicated sufficient resources to develop an alternate licensing framework for timely consideration of advanced technologies as it would not be appropriate to fund such development through fees assessed to the current base of licensees operating light-water reactors.

The Committee encourages the Department to focus on nuclear energy research, development, and demonstration activities that will enable the private sector to invest in the next generation of nuclear technology by providing critical research capabilities, including user facilities. The Committee encourages the Department to carry out research, development, and demonstration activities to resolve technical uncertainty and provide data to inform the Commission's development process for new licensing frameworks.

The Committee recommends \$110,000,000 for Nuclear Enabling Technologies. The Committee urges the Department to focus its efforts on high performance computation modeling that will increase confidence for materials integrity applicable to light water reactors and advanced reactor systems. The Committee recommends \$150,000,000 for Reactor Concepts Research, Development, and Demonstration. The Committee encourages the Department to continue the Small Modular Reactors Licensing Technical Support program. The Committee recommends \$180,000,000 for Fuel Cycle Research and Development.

The Committee anticipates the Department's assessment of its capabilities to authorize, host, and oversee prototypes reactor construction and operation at Department-owned sites and encourages the Secretary to develop an advanced reactor innovation testbed. The Committee anticipates the Department's findings with respect to research benefits of a high-flux fast reactor user facility that would enable further research and investment in advanced reactor technology in the United States.

The Committee urges the Department to continue its work to demonstrate the behavior of high-burnup fuels and support re-

search and development related to non-light water technologies, including sodium fast reactors, lead fast reactors, gas-cooled fast reactors, high temperature gas reactors, fluoride high temperature reactors, molten salt reactors, and other relevant designs. The Committee recommends \$5,000,000 to continue the Integrated University Program.

The Committee recommends that the GAO report provided for in Sec. 622 also be submitted to the House Committee on Energy and Commerce.

*Energy Efficiency and Renewable Energy research and development*

H.R. 1806 authorizes R&D for the three primary program areas within the Office of Energy Efficiency and Renewable Energy (EERE)—transportation, renewable power, and energy efficiency. The Committee acknowledges the importance of research and development in these three areas, but questions the Department's priorities within the office, as annual budget requests focus funding on subprograms in market transformation and market barrier mitigation, reduction of soft costs, and other technology deployment programs. The Committee finds that by reducing these accounts across all program areas, the Department can prioritize research and development within EERE while meeting funding levels authorized in this legislation.

Within transportation programs, the Committee supports research, development, and demonstration in vehicle technologies, hydrogen and fuel cell technologies, and bioenergy technologies, and encourages the Department to prioritize funding for research and development programs. The Committee finds that the distribution and use of transportation fuel is a global, multi-trillion dollar industry, with the capacity and market drivers to move deployment of cost-efficient technology forward without investing Federal funds in deployment and market-focused subprograms. The Committee acknowledges the Department's important role in research and development of biofuels, but expresses concern with the focus on commercial scale biofuels production. In response, H.R. 1806 prohibits the Department from diverting research and development funds to sponsor commercial biofuels production for defense purposes. The Committee recommends \$180,000,000 for Vehicle Technologies, \$150,000,000 for Bioenergy Technologies, and \$87,000,000 for Hydrogen and Fuel Cells Technologies.

In renewable power, the Committee supports research, development, and demonstration in solar, wind, water, and geothermal power technologies, and encourages the Department to prioritize funding for research and development programs. The Committee finds that the deployment of renewable power has been heavily subsidized by the Federal government, through direct government spending, grants, loan guarantees, and targeted tax credits for decades, but solar and wind power make up less than five percent of U.S. power generation. The Committee recommends a focus on research and development to solve the fundamental challenges of grid-scale energy storage and reliability within renewable power programs, and eliminating subprograms focused on the reductions of soft costs, market transformation, and large-scale deployment projects like offshore wind. Accordingly, the Committee recommends \$150,000,000 for Solar Energy, \$38,700,000 for Water

Power, \$36,000,000 for Geothermal Technologies, and \$50,000,000 for Wind Energy, eliminating authorization for the deployment of off-shore wind.

In energy efficiency, the Committee supports research, development, and demonstration in advanced manufacturing, building technologies, and the Federal Energy Management Program. The Committee finds that there are significant cost reduction drivers for private industry to undertake the deployment of energy efficient technology. American manufacturing and construction are billion dollar industries with the capacity and motivation to pursue sound business practices to cut costs and increase profits through energy efficiency, and American families are capable of making wise choices about saving energy in their homes when cost effective. The Committee recommends \$135,000,000 for Building Technologies and \$150,000,000 for Advanced Manufacturing, and encourages the Department to focus spending towards research and development in energy efficient technologies. The Committee recommends \$18,800,000 for the Federal Energy Management Program, and encourages the Department to focus on energy savings across the federal government, not advancing deployment of renewable energy.

*Fossil Energy research and development*

H.R. 1806 authorizes the Department to undertake research, development, demonstration, and commercial application programs for fossil energy. The Committee recommends that the Department prioritize long-term, strategic planning within the Fossil R&D program. In response, this legislation requires the Department to submit reports on the technical, institutional, policy, and regulatory constraints for the development of new domestic fossil technologies, and a long-term assessment of technological capabilities for expanded production from domestic unconventional oil, gas, and methane reserves.

Within Coal R&D programs, the Committee finds that testing of new, transformational energy conversion platforms under real operating conditions is necessary in order to overcome technical risks before significant investments can be made by industry to demonstrate and commercialize new technologies. The Committee recommends the Department pursue the most cost-effective mechanisms to develop valuable design and operational data for emerging technologies, with the goal of reducing Department-wide costs from commercial demonstration-scale projects. The Committee recommends that DOE support efforts to advance transformational technologies currently under development in the Department's Fossil Energy and Coal CCS & Power Systems R&D program, including engineering design as well as construction and operation of technologies at pilot scale.

The Committee recognizes the value of research and development in advanced natural gas combustion cycle (NGCC) technologies by authorizing a new R&D program for high efficiency gas turbines. By increasing the rate of innovation in materials, manufacturing, and design technology for gas turbines, industry can deploy more efficient turbines that can reduce costs and the amount of natural gas needed to meet the nation's energy demand.

H.R. 1806 authorizes \$605,000,000, an increase of \$34,000,000 for programs in Fossil Energy Research and Development. The

Committee encourages the Department to prioritize Coal R&D programs, particularly transformational coal technologies, and recommends an authorization of \$420,000,000 for programs in coal R&D programs. The Committee also recognizes the importance of the Natural Gas Technologies program, and recommends an authorization of \$45,000,000 for natural gas research and development programs, including mid-stream infrastructure R&D to enhance the deliverability efficiency of natural gas, and including \$25,000,000 for research, development, demonstration, and commercial application for high efficiency natural gas turbines for use in power generation systems.

*Advanced Research Projects Agency—Energy*

H.R. 1806 authorizes \$140,000,000 for programs in the Advanced Research Project Agency—Energy, or ARPA-E. ARPA-E was established by the America COMPETES Act (P.L. 110-69) in 2007, and was designed to promote high risk, high reward research that “industry by itself is not likely to undertake because of technical and financial uncertainty.”

The Committee finds that while some of ARPA-E’s funding has gone to projects in line with those guidelines, ARPA-E has too often subsidized large companies and technologies that have already received private financing. Close to twenty percent of ARPA-E’s funding has been awarded to large businesses. H.R. 1806 addresses the Committee’s concerns by codifying existing ARPA-E requirements that applicants demonstrate their technologies are not commercially viable and would not be developed without ARPA-E assistance, and adding a requirement that grant recipients provide documentation of attempts to secure private financing without success. This requirement maintains a focus on innovation where projects are too technically or financially risky for investors to consider.

The Committee remains concerned that ARPA-E funding is arbitrarily skewed towards renewable energy projects, and ignores innovative technologies in fossil and nuclear energy. Accordingly, H.R. 1806 removes the requirement for all ARPA-E projects to reduce greenhouse gas emissions to provide opportunities for ground-breaking technologies in all energy areas.

## TITLE VII—DEPARTMENT OF ENERGY TECHNOLOGY TRANSFER

*Technology transfer*

H.R. 1806 makes targeted reforms to the relationship between the Department of Energy and its national laboratories. The Committee is concerned that institutional inefficiencies between the Department of Energy and its laboratories, including onerous transactional oversight by the Department, harm laboratories’ productivity with respect to cooperative research and development with the private sector and technology transfer.

The Committee finds that the laboratories provide unique capabilities for the progress of science and technology, but have been prevented from achieving their potential due to bureaucratic restrictions inconsistent with the intent of the government-owned, contractor-operated model. Under this legislation, laboratory direc-

tors will receive increased authority to enter into certain cooperative agreements with the private sector. Laboratory directors will receive new authority to use technology transfer funds for the purpose of demonstrating research concepts, otherwise known as “maturation.”

Nuclear Prototype Development H.R. 1806 requires the Department will assess its capabilities to authorize, host, and oversee privately funded fusion and non-light water reactor prototypes and related demonstration facilities at Department-owned sites.

The Committee is concerned about the lack of progress in developing fusion and next generation nuclear fission technology in the United States, considering the more rapid rate of nuclear technology advancement in previous decades and comparative growth for such technologies overseas. While other countries continue to develop prototypes and commercial advanced reactors, the United States appears to be at least a decade away from beginning construction of an advanced reactor. If the United States fails to regain leadership in advanced nuclear technology, it will lose the opportunity to compete in the global export market and weaken its position to influence global nuclear safety and nonproliferation issues.

The Committee recognizes that the Nuclear Regulatory Commission regulates the operating fleet of light-water reactors, which generate nearly 20 percent of the United States’ electricity while maintaining an enviable safety record. The Committee understands that the Commission’s current regulatory framework is not well-suited to provide timely consideration of non-light water fission technology, otherwise known as “advanced reactors,” and fusion technology. The Commission’s light-water reactor centric regulatory framework creates a barrier for private developers to demonstrate the increased safety and efficiency features of their proposed designs.

The Committee urges the Department of Energy to place a higher emphasis on advanced reactor technology and anticipates the Department’s assessment of its capabilities to authorize, host, and oversee privately-funded advanced reactor prototypes, including research projects that could lead to prototypes.

The Committee recommends that the DOE report provided for in Sec. 712, and the GAO report provided for in Sec. 731 also be submitted to the House Committee on Energy and Commerce.

**National Science Foundation (NSF) Spending** (dollars in millions)

| Account   | FY2014<br>Actual | FY2015<br>Estimate | FY2016<br>Request | FY2016<br>& FY2017<br>Authorization | Authorization Over<br>FY2015 Estimate |             |
|---|------------------|--------------------|-------------------|-------------------------------------|---------------------------------------|-------------|
|   |                  |                    |                   |                                     | \$                                    | %           |
| <b>Research and Related Activities (RRA)</b>                              | <b>5775.3</b>    | <b>5933.7</b>      | <b>6186.3</b>     | <b>6186.3</b>                       | <b>252.7</b>                          | <b>4.3</b>  |
| Biological Sciences (BIO)   | 720.8            | 731.0              | 747.9             | 834.8                               | 103.8                                 | 14.2        |
| Computer and Info. Science and<br>Engineering (CISE)                      | 892.6            | 921.7              | 954.4             | 1050.0                              | 128.3                                 | 14.0        |
| Engineering (ENG)   | 833.1            | 892.3              | 949.2             | 1034.0                              | 141.7                                 | 15.9        |
| Geosciences (GEO)   | 1321.3           | 1304.4             | 1365.4            | 1200.0                              | -104.4                                | -8.0        |
| Mathematical and Physical Sciences<br>(MSP)                               | 1267.9           | 1326.7             | 1366.2            | 1500.0                              | 173.3                                 | 13.1        |
| Social, Behavioral, and Economic Sciences<br>(SBE)                        | 256.8            | 272.2              | 291.5             | 150.0                               | -122.2                                | -44.9       |
| International Science and Engineering<br>(OISE)                           | 48.3             | 48.5               | 51.0              | 38.5                                | -10.0                                 | -20.6       |
| Integrative Activities  | 433.1            | 425.3              | 459.2             | 377.5                               | -47.8                                 | -11.2       |
| U.S. Arctic Research Commission   | 1.3              | 1.4                | 1.5               | 1.5                                 | 0.1                                   | 5.0         |
| <b>Education and Human Resources (EHR)</b>                                | <b>832.0</b>     | <b>866.0</b>       | <b>962.6</b>      | <b>866.0</b>                        | <b>-</b>                              | <b>-</b>    |
| <b>Major Research Equipment &amp; Facilities<br/>Construction (MREFC)</b> | <b>200.0</b>     | <b>200.8</b>       | <b>200.3</b>      | <b>200.3</b>                        | <b>-0.5</b>                           | <b>-0.2</b> |
| <b>Agency Operations &amp; Award Management</b>                           | <b>306.0</b>     | <b>325.0</b>       | <b>354.8</b>      | <b>325.0</b>                        | <b>-</b>                              | <b>-</b>    |
| <b>National Science Board (NSB)</b>                                       | <b>4.3</b>       | <b>4.4</b>         | <b>4.4</b>        | <b>4.4</b>                          | <b>-</b>                              | <b>-</b>    |
| <b>Office of Inspector General (OIG)</b>                                  | <b>13.8</b>      | <b>14.4</b>        | <b>15.2</b>       | <b>15.2</b>                         | <b>0.7</b>                            | <b>5.1</b>  |
| <b>Totals:</b>  | <b>7131.4</b>    | <b>7344.2</b>      | <b>7723.6</b>     | <b>7597.1</b>                       | <b>252.9</b>                          | <b>3.4</b>  |

**National Institute of Standards and Technology (NIST) Spending** (dollars in millions)

| Account   | FY2014<br>Actual | FY2015<br>Estimate | FY2016<br>Request | FY2016<br>& FY2017<br>Authorization | Authorization Over<br>FY2015 Estimate |            |
|---|------------------|--------------------|-------------------|-------------------------------------|---------------------------------------|------------|
|   |                  |                    |                   |                                     | \$                                    | %          |
| Scientific & Technical Research<br>and Services (STRS)  | 651.0            | 675.5              | 754.7             | 744.7                               | 69.2                                  | 10.2       |
| Construction of Research<br>Facilities (CRF)            | 56.0             | 50.3               | 59.0              | 59.0                                | 8.7                                   | 17.3       |
| Industrial Technology Services<br>(ITS)                 | 143.0            | 138.1              | 306.0             | 130.0                               | -8.1                                  | -5.9       |
| Manufacturing Extension<br>Partnership (MEP)            | 128.0            | 130.0              | 141.0             | 125.0                               | -5.0                                  | -3.8       |
| Advanced Manufacturing<br>Technology Consortia (AMTech) | 15.0             | 8.1                | 15.0              | -                                   | -8.1                                  | -100.0     |
| National Network for<br>Manufacturing Innovation        | -                | -                  | 150.0             | 5.0                                 | 5.0                                   | 100.0      |
| <b>Totals:</b>  | <b>850.0</b>     | <b>863.9</b>       | <b>1,119.7</b>    | <b>933.7</b>                        | <b>69.8</b>                           | <b>8.1</b> |

**Office of Science and Technology Policy (OSTP) Spending** (dollars in millions)

| Account                                    | FY2014<br>Actual | FY2015<br>Estimate | FY2016<br>Request | FY2016<br>& FY2017<br>Authorization | Authorization Over<br>FY2015 Estimate |       |
|--|------------------|--------------------|-------------------|-------------------------------------|---------------------------------------|-------|
|  |                  |                    |                   |                                     | \$                                    | %     |
| Office of Science and Technology<br>Policy | 5.6              | 5.6                | 5.6               | 4.6                                 | -1.0                                  | -18.0 |



**Department of Energy (DOE) Civilian R&D Spending** (dollars in millions)

| Account                                   | FY2014<br>Actual | FY2015<br>Estimate | FY2016<br>Request | FY2016 &<br>FY2017<br>Authorization | Authorization Over<br>FY2015 Estimate |       |
|---|------------------|--------------------|-------------------|-------------------------------------|---------------------------------------|-------|
|   |                  |                    |                   |                                     | \$                                    | %     |
| Office of Science (Topline)               | 5,066.3          | 5,071.0            | 5,339.8           | 5,339.8                             | 268.8                                 | 5.3   |
| Advanced Scientific<br>Computing Research | 478.1            | 541.0              | 621.0             | 621.0                               | 80.0                                  | 14.8  |
| Basic Energy Sciences                     | 1,711.9          | 1,733.2            | 1,849.3           | 1,850.0                             | 116.8                                 | 6.7   |
| Biological & Environmental<br>Research    | 609.7            | 592.0              | 612.4             | 550.0                               | -42.0                                 | -7.1  |
| Fusion Energy Sciences                    | 504.7            | 467.5              | 420.0             | 488.0                               | 20.5                                  | 4.4   |
| High Energy Physics                       | 796.5            | 766.0              | 788.0             | 788.0                               | 22.0                                  | 2.9   |
| Nuclear Physics                           | 569.1            | 595.5              | 624.6             | 624.7                               | 29.2                                  | 4.9   |
| Workforce Development                     | 26.5             | 19.5               | 20.5              | 20.5                                | 1.0                                   | 5.1   |
| Science Lab Infrastructure                | 97.8             | 79.6               | 113.6             | 113.6                               | 34.0                                  | 42.7  |
| Safeguards & Security                     | 87.0             | 93.0               | 103.0             | 103.0                               | 10.0                                  | 10.8  |
| Program Direction                         | 185.0            | 183.7              | 187.4             | 181.0                               | -2.7                                  | -1.5  |
| Fossil Energy R&D                         | 570.4            | 571.0              | 560.0             | 605.0                               | 34.0                                  | 6.0   |
| Nuclear Energy R&D                        | 488.1            | 498.5              | 482.8             | 504.6                               | 6.1                                   | 1.2   |
| EERE R&D                                  | 1,682.5          | 1,694.0            | 2,404.5           | 1,198.5                             | -495.5                                | -29.3 |
| ARPA-E                                    | 280.0            | 280.0              | 325.0             | 140.0                               | -140.0                                | -50.0 |
| OE RD&D                                   | 105.7            | 107.7              | 143               | 113.0                               | 5.3                                   | 4.9   |
| TOTAL DOE R&D                             | 8,193.0          | 8,222.2            | 9,255.1           | 7,900.9                             | -321.3                                | -3.9  |

## SECTION—BY—SECTION

*Sec. 1. Short title; Table of contents*

This section establishes the short title of the bill as the “America COMPETES Reauthorization Act of 2015.”

*Sec. 2. Definitions*

This section defines STEM, STEM Education and Committee on STEM Education.

## TITLE I—NATIONAL SCIENCE FOUNDATION

*Sec. 101. Authorization of appropriations*

This section authorizes appropriations for fiscal years 2016 and 2017 for NSF. This includes specific allocations of \$6,186,300,000 for research and related activities, \$834,800,000 for the Biological Science Directorate, \$1,050,000,000 for the Computer and Information Science and Engineering Directorate, \$1,034,000,000 for the Engineering Directorate, \$1,200,000,000 for the Geosciences Directorate, \$1,500,000,000 for the Mathematical and Physical Science Directorate, \$150,000,000 for the Social, Behavioral, and Economics Directorate, of which \$50,000,000 is for the National Center for Science and Engineering Statistics, \$38,520,000 for the Office of International Science and Engineering, \$377,500,000 for Integrative Activities, and \$1,480,000 for the United States Arctic Commission. Further, \$866,000,000 will be allocated for education and human resources, \$200,310,000 for major research equipment and facilities construction, \$325,000,000 for agency operations and award management, \$4,370,000 for the Office of the National Science Board, and \$15,160,000 for the Office of the Inspector General.

*Sec. 102. Findings*

This section contains findings regarding the importance of the research and education activities supported by the NSF, the importance of accountability and transparency in Federal research funding, and notes that NSF-sponsored research should serve the national interest.

*Sec. 103. Policy objectives*

States the policy objectives that the NSF should follow when allocating resources. These include: renewing and maintaining the Nation’s international leadership in science and technology through specified activities; increasing overall workforce skills; and strengthening innovation by expanding the focus of competitiveness and innovation policy at the regional and local level.

*Sec 104. Definitions*

This section provides relevant definitions within Title I.

*Sec 105. Accountability and transparency*

Section 105 states that it the sense of Congress that: sustained, predictable Federal funding is essential to U.S. leadership in science and technology; building understanding of and confidence in investments in basic research are essential to support for Fed-

eral funding; and NSF should commit itself to transparency and accountability as well as clear public communication regarding the national interest for every NSF-awarded grant and cooperative agreement.

*Sec. 106. Greater accountability in Federal funding for research*

This section states that NSF will award funding for new grants or cooperative agreements only if a determination is made and written justification is published by NSF affirming that said grant or agreement is worthy of Federal funding and is in the national interest consistent with the law establishing the NSF in 1950, and further determined by meeting specified criteria. States that nothing in this section alters the Foundation's intellectual merit or broader impacts criteria for evaluating grants.

*Sec. 107. Obligation of major research equipment and facilities construction funds*

This section states that no funds may be used for an NSF construction project until at least 30 days after the report required under section 14 (a) (2) of the National Science Foundation Authorization Act of 2002 is transmitted to Congress.

*Sec. 108. Management and oversight of large facilities*

This section requires the Director to maintain within the Office of the Director a Large Facilities Office that will support all research directorates in the development, implementation and evaluation of major research facilities. Further, the Director must appoint a senior agency official within the Office of the Director whose primary responsibility is oversight of major research facilities. This section requires the Director to submit to Congress a report on the results of the study on reforming the Foundation's policies on financial management of major multi-user research facilities. This section also defines and sets restrictions on the use of "management fees," including a prohibition on certain unallowable expenses including: alcoholic beverages, tickets to concerts or sporting events, vacation or other travel for non-business purposes, charitable contributions, social or sporting club memberships, meals for non-business purposes, luxury or personal items, and lobbying.

*Sec. 109. Whistleblower education*

Section 109 states that the NSF must provide education and training for Foundation managers and staff on Section 4712 in the US Code, the Pilot Program for Enhancement of Contractor Employee Whistleblower Protections. This information must also be transmitted to all NSF grantees, contractors, and employees.

*Sec. 110. Graduate student support*

This section conveys the sense of Congress that essential elements of the NSF Research Traineeship, formerly the Integrative Graduate Education and Research Traineeship, shall be maintained. This section instructs the Director to enter into an agreement with the National Research Council to convene a workshop to examine models of Federal support for STEM graduate students. The purpose of the workshop shall be to compare and evaluate the

extent to which each model helps to prepare graduate students for diverse careers utilizing STEM degrees.

*Sec 111. Permissible support*

This section allows the Directorate for Education and Human Resources to support informal education grants for the participation of underrepresented students in nonprofit competitions, out-of-school activities, and field experience related to STEM subjects and allows support to broaden secondary school students' access to and interest in careers that require academic preparation in STEM subjects.

*Sec. 112. Expanding STEM opportunities*

Section 112 states that within the Directorate for Education and Human Resources, under existing programs targeting broadening participation, the Director may provide grants on a merit-reviewed, competitive basis for research on programming that engages underrepresented students in grades K–8 in order to better educate these students in STEM subjects. Grants awarded under this section can be used for providing before-school, after-school, out-of-school, or summer activities, and specifies permitted activities under these grants. This section specifies that in awarding grants, the Director shall give priority to applicants that include or partner with a nonprofit, nongovernmental organization that has experience and expertise in increasing the participation of underrepresented students in STEM. It also requires that no later than five years after the date of enactment, the Director shall evaluate the program established under this Act, and provide a report to Congress on the evaluation and make the report widely available. Specifies that the Director must consult, cooperate, and coordinate with relevant Federal agencies to enhance program effectiveness and avoid duplication.

*Sec. 113. Review of education programs*

Requires the Director to review NSF's education programs to determine whether there is any duplication in these programs and how these programs are being evaluated and assessed for outcome-oriented effectiveness. The Director must complete a report, submit the report to Congress and make it publicly available.

*Sec. 114. Recompetition of awards*

Section 114 includes findings that state that the merit-review process and recompetition of awards is the best way to ensure effective stewardship of NSF funds. This section requires the Director to ensure that the system for recompetition of multi-user research facilities is fair, consistent, and transparent and allows for renewal of grants and awards in a timely manner. It also requires that the Director periodically evaluate whether the criteria are being applied in a manner that is transparent, reliable, and valid.

*Sec. 115. Sense of the Congress regarding industry investment in STEM education.*

States that it is the sense of Congress that: many industry sectors are becoming involved in STEM at K–12, undergraduate, and graduate levels to bolster the future workforce; partnerships with

education providers, STEM-focused competitions, and other opportunities are important pieces of private sector efforts to strengthen the STEM workforce; understanding the private sector's efforts in STEM will inform the Federal Government's role in STEM education; and NSF should support successful private sector STEM initiatives.

*Sec. 116. Misrepresentation of research results*

Section 116 states that falsification, fabrication, plagiarism or other misrepresentation of research results obtained while working under an NSF grant is prohibited under the NSF's Research Misconduct Regulation. Within 30 days of the final administrative action of the Foundation, a finding of research misconduct must be made publicly available, including the name of the principal investigator.

*Sec. 117. Research reproducibility and replication*

This section states that it is the sense of Congress that the gold standard of good science is the ability of a researcher or lab to reproduce a method and finding; there is growing concern that significant amount of published research findings cannot be reproduced or replicated; there are a complex set of factors affecting reproducibility and replication; and the increasing interdisciplinary nature and complexity of scientific research may be a contributing factor to issues with research reproducibility and replication. Directs the Director to enter into an agreement with the NRC to provide a report assessing these issues and make recommendations.

*Sec. 118. Research grant conditions*

Section 118 requires NSF to establish procedures to ensure that: a research grant awarded by NSF to a PI does not duplicate the aims and scope of any grants being directly funded by another agency; a PI includes in a grant application to the NSF a list of all Federal funding received by the PI and any outstanding funding requests; unpublished results used to support a proposal made to NSF do not contain knowing misrepresentations of data; PIs that receive NSF funding under more than one grant at a time have sufficient resources to conduct the proposed research under each grant request; and barriers to early career and new PIs are addressed to take into account the potential of the investigator as well as potential impact of the project.

*Sec. 119. Computing resources study*

This section requires the Comptroller General to transmit to Congress a report on the results of a study on efficient use—through sharing, where possible—of computing resources funded by NSF at institutions of higher education.

*Sec. 120. Scientific breakthrough prizes*

This section requires the Director of NSF to place a high priority on designing and administering pilot programs for scientific breakthrough prizes that are consistent with Office of Science and Technology Policy guidelines and are of strategic importance to the national interest.

*Sec. 121. Rotating personnel*

To help control costs, this section requires the Deputy Director to provide written justification and waiver for each instance in which maximum rate of pay for members of the Senior Executive Service is exceeded; a detailed written justification and waiver must be provided by the Director in each instance in which the annual salary rate of the Vice President of the United States is exceeded; and the National Science Board shall provide an annual report to Congress on the costs to the Foundation of employing such individuals.

*Sec. 122. Sense of Congress regarding Innovation Corps*

This section contains a sense of Congress stating that: NSF's Innovation Corps (I-Corps) was established to foster a national innovation ecosystem; the I-Corps includes investment in entrepreneurship and commercialization education, training, and mentoring that should lead to the practical deployment of technologies, products, processes, and services that improve the Nation's competitiveness, promote economic growth, and benefit society; and by building networks of entrepreneurs, mentors, institutions, and collaborations, and supporting specialized education and training, the I-Corps is at the leading edge of a strong, lasting foundation for an American innovation ecosystem.

*Sec. 123. Brain Research through Advancing Innovative Neurotechnologies initiative*

Section 123 encourages the NSF to support the funding of research activities related to the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative and through cooperation with the Interagency Working Group on Neuroscience.

*Sec. 124. Noyce Scholarship Program amendments*

This section amends the NSF Noyce Master Teaching Fellowship program to allow participants with a bachelor's degree working toward a Master's degree to participate in the program. This section adds computer science to current definitions in the Noyce Teacher Scholarship Program.

*Sec. 125. Informal STEM education*

This section states that the Directorate for Education and Human Resources will continue to award competitive, merit-reviewed grants to support research and development of out-of-school STEM learning environments. Funds used for these activities may be used for research and development that improves understanding of the learning process, and design and testing of learning models and programs for K-12 students, K-12 teachers, and the general public.

*Sec. 126. Experimental program to Stimulate Competitive Research*

This section states that the Foundation shall continue to operate a robust Experimental Program to Stimulate Competitive Research (EPSCoR) and should be a high priority for the Foundation.

## TITLE II—SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS

### *Sec. 201. Findings; Sense of Congress*

This section includes findings stating the continued need for STEM education in the U.S. Additionally, this section states that more effective coordination and adoption of performance measurements is needed for Federally supported STEM programs; that leveraging private and non-profit investment in STEM is essential to strengthening the Federal STEM portfolio; that strengthening the Federal STEM portfolio may require program consolidations and terminations as evidence and stakeholder input warrants; coordinating STEM programs and activities across the Federal Government in order to limit duplication and engage stakeholders will strengthen the results of the U.S.'s Federal STEM education programs and activities and in turn strengthen the United States economy.

### *Sec. 202. STEM Education Advisory Panel*

This section instructs the President to establish or designate a STEM Education Advisory Panel incorporating key stakeholders from the education and industry sectors, co-chaired by members of the President's Council of Advisors on Science and Technology. The panel will assess and develop recommendations on: progress made in implementing the STEM Education Strategic Plan; the management, coordination and implementation of Federal STEM education programs and activities; the appropriateness of criteria used by Federal agencies to evaluate the effectiveness of Federal STEM Education programs and activities; ways to leverage private and non-profit STEM investments and encourage public-private partnerships to build the STEM workforce pipeline; ways to incorporate workforce needs into Federal STEM education programs, particularly for specific fields of national interest and areas experiencing high unemployment rates; ways to better integrate Federal STEM programs and activities from pre-K through graduate study and the workforce, and from in-school to out-of-school in order to improve transitions in the STEM pipeline; whether societal and workforce concerns are adequately addressed by current Federal STEM education programs and activities; the extent to which Federal STEM education programs and activities are contributing to recruitment and retention of women and underrepresented students in the STEM education and workforce pipeline; and ways to encourage geographic diversity in STEM education and the workforce pipeline. The panel must report to Congress and President on the aforementioned assessments every three years. This section allows travel expenses for panel members.

### *Sec. 203. Committee on STEM education*

This section amends language from the 2010 COMPETES Act that established a Committee on STEM Education (CoSTEM) under the National Science and Technology Council. The amendments require CoSTEM to collaborate with external stakeholders and review the evaluation measures used for Federal STEM education programs. This section also amends CoSTEM's role in the inventory of Federal STEM programs.

*Sec. 204. STEM Education Coordinating Office*

Section 204 requires the Director of NSF to establish a STEM Education Coordinating Office within the Directorate for Education and Human Resources with a Director and staff detailed from other Federal agencies with STEM education programs and activities. The Coordinating office will: provide technical and administrative support to CoSTEM, the Advisory Panel established in section 202, and Federal agencies with STEM education programs; periodically update and maintain the inventory of Federal STEM programs; and provide for dissemination of information on Federal STEM programs and activities. This section requires the Director of the Coordinating Office to submit an annual report to Congress containing: updates to the inventory of STEM programs; a description of all STEM education consolidations and terminations for the previous fiscal year; recommendations for consolidations or terminations in the upcoming year; a description of any significant new STEM Education public/private partnerships; and a description of the progress made in carrying out the strategic plan. Requires the Director of NSF to encourage and monitor the efforts of the Coordinating Office.

**TITLE III—OFFICE OF SCIENCE AND TECHNOLOGY POLICY**

*Sec. 301. Authorization of appropriations*

This section authorizes \$4,550,000 for fiscal year 2016 and \$4,550,000 for fiscal year 2017 for the Office of Science and Technology Policy.

*Sec. 302. Regulatory efficiency*

This section requires the Director of OSTP to establish a working group, which will include the Office of Management and Budget, to review Federal regulations affecting research and research universities and make recommendations on how to harmonize, streamline, and eliminate duplicative regulations and reporting requirements and minimize the regulatory burden on institutions of higher education performing Federally funded research. The Director must submit an annual report to Congress on what steps have been taken to carry out the recommendations of the working group.

*Sec. 303. Coordination of International Science and Technology Partnerships*

Establishes a body co-chaired by OSTP and the State Department to identify and coordinate international science and technology cooperation that can strengthen the American science and technology enterprise, improve economic and national security, and support our Nation's foreign policy goals. This section requires the Director of OSTP to submit a report to Congress every two years describing the work of the body, the ongoing and new partnerships established since the last report, the means by which stakeholder input was received as well as summary views of that input, and the issues influencing U.S. scientists' abilities to collaborate with foreign counterparts. This section also requires OSTP to submit an additional report to Congress 60 days after enactment and annually thereafter, on foreign travel conducted by OSTP personnel.



*Sec. 304. Alternative research funding models*

Provides science agencies, in consultation with OSTP, the authority to conduct pilot programs to validate alternative research funding models including scientific breakthrough prize programs and novel mechanisms of funding such as crowd-sourced funding. This section also establishes parameters for judging prize competitions and requires prize competitions to be widely advertised. Finally, it requires an annual report to Congress on the programs identified and conducted, and separately, 30 days after enactment, OSTP must transmit to Congress a non-disclosure/conflict of interest document that individuals who serve as judges who are not Federal employees will be required to sign.

*Sec. 305. Amendments to prize competitions*

Amends the Stevenson-Wydler Technology Innovation Act of 1980 (15 USC 3719) to require notices of prize competitions to be published online. Also amends language to explicitly allow prize funding to come from for profit or nonprofit entities in the private sector as well as Federal agencies; this section notes specifically that the head of an agency may not give any special consideration to a private sector for-profit or nonprofit entity in return for a donation. This section also adds to the annual report a requirement that it include a description of crosscutting topical areas and agency-specific mission needs that may be the strongest opportunities for prize competitions over the next two fiscal years.

*Sec. 306. United States Chief Technology Officer*

Amends Title II of the National Science and Technology Policy, Organization, and Priorities Act of 1976 by adding a section that designates the presidentially appointed U.S. Chief Technology Officer (USCTO) to be one of the Associate Directors of OSTP. In addition to functions the President and OSTP Director may assign to the USCTO, this section identifies various duties assigned to the USCTO, including that the individual promote transparency and accountability across the Federal government for all technological implementation by working with agencies to ensure that each arm of the Federal government, including the executive branch, makes its records open and accessible. The USCTO is also required to promote security and privacy protection policies for all Federal information technology systems. Additionally, this section requires the USCTO to submit an annual report to the President, OSTP and Congress, in consultation with the Office of Management and Budget, on the current state of information systems of all Federal agencies, including a review of websites with third-party embedded tools, and the amount of money being spent on various technologies.

*Sec. 307. National Research Council study on technology for emergency notifications on University campuses*

This section directs the Director of OSTP to enter into an agreement with the National Research Council to conduct a study to identify and review technologies employed at institutions of higher education to provide notifications to students, faculty, and other personnel during emergencies in accordance with the requirements of existing law.

#### TITLE IV—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

##### *Sec. 401. Authorization of appropriations*

For fiscal years 2016 and 2017, this section authorizes \$933,700,000 for the National Institute of Standards and Technology. For each fiscal year, this section specifies that \$744,700,000 shall be for scientific technical research and services laboratory activities, \$59,000,000 shall be for the construction and maintenance of facilities, and \$130,000,000 shall be for industrial technology services activities of which \$125,000,000 shall be used for the Manufacturing Extension Partnership program and \$5,000,000 shall be for the Network for Manufacturing Innovation program.

##### *Sec. 402. Standards and conformity assessment*

Amends Section 2 of the National Institute of Standards and Technology Act by adding language stating that the Director of NIST is authorized to serve “as the President’s principal adviser on standards policy pertaining to the Nation’s technological competitiveness and innovation ability”; replacing standards language to read: “facilitate standards-related information sharing and cooperation between Federal agencies”; and enabling more seamless technical standards related information sharing. This section would also add language authorizing the Director of NIST to participate in and support scientific conferences and perform pre-competitive measurement science and technology research in partnership with higher education and industry to promote U.S. competitiveness.

##### *Sec. 403. Visiting Committee on Advanced Technology*

Amends Section 10 of the National Institute of Standards and Technology Act by changing the size of the Committee from 15 members to “not fewer than 11 members” and revising proportions of membership requirements accordingly. This section would also permit consultation with the National Research Council in making recommendations for policy.

##### *Sec. 404. Police and security authority*

Amends Section 15 of the National Institute of Standards and Technology Act to authorize the Secretary of Commerce to undertake activities for the protection of NIST buildings and other facilities.

##### *Sec. 405. Education and outreach*

Amends Section 18, 19, and 19A of the National Institute of Standards and Technology Act. It codifies NIST’s authority to provide stipends directly to college students and teachers who show promise as contributors to the NIST mission and to United States citizens performing research and technical activities relevant to NIST. It also allows the Director to establish and conduct a post-doctoral fellowship program that shall include no fewer than 20 fellows per fiscal year.

*Sec. 406. Programmatic planning report*

This section requires NIST's three year planning document to describe how the Director is addressing recommendations from the Visiting Committee on Advanced Technology.

*Sec. 407. Assessments by the National Research Council*

This section requires NIST to contract with the National Academy of Sciences to conduct a comprehensive review of all of NIST's laboratory programs within six months. This section would also amend Section 24 of the National Institute of Standards and Technology act to require NIST to contract with NAS to perform reviews of each laboratory every three years. This section describes additional process requirements for these assessments.

*Sec. 408. Hollings Manufacturing Extension Partnership*

This section would amend Section 25 of the National Institute of Standards and Technology Act. It requires the Director to provide assistance for U.S. manufacturing through the creation and support of Hollings Manufacturing Extension Centers. In order to enhance competitiveness, productivity and technological performance, Centers help manufacturers with adoption of advanced production technologies, transfer and dissemination of research findings, and other improvements. Centers are selected by the Director through a competitive, merit-based process; nonprofit institutions or consortia or state or local governments may apply. This section states that the Secretary may not provide more than 50 percent of the capital and annual operating and maintenance funds for a Center. This section would require Center applicants to provide assurances and, if selected, enter into legal agreements, that non-Federal assets will meet not less than 50 percent of the costs incurred. Section 409 would require each MEP to be evaluated in its third year of operation by a panel of private experts: a Center receiving positive evaluation may receive funding through the sixth year; a Center not receiving a positive evaluation is to be placed on probation. After the sixth year, a Center may receive additional support if it has received another positive evaluation. This section also would require a Center to undergo an independent eight year review. If a Center has received funding for 10 years the Director shall conduct a new competition. NIST is required to submit a report on the plan for conducting reviews, assessment and reapplication, and independent assessment of the reapplication competition process, as well as a report that assesses the effects of higher Federal contributions to newly selected Centers on services provided to small manufacturing companies. Chapter 18 or title 35 and Section 552 or title 5 shall apply. Each Center is required to have a Board of Directors and an Advisory Board. Center Advisory Boards must institute conflict of interest policies to be approved by the Director and Board Members may not serve as a vendor or provide services to the Center. Centers may accept funds from other Federal agencies; the Director will determine whether those funds count toward the Federal share. Funds from the private sector may not be considered towards the Federal share. This section establishes the MEP Advisory Board, to consist of not fewer than ten members serving three year terms, at least two on or from Center Advisory Boards and at least five from U.S. small manufacturing businesses.

This section also sets other policies for the MEP Advisory Board and requires it to report to Congress on the status of the program within 30 days of the President's annual budget request. This section establishes a competitive grant program within the Hollings Manufacturing Extension Partnership in order to address new or emerging manufacturing problems determined by the Director. Centers or consortia of Centers may participate under the application and selection process described in this section. Grant recipients are not required to provide matching contributions. The Director may take into consideration whether an application has significant potential to enhance competitiveness of small and medium manufacturers. Grants shall not last more than 3 years. The Director is required to evaluate obstacles unique to small manufacturers. This section also provides definitions for area career and technical education schools and community colleges.

*Sec. 409. Elimination of obsolete reports*

This section eliminates the annual report on the Technology Innovation Program.

*Sec. 410. Modifications to grants and cooperative agreements*

Amends section 8(a) of the Stevenson-Wydler Technology Innovation Act of 1980 so that the total amount of any grant or cooperative agreement may not exceed 75 percent of the total cost of the program.

*Sec. 411. Information systems standards consultation*

Amends the National Institute of Standards and Technology Act to remove the National Security Agency from the list of the entities consulted during the development of information systems standards and guidelines.

*Sec. 412. United States-Israeli cooperation*

This section expresses the sense of Congress that partnerships that facilitate basic scientific research between the U.S. and Israel advance technology development, innovation, and commercialization leading to growth in various sectors, including manufacturing, benefiting both nations; joint research and development agreements carried out through government organizations like NIST support these efforts; partnerships between the U.S. and Israel that further the basic scientific enterprise should be encouraged; and NIST should continue its role as facilitator of scientific collaborations between Israel and U.S. technical agencies working in measurement science and standardization.

## TITLE V—DEPARTMENT OF ENERGY SCIENCE

*Sec. 501. Mission*

This section directs the Secretary to deliver scientific discoveries, capabilities, and major scientific tools to advance the national interest in energy and the corresponding fundamental scientific understanding. It also instructs the Secretary to support this mission through programs on basic energy sciences, advanced scientific computing research, high energy physics, biological and environmental research, fusion energy sciences, and nuclear physics.

*Sec. 502. Basic energy sciences*

This section directs the Director of the Office of Science to carry out a program in basic energy sciences, including materials sciences and engineering, chemical sciences, physical biosciences, and geosciences for the purpose of providing the scientific foundations for new energy technologies. Section 502 requires the Director to carry out the development, construction, operation, and maintenance of national user facilities, including x-ray light sources, neutron sources, nanoscale science research centers, and other facilities the Director considers appropriate. This section also authorizes the establishment of a light source leadership initiative to sustain and advance global leadership of light source user facilities.

*Sec. 503. Advanced scientific computing research*

Section 503 directs the Director to carry out a program to advance computational and network capabilities to analyze, model, simulate, and predict complex phenomena relevant to the development of new energy technologies and the competitiveness of the United States, including the development of world-class computing and network facilities and a program to develop exascale computing systems.

*Sec. 504. High energy physics*

This section directs the Director to carry out a research program on the elementary constituents of matter and energy and the nature of space and time. It requires the Director to create, preserve, and maintain United States facilities essential to underground research, and to carry out research and development in advanced accelerator concepts and technologies.

*Sec. 505. Biological and environmental research*

This section directs the Director to carry out a program on biological systems science prioritizing fundamental research on biological systems and genomics science. Section 505 requires the Director to carry out a research program on low dose radiation, the purpose of which is to enhance scientific understanding of and reduce uncertainties associated with the effects of human exposure to low dose radiation in order to inform improved risk management methods.

*Sec. 506. Fusion energy*

This section directs the Director to carry out a fusion energy sciences research program to expand the fundamental understanding of plasmas and matter at very high temperatures and densities and to build the scientific foundation necessary to enable fusion power.

*Sec. 507. Nuclear physics*

This section directs the Director to carry out a program to discover, explore, and understand all forms of nuclear matter, including a program for the production of isotopes that the Secretary determines are needed for research purposes.

*Sec. 508. Science Laboratories Infrastructure Program*

Section 508 requires the Director to carry out a program to improve safety, efficiency, and mission readiness of infrastructure at Office of Science laboratories.

*Sec. 509. Domestic manufacturing*

This section requires the Secretary to assess the domestic manufacturing sector's capability to meet procurement requirements of the Office of Science.

*Sec. 510. Authorization of appropriations*

This section authorizes appropriations for fiscal year 2016 and 2017 for the Office of Science at \$5,339,800,000, which includes Basic Energy Sciences at \$1,850,000,000; Advanced Scientific Computing Research at \$621,000,000; High Energy Physics at \$788,000,000; Biological and Environmental Research at \$550,000,000; Fusion Energy Sciences at \$488,000,000; Nuclear Physics at \$624,700,000; Science Laboratory Infrastructure at \$113,600,000; Science Program Direction at \$181,000,000; Safeguards and Security at \$103,000,000; and Workforce Development for Teachers and Scientists at \$20,500,000.

*Sec. 511. Definitions*

This section provides relevant definitions for Title V.

**TITLE VI—DEPARTMENT OF ENERGY APPLIED RESEARCH  
AND DEVELOPMENT**

**SUBTITLE A—CROSSCUTTING RESEARCH AND DEVELOPMENT**

*Sec. 601. Crosscutting research and development*

This section contains findings regarding the need for critical energy research and development, and directs the Secretary to promote crosscutting research and development advancing the state of the energy-water-land nexus; improving energy transmission and distribution system security and resiliency; utilizing supercritical carbon dioxide in power generation; and innovating technologies for subsurface engineering, exascale computing, cybersecurity, and other critical challenges identified through comprehensive energy studies, evaluations, and reviews.

It directs the Secretary to consolidate and coordinate activities throughout the Department to avoid duplication, identify opportunities for public-private partnerships, prioritize activities promoting the utilization of all affordable domestic resources, develop long-term planning insulated from political influence, and identify programs that may be more effectively left to the States, industry non-governmental organizations, institutes of higher education, or other stakeholders.

*Sec. 602. Strategic Research Portfolio Analysis and Coordination Plan*

Section 602 amends the requirements of the Strategic Research Portfolio Analysis and Coordination Plan to include, in addition to other plan contents, the identification of ongoing programs that

have experienced multiple years of poor performance and activities that may be more effectively left to states or other stakeholders.

*Sec. 603. Strategy for facilities and infrastructure*

This section directs the Secretary to prepare a report describing the long-term strategy developed and implemented for research and development facilities and infrastructure within the Department. This report shall be submitted along with the President's budget request for fiscal year 2018.

SUBTITLE B—ELECTRICITY DELIVERY AND ENERGY RELIABILITY  
RESEARCH AND DEVELOPMENT

*Sec. 611. Distributed energy and electric energy systems*

This section directs the Secretary to carry out programs of research and development on distributed systems reliability and efficiency, including advanced energy technologies and systems and advanced grid security, resiliency, and reliability technologies. The Secretary is further directed to leverage existing programs, consolidate and coordinate activities throughout the Department to facilitate a crosscutting approach, and identify programs that may be more effectively left to the states or other stakeholders.

*Sec. 612. Electric transmission and distribution research and development*

This section directs the Secretary to undertake electric transmission and distribution research, development, and demonstration activities. This section also directs the Secretary to identify opportunities for public-private partnerships, leverage existing programs, consolidate activities to prevent duplication and promote crosscutting approaches, and identify activities that may be more effectively left to the states or other stakeholders.

SUBTITLE C—NUCLEAR ENERGY RESEARCH AND DEVELOPMENT

*Sec. 621. Objectives*

Section 621 directs the Secretary to carry out a program for civilian nuclear energy research, development, demonstration, and commercial application.

*Sec. 622. Program objectives study*

This section instructs the GAO to assess Federal and state requirements and standards, including moratoria, which delay or impede development and commercialization of nuclear power and provide recommendation as to how DOE can assist in overcoming such delays or impediments.

*Sec. 623. Nuclear Energy Research and Development Programs*

This section directs the Secretary to carry out a research and development program related to advanced reactor concepts and currently deployed systems.

*Sec. 624. Small Modular Reactor Program*

Section 624 directs the Secretary to carry out a research and development program for small modular reactors.

*Sec. 625. Fuel cycle research and development*

Section 625 directs the Secretary to carry out a research and development program related to alternative fuel cycles, which may, among other things, increase fuel utilization, reduce nuclear waste products, improve safety, and minimize proliferation risk.

*Sec. 626. Nuclear Energy Enabling Technologies Program*

This section directs the Secretary to carry out a broad research and development program for crosscutting nuclear energy concepts including radiation mitigation, sensory and instrumentation, manufacturing methods, and high performance computation modeling.

*Sec. 627. Technical standards collaboration*

This section requires the Director of the National Institute of Standards and Technology (NIST) to establish a nuclear energy standards committee, which shall include representatives from appropriate Federal agencies and the private sector.

*Sec. 628. Available facilities database*

This section directs the Secretary to prepare a publicly accessible database of non-Federal user facilities receiving Federal funds that may be used for unclassified nuclear energy research.

*Sec. 629. Nuclear waste disposal*

This section designates that DOE shall remain responsible for disposal of high-level radioactive waste and spent nuclear fuel.

SUBTITLE D—ENERGY EFFICIENCY AND RENEWABLE ENERGY  
RESEARCH AND DEVELOPMENT

*Sec. 641. Energy efficiency*

This section directs the Secretary to carry out programs of research and development for energy efficiency, including programs of research, development, demonstration, and commercial application of technology to improve the energy efficiency and environmental performance of vehicles, buildings, energy-intensive and waste-intensive industries, advanced batteries, fuel cells, and appliances and mechanical systems of buildings.

*Sec. 642. Next Generation Lighting Initiative*

Section 642 repeals the Next Generation Lighting Initiative research and development program.

*Sec. 643. Building Standards*

This section repeals the grant program supporting additional building standards within the broader Building Standards research and development program.

*Sec. 644. Secondary Electric Vehicle Battery Use Program*

Section 644 repeals the Secondary Electric Vehicle Battery Use research and development program.

*Sec. 645. Network for manufacturing innovation program*

As provided for by appropriations Acts, the Secretary of Energy may transfer up to \$150 million between FY15 and FY17 for ad-



vanced manufacturing research and development to the National Institute of Standards and Technology to carry out the Network for Manufacturing Innovation Program.

*Sec. 646. Advanced Energy Technology Transfer Centers*

This section directs the Secretary to carry out a cost-sharing program for a geographically dispersed network of Advanced Energy Technology Transfer Centers. Funds awarded under this program may not be used for the deployment of otherwise commercially available technologies.

*Sec. 647. Renewable energy*

Section 647 directs the Secretary to carry out programs of research and development for renewable energy. Programs include solar energy, wind energy, geothermal, hydropower, and other miscellaneous projects. Miscellaneous projects include research and development of technologies facilitating the combined use of renewable and fossil energy resources. In carrying out rural demonstration projects, this section directs the Secretary to give priority to rural and remote locations. To guide budget and program decisions, this section directs the Secretary to evaluate renewable energy potential, program performance, and market drivers. This analysis shall be submitted to Congress annually, at least 30 days prior to the submission of the President's budget request.

*Sec. 648. Bioenergy Program*

This section directs the Secretary to carry out a program of research and development for bioenergy, including biopower energy systems, biofuels, bioproducts, integrated biorefineries, and cross-cutting research and development in feedstock. Programs include public-private partnerships to develop advanced bioenergy processes and retrofit technologies. This section also prohibits funding under the biofuels program for use on commercial biofuel production for defense purposes.

*Sec. 649. Concentrating Solar Power Research Program*

Section 649 repeals the Concentrating Solar Power Research Program.

*Sec. 650. Renewable Energy in Public Buildings*

Section 650 repeals the Renewable Energy in Public Buildings Demonstration Program.

SUBTITLE E—FOSSIL ENERGY RESEARCH AND DEVELOPMENT

*Sec. 661. Fossil energy*

This section directs the Secretary to carry out a program of research, development, demonstration, and commercial application for fossil energy.

This section also includes direction that not less than 20 percent of the funds appropriated for the research and development of mining technologies shall be dedicated to research and development carried out by institutions of higher education.

*Sec. 662. Coal research, development, demonstration, and commercial application programs*

This section directs the Secretary to carry out a program of research and development for advanced clean coal technologies. It expands the program to include water use and reuse; high temperature materials; and transformational technologies. Under this section, the Secretary may enter into cost sharing partnerships to carry out such research and development. This section directs the Secretary to identify cost and performance goals to advance cost-competitive coal-based technologies. It creates an advisory committee appointed by the Secretary to review and report on the progress of the program. The section also requires the Secretary to submit within one year an assessment of the cost and feasibility of a national system of carbon dioxide pipelines.

*Sec. 663. High efficiency gas turbines research and development*

Section 663 directs the Secretary to carry out a program of research and development for innovative and transformational technologies to maximize the efficiency of gas turbines used in power generation systems.

SUBTITLE F—ADVANCED RESEARCH PROJECTS AGENCY—ENERGY

*Sec. 671. ARPA—E amendments*

Section 671 directs the Secretary to carry out the Advanced Research Projects Agency-Energy to overcome the long-term and high-risk technological barriers in the development of energy technologies to enhance the economic and energy security and ensure the technological leadership of the United States. In carrying out activities under this section, the Secretary shall ensure prospective grantees demonstrate sufficient attempts to secure private financing as to indicate that the project is not independently commercially viable. This section provides for the Secretary to contract with the National Academy of Sciences every 6 years to conduct an evaluation of performance. Categories of sensitive proprietary information obtained by the Secretary shall be protected from public disclosure. Nothing in this section affects the Secretary's obligation to collect such information or to make it available to Congress.

SUBTITLE G—AUTHORIZATION OF APPROPRIATIONS

*Sec. 681. Authorization of appropriations*

This section authorizes to be appropriated funds for fiscal years 2016 and 2017 for research, development, demonstration, and commercial application activities within the Department of Energy, including the Office of Electricity at \$113,000,000; Nuclear Energy at \$504,600,000; Energy Efficiency and Renewable Energy \$1,198,500,000; Fossil Energy at \$605,000,000; and ARPA-E at \$140,000,000.

SUBTITLE H—DEFINITIONS

*Sec. 691. Definitions*

This section provides relevant definitions for Title VI.

## TITLE VII—DEPARTMENT OF ENERGY TECHNOLOGY TRANSFER

### SUBTITLE A—IN GENERAL

#### *Sec. 701. Definitions*

This section provides relevant definitions for Title VII.

#### *Sec. 702. Savings clause*

This section states that nothing within the Subtitle shall abrogate or affect the primary responsibilities of a national laboratory.

### SUBTITLE B—INNOVATION MANAGEMENT AT DEPARTMENT OF ENERGY

#### *Sec. 711. Under Secretary for Science and Energy*

Section 711 codifies the consolidation of the Under Secretary for Energy and Under Secretary for Science positions into one Under Secretary for Science and Energy.

#### *Sec. 712. Technology Transfer and Transitions Assessment*

This Section requires the Secretary to assess the effectiveness of DOE's Office of Technology Transitions and make recommended departmental policy changes accordingly.

#### *Sec. 713. Sense of Congress*

Section 713 provides a sense of Congress that the Secretary should encourage the national laboratories to inform small businesses of relevant opportunities and resources.

#### *Sec. 714. Nuclear energy innovation*

Section 714 requires DOE to assess its capabilities to authorize, host, and oversee privately funded fusion and non-light water reactor prototypes at Department-owned sites.

### SUBTITLE C—CROSS-SECTOR PARTNERSHIPS AND GRANT COMPETITIVENESS

#### *Sec. 721. Agreements for commercializing Technology Pilot Program*

This section authorizes the Secretary to continue until October 31, 2017 a pilot program to institute agreements between national laboratories and third-party entities. These agreements, known as ACT agreements, provide national laboratories with increased authority to negotiate contract terms, including intellectual property rights, payment structures, performance guarantees, and multiparty collaborations. Section 201 also requires the Secretary, in coordination with the laboratory directors, to report on the effectiveness of this pilot program and provide transparency regarding the potential use of funds derived from Federal contracts pursuant to this section.

#### *Sec. 722. Public-private partnerships for commercialization*

This section delegates to the national laboratories signature authority for certain agreements with third-party entities for a notional amount of less than \$1,000,000.

*Sec. 723. Inclusion of early-stage technology demonstration in authorized technology transfer activities*

Section 723 delegates to national laboratories authority to use technology transfer funds to carry out early-stage and pre-commercial technology demonstration activities to attract private sector investment for research and technology arising out of the national laboratories.

*Sec. 724. Funding competitiveness for institutions of higher education and other non-profit institutions*

This section exempts for a 6-year trial period universities and nonprofit institutions from the 20 percent cost-share requirement for applied research and development grants.

*Sec. 725. Participation in the Innovation Corps Program*

This section allows the Secretary to enter into an agreement with the Director of the National Science Foundation (NSF) to enable researchers funded by DOE to participate in NSF's Innovation Corps program.

SUBTITLE D—ASSESSMENT OF IMPACT

*Sec. 731. Report by Government Accountability Office*

Section 731 instructs the GAO to submit a report within three years of enactment assessing the impact of the technology transfer activities authorized in this legislation, pursuant to sections 721, 722, and 723. This section also requires an assessment of DOE's efforts to promote technology transfer.

TITLE VIII

*Sec. 801. Sense of Congress*

Section 801 states that it is the sense of Congress that climate change is real.

EXPLANATION OF AMENDMENTS

A manager's amendment offered by Representative Lamar Smith was adopted by the Committee. The amendment made minor and technical changes.

An amendment offered by Representative Mo Brooks was adopted by the Committee. The amendment added a new section in support of the NSF Experimental Program to Stimulate Competitive Research.

An amendment offered by Representative Alan Grayson was adopted by the Committee. The amendment added a new subsection in support of Energy Frontier Research Centers.

An amendment offered by Representative Alan Grayson was adopted by the Committee. The amendment made changes to section 506 regarding fusion energy.

An amendment offered by Representative Dan Lipinski was adopted by the Committee. The amendment added a new section on Advanced Reactor Innovation and included new areas of research for energy efficiency programs.

An amendment offered by Representative Eric Swalwell, as amended by Representative Lamar Smith, was adopted by the

Committee. The amendment adds a title expressing a sense of congress that climate change is real.

#### COMMITTEE CONSIDERATION

On April 22, 2015, the Committee met in open session and ordered reported favorably the bill, H.R. 1806, as amended, by roll call vote, a quorum being present.

#### ROLL CALL VOTES

AMENDMENT NO. JOHNSON 050 (AMENDMENT IN THE NATURE OF A SUBSTITUTE)

Bill: H.R. 1806

Roll Call No. 2

Amendment Sponsor: Ms. Johnson (TX)—Defeated

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... |     | X  |         |            |
| Mr. LUCAS—OK ** .....            |     | X  |         |            |
| Mr. SENSENBRENNER—WI. ....       |     |    |         |            |
| Mr. ROHRBACHER—CA .....          |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....          |     | X  |         |            |
| Mr. McCAUL—TX. ....              |     |    |         |            |
| Mr. PALAZZO—MS .....             |     | X  |         |            |
| Mr. BROOKS—AL .....              |     | X  |         |            |
| Mr. HULTGREN—IL .....            |     | X  |         |            |
| Mr. POSEY—FL .....               |     | X  |         |            |
| Mr. MASSIE—KY .....              |     |    |         |            |
| Mr. BRIDENSTINE—OK .....         |     | X  |         |            |
| Mr. WEBER—TX .....               |     | X  |         |            |
| Mr. JOHNSON—OH .....             |     | X  |         |            |
| Mr. MOOLENAAR—MI .....           |     | X  |         |            |
| Mr. KNIGHT—CA .....              |     | X  |         |            |
| Mr. BABIN—TX .....               |     | X  |         |            |
| Mr. WESTERMAN—AR .....           |     | X  |         |            |
| Mrs. COMSTOCK—VA .....           |     | X  |         |            |
| Mr. NEWHOUSE—WA. ....            |     |    |         |            |
| Mr. PALMER—AL .....              |     | X  |         |            |
| Mr. LOUDERMILK—CA .....          |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX .....    | X   |    |         |            |
| Ms. LOFGREN—CA .....             | X   |    |         |            |
| Mr. LIPINSKI—IL .....            | X   |    |         |            |
| Ms. EDWARDS—MD .....             | X   |    |         |            |
| Ms. BONAMICI—OR .....            | X   |    |         |            |
| Mr. SWALWELL—CA .....            | X   |    |         |            |
| Mr. GRAYSON—FL .....             | X   |    |         |            |
| Mr. BERA—CA .....                | X   |    |         |            |
| Ms. ESTY—CT .....                |     |    |         |            |
| Mr. VEASEY—TX .....              | X   |    |         |            |
| Ms. CLARK—MA .....               | X   |    |         |            |
| Mr. BEYER—VA .....               | X   |    |         |            |
| Mr. PERLMUTTER—CO .....          | X   |    |         |            |
| Mr. TONKO—NY .....               | X   |    |         |            |
| <i>Mr. TAKANO—CA</i> .....       | X   |    |         |            |
| <i>Mr. FOSTER—IL</i> .....       | X   |    |         |            |
| VACANT .....                     |     |    |         |            |
| Totals .....                     | 15  | 18 |         |            |

\*\* Vice Chair

## AMENDMENT NO. TAKANO 026

Bill: H.R. 1806

Roll Call No. 3

Amendment Sponsor: Mr. Takano (CA)—Defeated

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... |     | X  |         |            |
| Mr. LUCAS—OK ** .....            |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....       |     |    |         |            |
| Mr. ROHRABACHER—CA .....         |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....          |     | X  |         |            |
| Mr. McCAUL—TX .....              |     |    |         |            |
| Mr. PALAZZO—MS .....             |     | X  |         |            |
| Mr. BROOKS—AL .....              |     | X  |         |            |
| Mr. HULTGREN—IL .....            |     | X  |         |            |
| Mr. POSEY—FL .....               |     | X  |         |            |
| Mr. MASSIE—KY .....              |     |    |         |            |
| Mr. BRIDENSTINE—OK .....         |     | X  |         |            |
| Mr. WEBER—TX .....               |     | X  |         |            |
| Mr. JOHNSON—OH .....             |     | X  |         |            |
| Mr. MOOLENAAR—MI .....           |     | X  |         |            |
| Mr. KNIGHT—CA .....              |     | X  |         |            |
| Mr. BABIN—TX .....               |     | X  |         |            |
| Mr. WESTERMAN—AR .....           |     | X  |         |            |
| Mrs. COMSTOCK—VA .....           |     | X  |         |            |
| Mr. NEWHOUSE—WA .....            |     |    |         |            |
| Mr. PALMER—AL .....              |     | X  |         |            |
| Mr. LOUDERMILK—GA .....          |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX .....    | X   |    |         |            |
| Ms. LOFGREN—CA .....             | X   |    |         |            |
| Mr. LIPINSKI—IL .....            | X   |    |         |            |
| Ms. EDWARDS—MD .....             | X   |    |         |            |
| Ms. BONAMICI—OR .....            | X   |    |         |            |
| Mr. SWALWELL—CA .....            | X   |    |         |            |
| Mr. GRAYSON—FL .....             | X   |    |         |            |
| Mr. BERA—CA .....                | X   |    |         |            |
| Ms. ESTY—CT .....                |     |    |         |            |
| Mr. VEASEY—TX .....              | X   |    |         |            |
| Ms. CLARK—MA .....               | X   |    |         |            |
| Mr. BEYER—VA .....               | X   |    |         |            |
| Mr. PERLMUTTER—CO .....          | X   |    |         |            |
| Mr. TONKO—NY .....               | X   |    |         |            |
| <i>Mr. TAKANO—CA</i> .....       | X   |    |         |            |
| <i>Mr. FOSTER—IL</i> .....       | X   |    |         |            |
| <i>VACANT</i> .....              |     |    |         |            |
| Totals .....                     | 15  | 18 |         |            |

\*\* Vice Chair

AMENDMENT NO. BEYER 010 (AMENDING SECTION 101), BEYER 009,  
BEYER 010 (AMENDING SECTION 505)

Bill: H.R. 1806

Roll Call No. 4

Amendment Sponsor: Mr. Beyer (VA)—Defeated En Bloc

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... |     | X  |         |            |
| Mr. LUCAS—OK ** .....            |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....       |     |    |         |            |
| Mr. ROHRABACHER—CA .....         |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....          |     | X  |         |            |
| Mr. McCAUL—TX .....              |     |    |         |            |
| Mr. PALAZZO—MS .....             |     | X  |         |            |
| Mr. BROOKS—AL .....              |     | X  |         |            |
| Mr. HULTGREN—IL .....            |     | X  |         |            |

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. POSEY—FL .....            |     | X  |         |            |
| Mr. MASSIE—KY .....           |     |    |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |
| Ms. BONAMICI—OR .....         | X   |    |         |            |
| Mr. SWALWELL—CA .....         | X   |    |         |            |
| Mr. GRAYSON—FL .....          | X   |    |         |            |
| Mr. BERA—CA .....             | X   |    |         |            |
| Ms. ESTY—CT .....             |     |    |         |            |
| Mr. VEASEY—TX .....           | X   |    |         |            |
| Ms. CLARK—MA .....            | X   |    |         |            |
| Mr. BEYER—VA .....            | X   |    |         |            |
| Mr. PERLMUTTER—CO .....       | X   |    |         |            |
| Mr. TONKO—NY .....            | X   |    |         |            |
| Mr. TAKANO—CA .....           | X   |    |         |            |
| Mr. FOSTER—IL .....           | X   |    |         |            |
| VACANT .....                  |     |    |         |            |
| Totals .....                  | 15  | 18 |         |            |

\*\* Vice Chair

#### AMENDMENT NO. CLARK 001

Bill: H.R. 1806

Roll Call No. 5

Amendment Sponsor: Ms. Clark (MA)—Defeated

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. SMITH, Chair—TX .....     |     | X  |         |            |
| Mr. LUCAS—OK** .....          |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....    |     |    |         |            |
| Mr. ROHRABACHER—CA .....      |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....       |     | X  |         |            |
| Mr. McCaul—TX .....           |     |    |         |            |
| Mr. PALAZZO—MS .....          |     | X  |         |            |
| Mr. BROOKS—AL .....           |     | X  |         |            |
| Mr. HULTGREN—IL .....         |     | X  |         |            |
| Mr. POSEY—FL .....            |     | X  |         |            |
| Mr. MASSIE—KY .....           |     |    |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |

| Member                  | Aye | No | Present | Not Voting |
|-------------------------|-----|----|---------|------------|
| Ms. BONAMICI—OR .....   | X   |    |         |            |
| Mr. SWALWELL—CA .....   | X   |    |         |            |
| Mr. GRAYSON—FL .....    | X   |    |         |            |
| Mr. BERA—CA .....       | X   |    |         |            |
| Ms. ESTY—CT .....       |     |    |         |            |
| Mr. VEASEY—TX .....     | X   |    |         |            |
| Ms. CLARK—MA .....      | X   |    |         |            |
| Mr. BEYER—VA .....      | X   |    |         |            |
| Mr. PERLMUTTER—CO ..... | X   |    |         |            |
| Mr. TONKO—NY .....      | X   |    |         |            |
| Mr. TAKANO—CA .....     | X   |    |         |            |
| Mr. FOSTER—IL .....     | X   |    |         |            |
| VACANT .....            |     |    |         |            |
| Totals .....            | 15  | 18 |         |            |

\*\* Vice Chair

## AMENDMENT NO. FOSTER 003

Bill: H.R. 1806

Roll Call No. 6

Amendment Sponsor: Mr. Foster (IL)—Defeated

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. SMITH, Chair—TX .....     |     | X  |         |            |
| Mr. LUCAS—OK ** .....         |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....    |     |    |         |            |
| Mr. ROHRBACHER—CA .....       |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....       |     | X  |         |            |
| Mr. McCAUL—TX .....           |     |    |         |            |
| Mr. PALAZZO—MS .....          |     | X  |         |            |
| Mr. BROOKS—AL .....           |     | X  |         |            |
| Mr. HULTGREN—IL .....         |     | X  |         |            |
| Mr. POSEY—FL .....            |     | X  |         |            |
| Mr. MASSIE—KY .....           |     |    |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         |     | X  |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |
| Ms. BONAMICI—OR .....         | X   |    |         |            |
| Mr. SWALWELL—CA .....         | X   |    |         |            |
| Mr. GRAYSON—FL .....          | X   |    |         |            |
| Mr. BERA—CA .....             | X   |    |         |            |
| Ms. ESTY—CT .....             |     |    |         |            |
| Mr. VEASEY—TX .....           | X   |    |         |            |
| Ms. CLARK—MA .....            | X   |    |         |            |
| Mr. BEYER—VA .....            | X   |    |         |            |
| Mr. PERLMUTTER—CO .....       | X   |    |         |            |
| Mr. TONKO—NY .....            | X   |    |         |            |
| Mr. TAKANO—CA .....           | X   |    |         |            |
| Mr. FOSTER—IL .....           | X   |    |         |            |
| VACANT .....                  |     |    |         |            |
| Totals .....                  | 14  | 19 |         |            |

\*\* Vice Chair



## AMENDMENT NO. BONAMICI 009

Bill: H.R. 1806

Roll Call No. 9

Amendment Sponsor: Ms. Bonamici (OR)—Defeated

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... |     | X  |         |            |
| Mr. LUCAS—OK** .....             |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....       |     |    |         |            |
| Mr. ROHRABACHER—CA .....         |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....          |     | X  |         |            |
| Mr. McCAUL—TX .....              |     |    |         |            |
| Mr. PALAZZO—MS .....             |     | X  |         |            |
| Mr. BROOKS—AL .....              |     | X  |         |            |
| Mr. HULTGREN—IL .....            |     | X  |         |            |
| Mr. POSEY—FL .....               |     | X  |         |            |
| Mr. MASSIE—KY .....              |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....         |     | X  |         |            |
| Mr. WEBER—TX .....               |     | X  |         |            |
| Mr. JOHNSON—OH .....             |     | X  |         |            |
| Mr. MOOLENAAR—MI .....           |     | X  |         |            |
| Mr. KNIGHT—CA .....              |     | X  |         |            |
| Mr. BABIN—TX .....               |     | X  |         |            |
| Mr. WESTERMAN—AR .....           |     | X  |         |            |
| Mrs. COMSTOCK—VA .....           |     | X  |         |            |
| Mr. NEWHOUSE—WA .....            |     |    |         |            |
| Mr. PALMER—AL .....              |     | X  |         |            |
| Mr. LOUDERMILK—GA .....          |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX .....    | X   |    |         |            |
| Ms. LOFGREN—CA .....             | X   |    |         |            |
| Mr. LIPINSKI—IL .....            | X   |    |         |            |
| Ms. EDWARDS—MD .....             | X   |    |         |            |
| Ms. BONAMICI—OR .....            | X   |    |         |            |
| Mr. SWALWELL—CA .....            | X   |    |         |            |
| Mr. GRAYSON—FL .....             | X   |    |         |            |
| Mr. BERA—CA .....                | X   |    |         |            |
| Ms. ESTY—CT .....                | X   |    |         |            |
| Mr. VEASEY—TX .....              | X   |    |         |            |
| Ms. CLARK—MA .....               | X   |    |         |            |
| Mr. BEYER—VA .....               | X   |    |         |            |
| Mr. PERLMUTTER—CO .....          | X   |    |         |            |
| Mr. TONKO—NY .....               | X   |    |         |            |
| <i>Mr. TAKANO—CA</i> .....       | X   |    |         |            |
| <i>Mr. FOSTER—IL</i> .....       | X   |    |         |            |
| VACANT .....                     |     |    |         |            |
| Totals .....                     | 16  | 19 |         |            |

\*\* Vice Chair

## AMENDMENT NO. JOHNSON 049

Bill: H.R. 1806

Roll Call No. 10

Amendment Sponsor: Ms. Johnson (TX)—Defeated

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... |     | X  |         |            |
| Mr. LUCAS—OK** .....             |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....       |     |    |         |            |
| Mr. ROHRABACHER—CA .....         |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....          |     | X  |         |            |
| Mr. McCAUL—TX .....              |     |    |         |            |
| Mr. PALAZZO—MS .....             |     | X  |         |            |
| Mr. BROOKS—AL .....              |     | X  |         |            |
| Mr. HULTGREN—IL .....            |     | X  |         |            |
| Mr. POSEY—FL .....               |     | X  |         |            |

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. MASSIE—KY .....           |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |
| Ms. BONAMICI—OR .....         | X   |    |         |            |
| Mr. SWALWELL—CA .....         | X   |    |         |            |
| Mr. GRAYSON—FL .....          | X   |    |         |            |
| Mr. BERA—CA .....             | X   |    |         |            |
| Ms. ESTY—CT .....             | X   |    |         |            |
| Mr. VEASEY—TX .....           | X   |    |         |            |
| Ms. CLARK—MA .....            | X   |    |         |            |
| Mr. BEYER—VA .....            | X   |    |         |            |
| Mr. PERLMUTTER—CO .....       | X   |    |         |            |
| Mr. TONKO—NY .....            | X   |    |         |            |
| Mr. TAKANO—CA .....           | X   |    |         |            |
| Mr. FOSTER—IL .....           | X   |    |         |            |
| VACANT .....                  |     |    |         |            |
| Totals .....                  | 16  | 19 |         |            |

\*\* Vice Chair

#### AMENDMENT NO. VEASEY 015

Bill: H.R. 1806

Roll Call No. 14

Amendment Sponsor: Mr. Veasey (TX)—Defeated

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. SMITH, Chair—TX .....     |     | X  |         |            |
| Mr. LUCAS—OK ** .....         |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....    |     |    |         |            |
| Mr. ROHRABACHER—CA .....      |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....       |     | X  |         |            |
| Mr. McCaul—TX .....           |     |    |         |            |
| Mr. PALAZZO—MS .....          |     | X  |         |            |
| Mr. BROOKS—AL .....           |     | X  |         |            |
| Mr. HULTGREN—IL .....         |     | X  |         |            |
| Mr. POSEY—FL .....            |     | X  |         |            |
| Mr. MASSIE—KY .....           |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |
| Ms. BONAMICI—OR .....         | X   |    |         |            |

| Member                  | Aye | No | Present | Not Voting |
|-------------------------|-----|----|---------|------------|
| Mr. SWALWELL—CA .....   | X   |    |         |            |
| Mr. GRAYSON—FL .....    | X   |    |         |            |
| Mr. BERA—CA .....       | X   |    |         |            |
| Ms. ESTY—CT .....       | X   |    |         |            |
| Mr. VEASEY—TX .....     | X   |    |         |            |
| Ms. CLARK—MA .....      | X   |    |         |            |
| Mr. BEYER—VA .....      | X   |    |         |            |
| Mr. PERLMUTTER—CO ..... | X   |    |         |            |
| Mr. TONKO—NY .....      | X   |    |         |            |
| Mr. TAKANO—CA .....     | X   |    |         |            |
| Mr. FOSTER—IL .....     | X   |    |         |            |
| VACANT .....            |     |    |         |            |
| Totals .....            | 16  | 19 |         |            |

\*\* Vice Chair

## AMENDMENT NO. BONAMICI 000

Bill: H.R. 1806

Roll Call No. 20

Amendment Sponsor: Ms. Bonamici (OR)—Defeated

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. SMITH, Chair—TX .....     |     | X  |         |            |
| Mr. LUCAS—OK ** .....         |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....    |     |    |         |            |
| Mr. ROHRABACHER—CA .....      |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....       |     | X  |         |            |
| Mr. McCAUL—TX .....           |     |    |         |            |
| Mr. PALAZZO—MS .....          |     | X  |         |            |
| Mr. BROOKS—AL .....           |     | X  |         |            |
| Mr. HULTGREN—IL .....         |     | X  |         |            |
| Mr. POSEY—FL .....            |     | X  |         |            |
| Mr. MASSIE—KY .....           |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |
| Ms. BONAMICI—OR .....         | X   |    |         |            |
| Mr. SWALWELL—CA .....         | X   |    |         |            |
| Mr. GRAYSON—FL .....          | X   |    |         |            |
| Mr. BERA—CA .....             | X   |    |         |            |
| Ms. ESTY—CT .....             | X   |    |         |            |
| Mr. VEASEY—TX .....           | X   |    |         |            |
| Ms. CLARK—MA .....            | X   |    |         |            |
| Mr. BEYER—VA .....            | X   |    |         |            |
| Mr. PERLMUTTER—CO .....       | X   |    |         |            |
| Mr. TONKO—NY .....            | X   |    |         |            |
| Mr. TAKANO—CA .....           | X   |    |         |            |
| Mr. FOSTER—IL .....           | X   |    |         |            |
| VACANT .....                  |     |    |         |            |
| Totals .....                  | 16  | 19 |         |            |

\*\* Vice Chair

## AMENDMENT NO. TONKO 014

Bill: H.R. 1806

Roll Call No. 21

Amendment Sponsor: Mr. Tonko (NY)—Defeated

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... |     | X  |         |            |
| Mr. LUCAS—OK** .....             |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....       |     |    |         |            |
| Mr. ROHRABACHER—CA .....         |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....          |     | X  |         |            |
| Mr. McCAUL—TX .....              |     |    |         |            |
| Mr. PALAZZO—MS .....             |     | X  |         |            |
| Mr. BROOKS—AL .....              |     | X  |         |            |
| Mr. HULTGREN—IL .....            |     | X  |         |            |
| Mr. POSEY—FL .....               |     | X  |         |            |
| Mr. MASSIE—KY .....              |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....         |     | X  |         |            |
| Mr. WEBER—TX .....               |     | X  |         |            |
| Mr. JOHNSON—OH .....             |     | X  |         |            |
| Mr. MOOLENAAR—MI .....           |     | X  |         |            |
| Mr. KNIGHT—CA .....              |     | X  |         |            |
| Mr. BABIN—TX .....               |     | X  |         |            |
| Mr. WESTERMAN—AR .....           |     | X  |         |            |
| Mrs. COMSTOCK—VA .....           |     | X  |         |            |
| Mr. NEWHOUSE—WA .....            |     |    |         |            |
| Mr. PALMER—AL .....              |     | X  |         |            |
| Mr. LOUDERMILK—GA .....          |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX .....    | X   |    |         |            |
| Ms. LOFGREN—CA .....             | X   |    |         |            |
| Mr. LIPINSKI—IL .....            | X   |    |         |            |
| Ms. EDWARDS—MD .....             | X   |    |         |            |
| Ms. BONAMICI—OR .....            | X   |    |         |            |
| Mr. SWALWELL—CA .....            | X   |    |         |            |
| Mr. GRAYSON—FL .....             | X   |    |         |            |
| Mr. BERA—CA .....                | X   |    |         |            |
| Ms. ESTY—CT .....                | X   |    |         |            |
| Mr. VEASEY—TX .....              | X   |    |         |            |
| Ms. CLARK—MA .....               | X   |    |         |            |
| Mr. BEYER—VA .....               | X   |    |         |            |
| Mr. PERLMUTTER—CO .....          | X   |    |         |            |
| Mr. TONKO—NY .....               | X   |    |         |            |
| <i>Mr. TAKANO—CA</i> .....       | X   |    |         |            |
| <i>Mr. FOSTER—IL</i> .....       | X   |    |         |            |
| <i>VACANT</i> .....              |     |    |         |            |
| Totals .....                     | 16  | 19 |         |            |

\*\* Vice Chair

## AMENDMENT NO. TONKO 016

Bill: H.R. 1806

Roll Call No. 22

Amendment Sponsor: Mr. Tonko (NY)—Defeated

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... |     | X  |         |            |
| Mr. LUCAS—OK** .....             |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....       |     |    |         |            |
| Mr. ROHRABACHER—CA .....         |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....          |     | X  |         |            |
| Mr. McCAUL—TX .....              |     |    |         |            |
| Mr. PALAZZO—MS .....             |     | X  |         |            |
| Mr. BROOKS—AL .....              |     | X  |         |            |
| Mr. HULTGREN—IL .....            |     | X  |         |            |
| Mr. POSEY—FL .....               |     | X  |         |            |

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. MASSIE—KY .....           |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |
| Ms. BONAMICI—OR .....         | X   |    |         |            |
| Mr. SWALWELL—CA .....         | X   |    |         |            |
| Mr. GRAYSON—FL .....          | X   |    |         |            |
| Mr. BERA—CA .....             | X   |    |         |            |
| Ms. ESTY—CT .....             | X   |    |         |            |
| Mr. VEASEY—TX .....           | X   |    |         |            |
| Ms. CLARK—MA .....            | X   |    |         |            |
| Mr. BEYER—VA .....            | X   |    |         |            |
| Mr. PERLMUTTER—CO .....       | X   |    |         |            |
| Mr. TONKO—NY .....            | X   |    |         |            |
| Mr. TAKANO—CA .....           | X   |    |         |            |
| Mr. FOSTER—IL .....           | X   |    |         |            |
| VACANT .....                  |     |    |         |            |
| Totals .....                  | 16  | 19 |         |            |

\*\* Vice Chair

#### AMENDMENT NO. VEASEY 016

Bill: H.R. 1806

Roll Call No. 23

Amendment Sponsor: Mr. Veasey (TX) and Mr. Bera (CA)—De-  
feated

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. SMITH, Chair—TX .....     |     | X  |         |            |
| Mr. LUCAS—OK** .....          |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....    |     |    |         |            |
| Mr. ROHRABACHER—CA .....      |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....       |     | X  |         |            |
| Mr. McCaul—TX .....           |     |    |         |            |
| Mr. PALAZZO—MS .....          |     | X  |         |            |
| Mr. BROOKS—AL .....           |     | X  |         |            |
| Mr. HULTGREN—IL .....         |     | X  |         |            |
| Mr. POSEY—FL .....            |     | X  |         |            |
| Mr. MASSIE—KY .....           |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |

| Member                  | Aye | No | Present | Not Voting |
|-------------------------|-----|----|---------|------------|
| Ms. EDWARDS—MD .....    | X   |    |         |            |
| Ms. BONAMICI—OR .....   | X   |    |         |            |
| Mr. SWALWELL—CA .....   | X   |    |         |            |
| Mr. GRAYSON—FL .....    | X   |    |         |            |
| Mr. BERA—CA .....       | X   |    |         |            |
| Ms. ESTY—CT .....       | X   |    |         |            |
| Mr. VEASEY—TX .....     | X   |    |         |            |
| Ms. CLARK—MA .....      | X   |    |         |            |
| Mr. BEYER—VA .....      | X   |    |         |            |
| Mr. PERLMUTTER—CO ..... | X   |    |         |            |
| Mr. TONKO—NY .....      | X   |    |         |            |
| Mr. TAKANO—CA .....     | X   |    |         |            |
| Mr. FOSTER—IL .....     | X   |    |         |            |
| VACANT .....            |     |    |         |            |
| Totals .....            | 16  | 19 |         |            |

\*\*Vice Chair

#### AMENDMENT NO. TAKANO 012

Bill: H.R. 1806

Roll Call No. 24

Amendment Sponsor: Mr. Takano (CA)—Defeated

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. SMITH, Chair—TX .....     |     | X  |         |            |
| Mr. LUCAS—OK ** .....         |     | X  |         |            |
| Mr. SENSENBRENNER—WI .....    |     |    |         |            |
| Mr. ROHRBACHER—CA .....       |     | X  |         |            |
| Mr. NEUGEBAUER—TX .....       |     | X  |         |            |
| Mr. McCaul—TX .....           |     |    |         |            |
| Mr. PALAZZO—MS .....          |     | X  |         |            |
| Mr. BROOKS—AL .....           |     | X  |         |            |
| Mr. HULTGREN—IL .....         |     | X  |         |            |
| Mr. POSEY—FL .....            |     | X  |         |            |
| Mr. MASSIE—KY .....           |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            |     | X  |         |            |
| Mr. JOHNSON—OH .....          |     | X  |         |            |
| Mr. MOOLENAAR—MI .....        |     | X  |         |            |
| Mr. KNIGHT—CA .....           |     | X  |         |            |
| Mr. BABIN—TX .....            |     | X  |         |            |
| Mr. WESTERMAN—AR .....        |     | X  |         |            |
| Mrs. COMSTOCK—VA .....        |     | X  |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           |     | X  |         |            |
| Mr. LOUDERMILK—GA .....       |     | X  |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |
| Ms. BONAMICI—OR .....         | X   |    |         |            |
| Mr. SWALWELL—CA .....         | X   |    |         |            |
| Mr. GRAYSON—FL .....          | X   |    |         |            |
| Mr. BERA—CA .....             | X   |    |         |            |
| Ms. ESTY—CT .....             | X   |    |         |            |
| Mr. VEASEY—TX .....           | X   |    |         |            |
| Ms. CLARK—MA .....            | X   |    |         |            |
| Mr. BEYER—VA .....            | X   |    |         |            |
| Mr. PERLMUTTER—CO .....       | X   |    |         |            |
| Mr. TONKO—NY .....            | X   |    |         |            |
| Mr. TAKANO—CA .....           | X   |    |         |            |
| Mr. FOSTER—IL .....           | X   |    |         |            |
| VACANT .....                  |     |    |         |            |
| Totals .....                  | 16  | 19 |         |            |

\*\* Vice Chair

## AMENDMENT NO. SMITH AMENDMENT TO SWALWELL (013) AMENDMENT

Bill: H.R. 1806

Roll Call No. 25

Amendment Sponsor: Mr. Smith (TX)—Passed

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... | X   |    |         |            |
| Mr. LUCAS—OK** .....             | X   |    |         |            |
| Mr. SENSENBRENNER—WI .....       |     |    |         |            |
| Mr. ROHRABACHER—CA .....         | X   |    |         |            |
| Mr. NEUGEBAUER—TX .....          | X   |    |         |            |
| Mr. McCAUL—TX .....              |     |    |         |            |
| Mr. PALAZZO—MS .....             | X   |    |         |            |
| Mr. BROOKS—AL .....              | X   |    |         |            |
| Mr. HULTGREN—IL .....            | X   |    |         |            |
| Mr. POSEY—FL .....               | X   |    |         |            |
| Mr. MASSIE—KY .....              | X   |    |         |            |
| Mr. BRIDENSTINE—OK .....         | X   |    |         |            |
| Mr. WEBER—TX .....               | X   |    |         |            |
| Mr. JOHNSON—OH .....             | X   |    |         |            |
| Mr. MOOLENAAR—MI .....           | X   |    |         |            |
| Mr. KNIGHT—CA .....              | X   |    |         |            |
| Mr. BABIN—TX .....               | X   |    |         |            |
| Mr. WESTERMAN—AR .....           | X   |    |         |            |
| Mrs. COMSTOCK—VA .....           | X   |    |         |            |
| Mr. NEWHOUSE—WA .....            |     |    |         |            |
| Mr. PALMER—AL .....              | X   |    |         |            |
| Mr. LOUDERMILK—GA .....          | X   |    |         |            |
| Ms. JOHNSON, Ranking—TX .....    |     | X  |         |            |
| Ms. LOFGREN—CA .....             |     | X  |         |            |
| Mr. LIPINSKI—IL .....            |     | X  |         |            |
| Ms. EDWARDS—MD .....             |     | X  |         |            |
| Ms. BONAMICI—OR .....            |     | X  |         |            |
| Mr. SWALWELL—CA .....            |     | X  |         |            |
| Mr. GRAYSON—FL .....             |     | X  |         |            |
| Mr. BERA—CA .....                |     | X  |         |            |
| Ms. ESTY—CT .....                |     | X  |         |            |
| Mr. VEASEY—TX .....              |     | X  |         |            |
| Ms. CLARK—MA .....               |     | X  |         |            |
| Mr. BEYER—VA .....               |     | X  |         |            |
| Mr. PERLMUTTER—CO .....          |     | X  |         |            |
| Mr. TONKO—NY .....               |     | X  |         |            |
| <i>Mr. TAKANO—CA</i> .....       |     | X  |         |            |
| <i>Mr. FOSTER—IL</i> .....       |     | X  |         |            |
| <i>VACANT</i> .....              |     |    |         |            |
| Totals .....                     | 19  | 16 |         |            |

\*\* Vice Chair

## AMENDMENT NO. SWALWELL 013 (AS AMENDED)

Bill: H.R. 1806

Roll Call No. 26

Amendment Sponsor: Mr. Swalwell (CA)—Passed

| Member                           | Aye | No | Present | Not Voting |
|----------------------------------|-----|----|---------|------------|
| <i>Mr. SMITH, Chair—TX</i> ..... | X   |    |         |            |
| Mr. LUCAS—OK** .....             | X   |    |         |            |
| Mr. SENSENBRENNER—WI .....       |     |    |         |            |
| Mr. ROHRABACHER—CA .....         | X   |    |         |            |
| Mr. NEUGEBAUER—TX .....          | X   |    |         |            |
| Mr. McCAUL—TX .....              | X   |    |         |            |
| Mr. PALAZZO—MS .....             | X   |    |         |            |
| Mr. BROOKS—AL .....              | X   |    |         |            |
| Mr. HULTGREN—IL .....            | X   |    |         |            |
| Mr. POSEY—FL .....               | X   |    |         |            |

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. MASSIE—KY .....           |     | X  |         |            |
| Mr. BRIDENSTINE—OK .....      |     | X  |         |            |
| Mr. WEBER—TX .....            | X   |    |         |            |
| Mr. JOHNSON—OH .....          | X   |    |         |            |
| Mr. MOOLENAAR—MI .....        | X   |    |         |            |
| Mr. KNIGHT—CA .....           | X   |    |         |            |
| Mr. BABIN—TX .....            | X   |    |         |            |
| Mr. WESTERMAN—AR .....        | X   |    |         |            |
| Mrs. COMSTOCK—VA .....        | X   |    |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           | X   |    |         |            |
| Mr. LOUDERMILK—GA .....       | X   |    |         |            |
| Ms. JOHNSON, Ranking—TX ..... | X   |    |         |            |
| Ms. LOFGREN—CA .....          | X   |    |         |            |
| Mr. LIPINSKI—IL .....         | X   |    |         |            |
| Ms. EDWARDS—MD .....          | X   |    |         |            |
| Ms. BONAMICI—OR .....         | X   |    |         |            |
| Mr. SWALWELL—CA .....         | X   |    |         |            |
| Mr. GRAYSON—FL .....          | X   |    |         |            |
| Mr. BERA—CA .....             | X   |    |         |            |
| Ms. ESTY—CT .....             | X   |    |         |            |
| Mr. VEASEY—TX .....           | X   |    |         |            |
| Ms. CLARK—MA .....            | X   |    |         |            |
| Mr. BEYER—VA .....            | X   |    |         |            |
| Mr. PERLMUTTER—CO .....       | X   |    |         |            |
| Mr. TONKO—NY .....            | X   |    |         |            |
| Mr. TAKANO—CA .....           | X   |    |         |            |
| Mr. FOSTER—IL .....           | X   |    |         |            |
| VACANT .....                  |     |    |         |            |
| Totals .....                  | 33  | 2  |         |            |

\*\* Vice Chair

### FINAL PASSAGE

Bill: H.R. 1806  
Roll Call No. 27  
PASSED

| Member                        | Aye | No | Present | Not Voting |
|-------------------------------|-----|----|---------|------------|
| Mr. SMITH, Chair—TX .....     | X   |    |         |            |
| Mr. LUCAS—OK ** .....         | X   |    |         |            |
| Mr. SENSENBRENNER—WI .....    |     |    |         |            |
| Mr. ROHRBACHER—CA .....       | X   |    |         |            |
| Mr. NEUGEBAUER—TX .....       | X   |    |         |            |
| Mr. McCaul—TX .....           |     |    |         |            |
| Mr. PALAZZO—MS .....          | X   |    |         |            |
| Mr. BROOKS—AL .....           | X   |    |         |            |
| Mr. HULTGREN—IL .....         | X   |    |         |            |
| Mr. POSEY—FL .....            | X   |    |         |            |
| Mr. MASSIE—KY .....           | X   |    |         |            |
| Mr. BRIDENSTINE—OK .....      | X   |    |         |            |
| Mr. WEBER—TX .....            | X   |    |         |            |
| Mr. JOHNSON—OH .....          | X   |    |         |            |
| Mr. MOOLENAAR—MI .....        | X   |    |         |            |
| Mr. KNIGHT—CA .....           | X   |    |         |            |
| Mr. BABIN—TX .....            | X   |    |         |            |
| Mr. WESTERMAN—AR .....        | X   |    |         |            |
| Mrs. COMSTOCK—VA .....        | X   |    |         |            |
| Mr. NEWHOUSE—WA .....         |     |    |         |            |
| Mr. PALMER—AL .....           | X   |    |         |            |
| Mr. LOUDERMILK—GA .....       | X   |    |         |            |
| Ms. JOHNSON, Ranking—TX ..... |     | X  |         |            |
| Ms. LOFGREN—CA .....          |     | X  |         |            |
| Mr. LIPINSKI—IL .....         |     | X  |         |            |
| Ms. EDWARDS—MD .....          |     | X  |         |            |
| Ms. BONAMICI—OR .....         |     | X  |         |            |



| Member                  | Aye | No | Present | Not Voting |
|-------------------------|-----|----|---------|------------|
| Mr. SWALWELL—CA .....   |     | X  |         |            |
| Mr. GRAYSON—FL .....    |     | X  |         |            |
| Mr. BERA—CA .....       |     | X  |         |            |
| Ms. ESTY—CT .....       |     | X  |         |            |
| Mr. VEASEY—TX .....     |     | X  |         |            |
| Ms. CLARK—MA .....      |     | X  |         |            |
| Mr. BEYER—VA .....      |     | X  |         |            |
| Mr. PERLMUTTER—CO ..... |     | X  |         |            |
| Mr. TONKO—NY .....      |     | X  |         |            |
| Mr. TAKANO—CA .....     |     | X  |         |            |
| Mr. FOSTER—IL .....     |     | X  |         |            |
| VACANT .....            |     |    |         |            |
| Totals .....            | 19  | 16 |         |            |

\*\* Vice Chair

CORRESPONDENCE

JASON CHAFFETZ, UTAH  
CHAIRMAN

ONE HUNDRED FOURTEENTH CONGRESS

ELIJAH E. CUMMINGS, MARYLAND  
RANKING MINORITY MEMBER

**Congress of the United States**  
**House of Representatives**

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

2157 RAYBURN HOUSE OFFICE BUILDING

WASHINGTON, DC 20515-6143

MAJORITY (202) 225-5074  
MINORITY (202) 225-5051  
<http://oversight.house.gov>

May 4, 2015

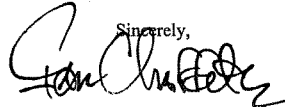
The Honorable Lamar Smith  
Chairman  
Committee on Science, Space, and Technology  
2321 Rayburn HOB  
Washington, DC 20515

Dear Mr. Chairman:

I write concerning H.R. 1806, the America COMPETES Reauthorization Act of 2015. As you know, the Committee on Science, Space, and Technology received an original referral and the Committee on Oversight and Government Reform a secondary referral when the bill was introduced on April 15, 2015. I recognize and appreciate your desire to bring this legislation before the House of Representatives in an expeditious manner, and accordingly, the Committee on Oversight and Government Reform will forego action on the bill.

The Committee takes this action with our mutual understanding that by foregoing consideration of H.R. 1806 at this time, we do not waive any jurisdiction over the subject matter contained in this or similar legislation. Further, I request your support for the appointment of conferees from the Committee on Oversight and Government Reform during any House-Senate conference convened on this or related legislation.

Finally, I would ask that a copy of our exchange of letters on this matter be included in the bill report filed by the Committee on Science, Space, and Technology, as well as in the *Congressional Record* during floor consideration, to memorialize our understanding

Sincerely,  


Jason Chaffetz  
Chairman

cc: The Honorable John A. Boehner, Speaker  
The Honorable Elijah E. Cummings  
The Honorable Eddie Bernice Johnson  
The Honorable Thomas J. Wickham, Parliamentarian

LAMAR S. SMITH, Texas  
CHAIRMAN

EDDIE BERNICE JOHNSON, Texas  
RANKING MEMBER

**Congress of the United States**  
**House of Representatives**

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

2321 RAYBURN HOUSE OFFICE BUILDING

WASHINGTON, DC 20515-6301

(202) 225-6371  
www.science.house.gov

May 4, 2015

The Honorable Jason Chaffetz  
Chairman  
Committee on Oversight and Government Reform  
2157 Rayburn House Office Building  
Washington, D.C. 20515


Dear Mr. Chairman:

Thank you for your letter regarding the Committee on Oversight and Government Reform's jurisdictional interest in H.R. 1806, the "America COMPETES Reauthorization Act of 2015," and your willingness to forego consideration of H.R. 1806 by your committee.

I agree that the Committee on Oversight and Government Reform has a valid jurisdictional interest in certain provisions of H.R. 1806, and that the Committee's jurisdiction will not be adversely affected by your decision to forego consideration of H.R. 1806. As you have requested, I will support your request for an appropriate appointment of outside conferees from your Committee in the event of a House-Senate conference on this or similar legislation should such a conference be convened.

Finally, I will include a copy of your letter and this response in the Committee Report and in the *Congressional Record* during the floor consideration of this bill. Thank you again for your cooperation.

Sincerely,

  
Lamar Smith  
Chairman

cc: The Honorable John Boehner  
The Honorable Eddie Bernice Johnson  
The Honorable Elijah Cummings  
Mr. Tom Wickham, Parliamentarian

MAJORITY MEMBERS:

JOHN KLINE, MINNESOTA, *Chairman*

JOE WILSON, SOUTH CAROLINA  
 VIRGINIA FOXX, NORTH CAROLINA  
 DUNCAN HUNTER, CALIFORNIA  
 DAVID P. ROE, TENNESSEE  
 OLEMI THOMPSON, PENNSYLVANIA  
 TIM WALBERG, INDIANA  
 MATT SALMON, ARIZONA  
 BRETT GUTHRIE, KENTUCKY  
 TODD ROKITA, INDIANA  
 LEO BARRETTA, PENNSYLVANIA  
 JOSEPH J. HECK, NEVADA  
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 BRADLEY SPYER, ALABAMA  
 DAVID BRAT, VIRGINIA  
 PILOU DANTEL, GEORGIA  
 MICHAEL D. BESHOP, MICHIGAN  
 GLENN GROTHMAN, WISCONSIN  
 STEVE PLATTER, OKLAHOMA  
 CARLOS CUBELLE, FLORIDA  
 ELSIE STEPHAN, NEW YORK  
 RICK ALLEN, GEORGIA



COMMITTEE ON EDUCATION  
 AND THE WORKFORCE  
 U.S. HOUSE OF REPRESENTATIVES  
 2181 RAYBURN HOUSE OFFICE BUILDING  
 WASHINGTON, DC 20515-6100

MINORITY MEMBERS:

FOREST G. "BOBBY" SCOTT, VIRGINIA  
*Ranking Member*

RUBEN HINOJOSA, TEXAS  
 SUSAN A. DAVIS, CALIFORNIA  
 PAUL M. GOSAR, ARIZONA  
 JOE COURTNEY, CONNECTICUT  
 MARCO L. FUDGE, OHIO  
 JARED POLIS, COLORADO  
 FREEDOM KILLI COMACHO SARIAN,  
 NORTHERN MARIANA ISLANDS  
 FREDERICA S. WILSON, FLORIDA  
 SUZANNE BONAMICI, GREECE  
 MARK FODAN, WISCONSIN  
 MARK TAKANO, CALIFORNIA  
 HAKEEM S. JEFFRIES, NEW YORK  
 KATHERINE M. CLARK, MASSACHUSETTS  
 ALMA S. AGANIS, NORTH CAROLINA  
 SHAR D'SAULNIER, CALIFORNIA

May 4, 2015

The Honorable Lamar Smith  
 Chairman, Committee on Science, Space, and Technology  
 House of Representatives  
 Washington, D.C. 20515

Dear Mr. Chairman:

I am writing to confirm our mutual understanding with respect to H.R. 1806, the *America COMPETES Reauthorization Act of 2015*. Thank you for consulting with the Committee on Education and the Workforce with regard to H.R. 1806 on those matters within the Committee's jurisdiction.

In the interest of expediting the House's consideration of H.R. 1806, the Committee on Education and the Workforce will forgo further consideration of this bill. However, I do so only with the understanding this procedural route will not be construed to prejudice my Committee's jurisdictional interest and prerogatives on this bill or any other similar legislation and will not be considered as precedent for consideration of matters of jurisdictional interest to my Committee in the future.

I respectfully request your support for the appointment of outside conferees from the Committee on Education and the Workforce should this bill or a similar bill be considered in a conference with the Senate. I also request you include our exchange of letters on this matter in the Committee Report on H.R. 1806 and in the Congressional Record during consideration of this bill on the House Floor. Thank you for your attention to these matters.

Sincerely,

*John Kline*  
 JOHN KLINE  
 Chairman

CC: The Honorable John Boehner  
 The Honorable Bobby Scott  
 The Honorable Eddie Bernice Johnson  
 Mr. Tom Wickham

LAMAR S. SMITH, Texas  
CHAIRMAN

EDDIE BERNICE JOHNSON, Texas  
RANKING MEMBER

**Congress of the United States**  
**House of Representatives**

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

2321 RAYBURN HOUSE OFFICE BUILDING

WASHINGTON, DC 20515-6301

(202) 225-6371  
www.science.house.gov

May 4, 2015

The Honorable John Kline  
Chairman  
Committee on Education and the Workforce  
2181 Rayburn House Office Building  
Washington, D.C. 20515


Dear Mr. Chairman:

Thank you for your letter regarding the Committee on Education and the Workforce's jurisdictional interest in H.R. 1806, the "America COMPETES Reauthorization Act of 2015," and your willingness to forego consideration of H.R. 1806 by your committee.

I agree that the Committee on Education and the Workforce has a valid jurisdictional interest in certain provisions of H.R. 1806, and that the Committee's jurisdiction will not be adversely affected by your decision to forego consideration of H.R. 1806. As you have requested, I will support your request for an appropriate appointment of outside conferees from your Committee in the event of a House-Senate conference on this or similar legislation should such a conference be convened.

Finally, I will include a copy of your letter and this response in the Committee Report and in the *Congressional Record* during the floor consideration of this bill. Thank you again for your cooperation.

Sincerely,

  
Lamar Smith  
Chairman

cc: The Honorable John Boehner  
The Honorable Eddie Bernice Johnson  
The Honorable Robert C. "Bobby" Scott  
Mr. Tom Wickham, Parliamentarian

## APPLICATION OF LAW TO THE LEGISLATIVE BRANCH

Section 102(b) (3) of Public Law 104–1 requires a description of the application of this bill to the legislative branch where the bill relates to the terms and conditions of employment or access to public services and accommodations. This bill reauthorizes the National Science Foundation, the coordination of Federal STEM education programs, the White House Office of Science and Technology Policy, the National Institute of Standards and Technology, the Department of Energy Office of Science, and DOE's energy supply Research and Development programs. The bill also authorizes changes to improve technology transfer from the DOE's national laboratories to the private sector. As such this bill does not relate to employment or access to public services and accommodations.

## STATEMENT OF OVERSIGHT FINDINGS AND RECOMMENDATIONS OF THE COMMITTEE

In compliance with clause 3(c)(1) of rule XIII and clause (2)(b)(1) of rule X of the Rules of the House of Representatives, the Committee's oversight findings and recommendations are reflected in the descriptive portions of this report.

## STATEMENT OF GENERAL PERFORMANCE GOALS AND OBJECTIVES

The goal of H.R. 1806 is to reauthorize the National Science Foundation, the coordination of Federal STEM education programs, the White House Office of Science and Technology Policy, the National Institute of Standards and Technology, the Department of Energy Office of Science, and DOE's energy supply Research and Development programs.

## DUPLICATION OF FEDERAL PROGRAMS

No provision of H.R. 1806 establishes or reauthorizes a program of the Federal Government known to be duplicative of another Federal program, a program that was included in any report from the Government Accountability Office to Congress pursuant to section 21 of Public Law 111–139, or a program related to a program identified in the most recent Catalog of Federal Domestic Assistance.

## DISCLOSURE OF DIRECTED RULE MAKINGS

The Committee estimates that enacting H.R. 1806 does not direct the completion of any specific rule makings within the meaning of 5 U.S.C. 551.

## FEDERAL ADVISORY COMMITTEE ACT

The Committee finds that the legislation does not establish or authorize the establishment of an advisory committee within the definition of 5 U.S.C. App., Section 5(b).

## UNFUNDED MANDATE STATEMENT

Section 423 of the Congressional Budget and Impoundment Control Act (as amended by Section 101(a)(2) of the Unfunded Mandate Reform Act, P.L. 104–4) requires a statement as to whether the provisions of the reported include unfunded mandates. In compli-

ance with this requirement the Committee has received a letter from the Congressional Budget Office included herein.

#### EARMARK IDENTIFICATION

H.R. 1806 does not include any congressional earmarks, limited tax benefits, or limited tariff benefits as defined in clause 9 of rule XXI.

#### COMMITTEE ESTIMATE

Clause 3(d)(2) of rule XIII of the Rules of the House of Representatives requires an estimate and a comparison by the Committee of the costs that would be incurred in carrying out H.R. 1806. However, clause 3(d)(3)(B) of that rule provides that this requirement does not apply when the Committee has included in its report a timely submitted cost estimate of the bill prepared by the Director of the Congressional Budget Office under section 402 of the Congressional Budget Act.

#### BUDGET AUTHORITY AND CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

With respect to the requirements of clause 3(c)(2) of rule XIII of the Rules of the House of Representatives and section 308(a) of the Congressional Budget Act of 1974 and with respect to requirements of clause (3)(c)(3) of rule XIII of the Rules of the House of Representatives and section 402 of the Congressional Budget Act of 1974, the Committee has received the following cost estimate for H.R. 1806 from the Director of Congressional Budget Office:

MAY 5, 2015.

Hon. LAMAR SMITH,  
*Chairman Committee on Science, Space, and Technology,*  
*House of Representatives, Washington, DC.*

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 1806, the America COMPETES Reauthorization Act of 2015.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Marin Burnett.

Sincerely,

KEITH HALL.

Enclosure.

#### *H.R. 1806—America COMPETES Reauthorization Act of 2015*

Summary: H.R. 1806 would authorize appropriations totaling about \$33 billion over the 2016–2020 period for several agencies to support scientific research, industrial innovation, and certain educational activities. Assuming appropriation of the necessary amounts, CBO estimates that implementing the legislation would cost about \$32 billion over the 2016–2020 period.

Enacting the legislation could increase direct spending; therefore, pay-as-you-go procedures would apply. However, CBO estimates that the net effect on direct spending would be negligible for each year. H.R. 1806 would not affect revenues.

H.R. 1806 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary effects of H.R. 1806 are shown in the following table. The costs of this legislation fall within budget functions 250 (general science, space, and technology), 270 (energy), 370 (commerce and housing credit), 450 (community and regional development), and 800 (general government).

|  | By fiscal year, in millions of dollars— |        |       |       |       |           |
|--|---|--------|-------|-------|-------|-----------|
|  | 2016                                    | 2017   | 2018  | 2019  | 2020  | 2016–2020 |
| CHANGES IN SPENDING SUBJECT TO APPROPRIATION               |   |        |       |       |       |           |
| National Science Foundation:                               |   |        |       |       |       |           |
| Research and Related Activities:                           |   |        |       |       |       |           |
| Authorization Level .....                                  | 6,186                                   | 6,186  | 0     | 0     | 0     | 12,372    |
| Estimated Outlays .....                                    | 1,113                                   | 3,712  | 3,959 | 1,918 | 866   | 11,568    |
| Education and Human Resources:                             |   |        |       |       |       |           |
| Authorization Level .....                                  | 866                                     | 866    | 0     | 0     | 0     | 1,732     |
| Estimated Outlays .....                                    | 104                                     | 450    | 572   | 355   | 173   | 1,654     |
| Other National Science Foundation Activities:              |   |        |       |       |       |           |
| Authorization Level .....                                  | 544                                     | 544    | 0     | 0     | 0     | 1,088     |
| Estimated Outlays .....                                    | 326                                     | 441    | 186   | 91    | 30    | 1,074     |
| Subtotal, National Science Foundation:                     |   |        |       |       |       |           |
| Authorization Level .....                                  | 7,596                                   | 7,596  | 0     | 0     | 0     | 15,192    |
| Estimated Outlays .....                                    | 1,543                                   | 4,603  | 4,717 | 2,364 | 1,069 | 14,296    |
| Office of Science and Technology Policy:                   |   |        |       |       |       |           |
| Authorization Level .....                                  | 5                                       | 5      | 0     | 0     | 0     | 10        |
| Estimated Outlays .....                                    | 4                                       | 5      | 1     | 1     | 1     | 10        |
| National Institutes of Standards and Technology:           |   |        |       |       |       |           |
| Science and Technical Research:                            |   |        |       |       |       |           |
| Authorization Level .....                                  | 745                                     | 744    | 0     | 0     | 0     | 1,489     |
| Estimated Outlays .....                                    | 574                                     | 729    | 171   | 15    | 0     | 1,489     |
| Industrial Technology Services:                            |   |        |       |       |       |           |
| Authorization Level .....                                  | 130                                     | 130    | 0     | 0     | 0     | 260       |
| Estimated Outlays .....                                    | 35                                      | 103    | 94    | 26    | 3     | 260       |
| Facility Construction and Maintenance:                     |   |        |       |       |       |           |
| Authorization Level .....                                  | 59                                      | 59     | 0     | 0     | 0     | 118       |
| Estimated Outlays .....                                    | 7                                       | 15     | 18    | 28    | 28    | 97        |
| Subtotal, National Institutes of Standards and Technology: |   |        |       |       |       |           |
| Authorization Level .....                                  | 934                                     | 933    | 0     | 0     | 0     | 1,867     |
| Estimated Outlays .....                                    | 615                                     | 848    | 282   | 69    | 31    | 1,846     |
| Department of Energy:                                      |   |        |       |       |       |           |
| Office of Science:   |   |        |       |       |       |           |
| Authorization Level .....                                  | 5,340                                   | 5,340  | 0     | 0     | 0     | 10,680    |
| Estimated Outlays .....                                    | 2,937                                   | 4,539  | 2,403 | 801   | 0     | 10,680    |
| Applied Research and Development:                          |   |        |       |       |       |           |
| Authorization Level .....                                  | 2,563                                   | 2,563  | 0     | 0     | 0     | 5,126     |
| Estimated Outlays .....                                    | 469                                     | 1,282  | 1,441 | 993   | 559   | 4,745     |
| Subtotal, Department of Energy:                            |   |        |       |       |       |           |
| Authorization Level .....                                  | 7,903                                   | 7,903  | 0     | 0     | 0     | 15,806    |
| Estimated Outlays .....                                    | 3,406                                   | 5,821  | 3,844 | 1,794 | 559   | 15,425    |
| Total Spending Under H.R. 1806:                            |   |        |       |       |       |           |
| Estimated Authorization Level .....                        | 16,438                                  | 16,437 | 0     | 0     | 0     | 32,875    |
| Estimated Outlays .....                                    | 5,568                                   | 11,277 | 8,844 | 4,228 | 1,659 | 31,576    |

Note: Components may not sum to totals because of rounding.

Basis of estimate: For this estimate, CBO assumes H.R. 1806 will be enacted near the end of 2015 and that the necessary amounts will be appropriated for each fiscal year. Estimated outlays are based on historical spending patterns for existing programs.



*National Science Foundation (NSF) Programs*

H.R. 1806 would authorize the appropriation of \$15.2 billion over the 2016–2017 period for the National Science Foundation to carry out various activities to support basic scientific research and education.

**Research and Related Activities.** The bill would authorize the appropriation of \$12.4 billion over the 2016–2017 period for programs under NSF’s research and related activities account. In 2015, those programs received an appropriation of \$5.8 billion. Based on historical spending patterns, CBO estimates that this provision would cost \$11.6 billion over the 2016–2020 period and \$0.8 billion after 2020.

**Education and Human Resources.** The legislation would authorize the appropriation of \$1.7 billion over the 2016–2017 period for NSF’s education and human resources programs. CBO estimates that implementing this provision would cost \$1.7 billion over the 2016–2020 period.

**Other NSF Activities.** H.R. 1806 would authorize the appropriation of \$1.1 billion over the 2016–2017 period for other NSF activities, including agency operations and award management, major research equipment and facilities construction, the Office of the Inspector General, and the Office of the National Science Board. In 2015, those programs received appropriations totaling \$544 million. Based on historical spending patterns, CBO estimates that implementing those provisions would cost \$1.1 billion over the 2016–2020 period.

*Office of Science and Technology Policy*

H.R. 1806 would authorize the appropriation of \$10 million over the 2016–2017 period for the Office of Science and Technology Policy (OSTP). OSTP also would be required to establish a body within the National Science and Technology Council to coordinate international science and technology cooperation, as well as a federal coordination office for Science, Technology, Engineering, and Mathematics education. In 2015, the agency received an appropriation of \$6 million.

*National Institute of Standards and Technology (NIST) Programs*

H.R. 1806 would authorize the appropriation of \$1.9 billion over the 2016–2017 period for programs administered by the National Institute of Standards and Technology. By comparison, appropriations for NIST programs in 2015 total about \$864 million.

**Scientific and Technical Research.** The bill would authorize the appropriation of about \$1.5 billion for NIST’s Scientific and Technical Research and Services program, which supports NIST’s laboratories and technical programs as well as national research facilities. Assuming appropriation of the specified amounts, CBO estimates that implementing this provision would cost \$1.5 billion over the 2016–2020.

**Industrial Technology Services.** H.R. 1806 also would authorize the appropriation of \$260 million over the 2016–2017 period to operate two programs:

- The Manufacturing Extension Partnership program (\$250 million), which provides technical assistance and training to small manufacturers, and

- The Network for Manufacturing Innovation program (\$10 million), which supports a network of research centers focused on developing manufacturing technologies.

Assuming appropriation of the specified amounts, CBO estimates that implementing this provision would cost \$260 million over the 2016–2020 period.

Facility Construction and Maintenance. Finally, for NIST, the bill would authorize the appropriation of \$118 million over the 2016–2017 period for construction and maintenance of NIST buildings and laboratories. Assuming appropriation of the specified amounts, CBO estimates that implementing this provision would cost \$97 million over the 2016–2020 period and \$21 million after 2020.

#### *Department of Energy (DOE) Programs*

H.R. 1806 would authorize the appropriation of \$15.8 billion over the 2016–2017 period for the Department of Energy to carry out various activities to support scientific research and education.

Office of Science. The bill would authorize the appropriation of \$10.7 billion over the 2016–2017 period for DOE research programs in basic energy sciences, biological and environmental sciences, high energy physics, and computational science. In 2015, DOE received appropriations totaling \$5.1 billion to carry out those activities. Assuming appropriation of the authorized amounts, CBO estimates this provision would cost \$10.7 billion over the 2016–2020 period.

Applied Research and Development. H.R. 1806 would authorize appropriations totaling \$5.1 billion over the 2016–2017 period for DOE’s major research and development programs. (By comparison, appropriations for those programs in 2015 total \$3.6 billion.) Authorized funding under H.R. 1806 includes:

- \$2.4 billion for activities related to energy-efficiency and renewable energy;
- \$1.2 billion for fossil energy programs;
- \$1 billion for nuclear energy programs;
- \$280 million for activities of the Advanced Research Projects Agency—Energy; and
- \$226 million for the Office of Electricity Delivery and Energy Reliability.

Based on historical spending patterns, CBO estimates that fully funding applied research and development would cost \$4.7 billion over the 2016–2020 period, and \$0.5 billion after 2020.

Pay-As-You-Go considerations: The Statutory Pay-As-You-Go Act of 2010 establishes budget reporting and enforcement procedures for legislation affecting direct spending or revenues.

H.R. 1806 would authorize NIST to accept funds from private entities for efforts to support domestic manufacturing and would make those amounts available to the agency without further appropriation. Based on information from NIST, CBO estimates that this provision would have an insignificant effect on net direct spending because amounts collected would be small—less than \$500,000 per year—and would be spent by the agency.

H.R. 1806 also would allow agencies that sponsor prize competitions to waive a requirement that participants obtain liability insurance to protect the government against claims by third party

entities. Because any successful claims against the government for those cases would probably be paid from the Treasury's Judgment Fund (a permanent, indefinite appropriation for claims and judgments against the United States), the bill could affect direct spending. However, CBO anticipates that any such cases would be rare and that the impact on direct spending would be insignificant.

Intergovernmental and private-sector impact: H.R. 1806 contains no intergovernmental or private-sector mandates as defined in UMRA. Public colleges, universities, and research centers could benefit from grants authorized by the bill.

Estimate prepared by: Federal costs: Marin Burnett (NSF, DOE—Office of Science, OSTP); Susan Willie (NIST); Megan Carroll (DOE—Applied Research & Development); Impact on state, local, and tribal governments: Jon Sperl; Impact on the private sector: Amy Petz.

Estimate approved by: Theresa Gullo, Assistant Director for Budget Analysis.

#### CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

In compliance with clause 3(e) of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in *italic*, and existing law in which no change is proposed is shown in roman):

### NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT OF 2002

\* \* \* \* \*

#### SEC. 10. ROBERT NOYCE TEACHER SCHOLARSHIP PROGRAM.

##### (a) SCHOLARSHIP PROGRAM.—

(1) IN GENERAL.—The Director shall carry out a program to award grants to eligible entities to recruit and train mathematics and science teachers and to provide scholarships and stipends to individuals participating in the program. Such program shall be known as the “Robert Noyce Teacher Scholarship Program”.

(2) MERIT REVIEW.—Grants shall be provided under this section on a competitive, merit-reviewed basis.

(3) USE OF GRANTS.—A grant provided under this section shall be used by the eligible entity—

(A) to develop and implement a program to recruit and prepare undergraduate students majoring in science, technology, engineering, and mathematics at the eligible entity (and participating institutions of higher education of the consortium, if applicable) to become qualified as mathematics and science teachers, through—

(i) administering scholarships in accordance with subsection (c);

(ii) offering academic courses and early clinical teaching experiences designed to prepare students participating in the program to teach in elementary schools and secondary schools, including such prepara-

tion as is necessary to meet requirements for teacher certification or licensing;

(iii) offering programs to students participating in the program, both before and after the students receive their baccalaureate degree, to enable the students to become better mathematics and science teachers, to fulfill the service requirements of this section, and to exchange ideas with others in the students' fields; and

(iv) providing summer internships for freshman and sophomore students participating in the program; or

(B) to develop and implement a program to recruit and prepare science, technology, engineering, or mathematics professionals to become qualified as mathematics and science teachers, through—

(i) administering stipends in accordance with subsection (d);

(ii) offering academic courses and clinical teaching experiences designed to prepare stipend recipients to teach in elementary schools and secondary schools served by a high need local educational agency, including such preparation as is necessary to meet requirements for teacher certification or licensing; and

(iii) offering programs to stipend recipients, both during and after matriculation in the program for which the stipend is received, to enable recipients to become better mathematics and science teachers, to fulfill the service requirements of this section, and to exchange ideas with others in the students' fields.

(4) ELIGIBILITY REQUIREMENT.—

(A) IN GENERAL.—To be eligible to receive a grant under this section, an eligible entity shall ensure that specific faculty members and staff from the science, technology, engineering, and mathematics departments and specific education faculty of the eligible entity (and participating institutions of higher education of the consortium, if applicable) are designated to carry out the development and implementation of the program.

(B) INCLUSION OF MASTER TEACHERS.—An eligible entity (and participating institutions of higher education of the consortium, if applicable) receiving a grant under this section may also include master teachers in the development of the pedagogical content of the program and in the supervision of students participating in the program in their clinical teaching experiences.

(C) ACTIVE PARTICIPANTS.—No eligible entity (or participating institution of higher education of the consortium, if applicable) shall be eligible for a grant under this section unless faculty from the science, technology, engineering, and mathematics departments of the eligible entity (and participating institutions of higher education of the consortium, if applicable) are active participants in the program.

(5) AWARDS.—In awarding grants under this section, the Director shall ensure that the eligible entities (and participating institutions of higher education of the consortia, if applicable)

represent a variety of types of institutions of higher education. In support of this goal, the Director shall broadly disseminate information about when and how to apply for grants under this section, including by conducting outreach to—

(A) historically Black colleges and universities that are part B institutions, as defined in section 322(2) of the Higher Education Act of 1965 (20 U.S.C. 1061(2)); and

(B) minority institutions, as defined in section 365(3) of the Higher Education Act of 1965 (20 U.S.C. 1067k(3)).

(6) SUPPLEMENT NOT SUPPLANT.—Grant funds provided under this section shall be used to supplement, and not supplant, other Federal or State funds available for the type of activities supported by the grant.

(b) SELECTION PROCESS.—

(1) APPLICATION.—An eligible entity seeking funding 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) in the case of an applicant that is submitting an application on behalf of a consortium of institutions of higher education, a description of the participating institutions of higher education and the roles and responsibilities of each such institution;

(B) a description of the program that the applicant intends to operate, including the number of scholarships and summer internships or the size and number of stipends the applicant intends to award, the type of activities proposed for the recruitment of students to the program, and the selection process that will be used in awarding the scholarships or stipends;

(C) evidence that the applicant has the capability to administer the program in accordance with the provisions of this section, which may include a description of any existing programs at the applicant eligible entity (and participating institutions of higher education of the consortium, if applicable) that are targeted to the education of mathematics and science teachers and the number of teachers graduated annually from such programs;

(D) a description of the academic courses and clinical teaching experiences required under subparagraphs (A)(ii) and (B)(ii) of subsection (a)(3), as applicable, including—

(i) a description of the undergraduate program that will enable a student to graduate within 5 years with a major in science, technology, engineering, or mathematics and to obtain teacher certification or licensing;

(ii) a description of the clinical teaching experiences proposed; and

(iii) evidence of agreements between the applicant and the schools or local educational agencies that are identified as the locations at which clinical teaching experiences will occur;

(E) a description of the programs required under subparagraphs (A)(iii) and (B)(iii) of subsection (a)(3), includ-

ing activities to assist new teachers in fulfilling the teachers' service requirements under this section;

(F) an identification of the applicant eligible entity's science, technology, engineering, and mathematics faculty and its education faculty (and such faculty of participating institutions of higher education of the consortium, if applicable) who will carry out the development and implementation of the program as required under subsection (a)(4); and

(G) a description of the process the applicant will use to fulfill the requirements of subsection (f).

(2) REVIEW OF APPLICATIONS.—In evaluating the applications submitted under paragraph (1), the Director shall consider, at a minimum—

(A) the ability of the applicant (and the participating institutions of higher education of the consortium, if applicable) to effectively carry out the program;

(B) the extent to which the applicant's science, technology, engineering, and mathematics faculty and its education faculty (and such faculty of participating institutions of higher education of the consortium, if applicable) have worked or will work collaboratively to design new or revised curricula that recognize the specialized pedagogy required to teach science, technology, engineering, and mathematics effectively in elementary schools and secondary schools;

(C) the extent to which the applicant (and the participating institutions of higher education of the consortium, if applicable) is committed to making the program a central organizational focus;

(D) the degree to which the proposed programming will enable scholarship or stipend recipients to become successful mathematics and science teachers;

(E) the number and academic qualifications of the students who will be served by the program; and

(F) the ability of the applicant (and the participating institutions of higher education of the consortium, if applicable) to recruit students who would otherwise not pursue a career in teaching in elementary schools or secondary schools and students who are individuals identified in section 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a or 1885b).

(c) SCHOLARSHIP REQUIREMENTS.—

(1) IN GENERAL.—Scholarships under this section shall be available only to students who—

(A) are majoring in science, technology, engineering, or mathematics; and

(B) have attained at least junior status in a baccalaureate degree program.

(2) SELECTION.—Individuals shall be selected to receive scholarships primarily on the basis of academic merit, with consideration given to financial need and 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).

(3) AMOUNT.—The Director shall establish for each year the amount to be awarded for scholarships under this section for that year, which shall be not less than \$10,000 per year, except that no individual shall receive for any year more than the cost of attendance at that individual's institution. Full-time students may receive annual scholarships through the completion of a baccalaureate degree program, not to exceed a maximum of 3 years. Part-time students may receive scholarships that are prorated according to such students' enrollment status, not to exceed 6 years of scholarship support.

(4) SERVICE OBLIGATION.—If an individual receives a scholarship under this section, such individual shall be required to complete, within 8 years after graduation from the baccalaureate degree program for which the scholarship was awarded, 2 years of service as a mathematics or science teacher for each full scholarship award received, with a maximum service requirement of 6 years. Service required under this paragraph shall be performed in a high need local educational agency.

(d) STIPENDS.—

(1) IN GENERAL.—Stipends under this section shall be available only to science, technology, engineering, or mathematics professionals who, while receiving the stipend, are enrolled in a program established under subsection (a)(3)(B).

(2) SELECTION.—Individuals shall be selected to receive stipends under this section primarily on the basis of academic merit and professional achievement, with consideration given to financial need and 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).

(3) AMOUNT AND DURATION.—Stipends under this section shall be not less than \$10,000 per year, except that no individual shall receive for any year more than the cost of attendance at such individual's institution. Individuals may receive a maximum of 1 year of stipend support, except that if an individual is enrolled in a part-time program, such amount shall be prorated according to the length of the program.

(4) SERVICE OBLIGATION.—If an individual receives a stipend under this section, such individual shall be required to complete, within 4 years after graduation from the program for which the stipend was awarded, 2 years of service as a mathematics or science teacher. Service required under this paragraph shall be performed in a high need local educational agency.

(e) CONDITIONS OF SUPPORT.—As a condition of acceptance of a scholarship or stipend under this section, a recipient of a scholarship or stipend shall enter into an agreement with the eligible entity—

(1) accepting the terms of the scholarship or stipend pursuant to subsection (c) or subsection (d);

(2) agreeing to provide the eligible entity with annual certification of employment and up-to-date contact information and to participate in surveys conducted by the eligible entity as part of an ongoing assessment program; and

(3) establishing that if the service obligation required under this section is not completed, all or a portion of the scholarship or stipend received under this section shall be repaid in accordance with subsection (g).

(f) COLLECTION FOR NONCOMPLIANCE.—

(1) MONITORING COMPLIANCE.—An eligible entity receiving a grant under this section shall, as a condition of participating in the program, enter into an agreement with the Director to monitor the compliance of scholarship or stipend recipients with their respective service requirements.

(2) COLLECTION OF REPAYMENT.—

(A) IN GENERAL.—In the event that a scholarship or stipend recipient is required to repay the scholarship or stipend under subsection (g), the eligible entity shall—

(i) be responsible for determining the repayment amounts and for notifying the recipient and the Director of the amount owed; and

(ii) collect such repayment amount within a period of time as determined under the agreement described in paragraph (1), or the repayment amount shall be treated as a loan in accordance with subparagraph (C).

(B) RETURNED TO TREASURY.—Except as provided in subparagraph (C), any such repayment shall be returned to the Treasury of the United States.

(C) RETAIN PERCENTAGE.—An eligible entity may retain a percentage of any repayment the eligible entity collects to defray administrative costs associated with the collection. The Director shall establish a single, fixed percentage that will apply to all eligible entities.

(g) FAILURE TO COMPLETE SERVICE OBLIGATION.—

(1) GENERAL RULE.—If an individual who has received a scholarship or stipend under this section—

(A) fails to maintain an acceptable level of academic standing in the educational institution in which the individual is enrolled, as determined by the Director;

(B) is dismissed from such educational institution for disciplinary reasons;

(C) withdraws from the program for which the award was made before the completion of such program;

(D) declares that the individual does not intend to fulfill the service obligation under this section; or

(E) fails to fulfill the service obligation of the individual under this section,

such individual shall be liable to the United States as provided in paragraph (2).

(2) AMOUNT OF REPAYMENT.—

(A) LESS THAN ONE YEAR OF SERVICE.—If a circumstance described in paragraph (1) occurs before the completion of 1 year of a service obligation under this section, the total amount of awards received by the individual under this section shall be repaid or such amount shall be treated as a loan to be repaid in accordance with subparagraph (C).

(B) MORE THAN ONE YEAR OF SERVICE.—If a circumstance described in subparagraph (D) or (E) of para-



graph (1) occurs after the completion of 1 year of a service obligation under this section—

(i) for a scholarship recipient, the total amount of scholarship awards received by the individual under this section, reduced by the ratio of the number of years of service completed divided by the number of years of service required, shall be repaid or such amount shall be treated as a loan to be repaid in accordance with subparagraph (C); and

(ii) for a stipend recipient, one-half of the total amount of stipends received by the individual under this section shall be repaid or such amount shall be treated as a loan to be repaid in accordance with subparagraph (C).

(C) REPAYMENTS.—The loans described under subparagraphs (A) and (B) shall be payable to the Federal Government, consistent with the provisions of part B or D of title IV of the Higher Education Act of 1965, and shall be subject to repayment in accordance with terms and conditions specified by the Director (in consultation with the Secretary of Education) in regulations promulgated to carry out this paragraph.

(3) EXCEPTIONS.—The Director may provide for the partial or total waiver or suspension of any service or payment obligation by an individual under this section whenever compliance by the individual with the obligation is impossible or would involve extreme hardship to the individual, or if enforcement of such obligation with respect to the individual would be unconscionable.

(h) DATA COLLECTION.—An eligible entity receiving a grant under this section shall supply to the Director any relevant statistical and demographic data on scholarship and stipend recipients the Director may request, including information on employment required under this section.

(i) DEFINITIONS.—In this section—

(1) the term “cost of attendance” has the meaning given such term in section 472 of the Higher Education Act of 1965 (20 U.S.C. 10871l);

(2) the term “eligible entity” means—

(A) an institution of higher education; or

(B) an institution of higher education that receives grant funds on behalf of a consortium of institutions of higher education;

(3) the term “fellowship” means an award to an individual under section 10A;

(4) the term “high need local educational agency” has the meaning given such term in section 201 of the Higher Education Act of 1965 (20 U.S.C. 1021);

(5) the term “mathematics and science teacher” means a science, *computer science*, technology, engineering, or mathematics teacher at the elementary school or secondary school level;

(6) the term “scholarship” means an award under subsection (c);

(7) the term “science, technology, engineering, or mathematics professional” means a person who holds a baccalaureate, master’s, or doctoral degree in science, technology, engineering, or mathematics, and is working in or had a career in such field or a related area; and

(8) the term “stipend” means an award under subsection (d).

(j) MATHEMATICS AND SCIENCE SCHOLARSHIP GIFT FUND.—In accordance with section 11(f) of the National Science Foundation Act of 1950 (42 U.S.C. 1870(f)), the Director is authorized to accept donations from the private sector to supplement but not supplant scholarships, stipends, internships, or fellowships associated with programs under this section or section 10A.

(k) ASSESSMENT OF TEACHER SERVICE AND RETENTION.—Not later than 4 years after the date of enactment of the America COMPETES Act, the Director shall transmit to the Committee on Health, Education, Labor, and Pensions of the Senate and the Committee on Science and Technology of the House of Representatives a report on the effectiveness of the programs carried out under this section and section 10A. The report shall include the proportion of individuals receiving scholarships, stipends, or fellowships under the program who—

(1) fulfill the individuals’ service obligation required under this section or section 10A;

(2) remain in the teaching profession beyond the individuals’ service obligation; and

(3) remain in the teaching profession in a high need local educational agency beyond the individuals’ service obligation.

(l) EVALUATION.—Not less than 2 years after the date of enactment of the America COMPETES Act, the Director, in consultation with the Secretary of Education, shall conduct an evaluation to determine whether the scholarships, stipends, and fellowships authorized under this section and section 10A have been effective in increasing the numbers of high-quality mathematics and science teachers teaching in high need local educational agencies and whether there continue to exist significant shortages of such teachers in high need local educational agencies.

#### **SEC. 10A. NATIONAL SCIENCE FOUNDATION TEACHING FELLOWSHIPS AND MASTER TEACHING FELLOWSHIPS.**

(a) IN GENERAL.—

(1) GRANTS.—

(A) IN GENERAL.—As part of the Robert Noyce Teacher Scholarship Program established under section 10, the Director shall establish a separate program to award grants to eligible entities to enable such entities to administer fellowships in accordance with this section.

(B) DEFINITIONS.—The terms used in this section have the meanings given the terms in section 10.

(2) FELLOWSHIPS.—Fellowships under this section shall be available only to—

(A) science, technology, engineering, or mathematics professionals, including retiring professionals in those fields, who shall be referred to as “National Science Foundation Teaching Fellows” and who, in the first year of the fellowship, are enrolled in a master’s degree program leading to teacher certification or licensing; and

(B) mathematics and science teachers, who shall be referred to as “National Science Foundation Master Teaching Fellows” and who possess a master’s *or bachelor’s* degree in their field.

(b) ELIGIBILITY.—In order to be eligible to receive a grant under this section, an eligible entity shall enter into a partnership that shall include—

(1) a department within an institution of higher education participating in the partnership that provides an advanced program of study in mathematics and science;

(2)(A) a school or department within an institution of higher education participating in the partnership that provides a teacher preparation program; or

(B) a 2-year institution of higher education that has a teacher preparation offering or a dual enrollment program with an institution of higher education participating in the partnership;

(3) not less than 1 high need local educational agency and a public school or a consortium of public schools served by the agency; and

(4) 1 or more nonprofit organizations that have a demonstrated record of capacity to provide expertise or support to meet the purposes of this section.

(c) USE OF GRANTS.—Grants awarded under this section shall be used by the eligible entity (and participating institutions of higher education of the consortium, if applicable) to develop and implement a program for National Science Foundation Teaching Fellows or National Science Foundation Master Teaching Fellows, through—

(1) administering fellowships in accordance with this section, including providing the teaching fellowship salary supplements described in subsection (f);

(2) in the case of National Science Foundation Teaching Fellowships—

(A) offering academic courses and clinical teaching experiences leading to a master’s degree and designed to prepare individuals to teach in elementary schools and secondary schools, including such preparation as is necessary to meet the requirements for certification or licensing; and

(B) offering programs both during and after matriculation in the program for which the fellowship is received to enable fellows to become highly effective mathematics and science teachers, including mentoring, training, induction, and professional development activities, to fulfill the service requirements of this section, including the requirements of subsection (e), and to exchange ideas with others in their fields; **[and]**

(3) in the case of National Science Foundation Master Teaching Fellowships *for teachers with master’s degrees in their field*—

(A) offering academic courses and leadership training to prepare individuals to become master teachers in elementary schools and secondary schools; and

(B) offering programs both during and after matriculation in the program for which the fellowship is received to enable fellows to become highly effective mathematics and

science teachers, including mentoring, training, induction, and professional development activities, to fulfill the service requirements of this section, including the requirements of subsection (e), and to exchange ideas with others in their fields[.]; and

(4) *in the case of National Science Foundation Master Teaching Fellowships for teachers with bachelor's degrees in their field and working toward a master's degree—*

(A) *offering academic courses leading to a master's degree and leadership training to prepare individuals to become master teachers in elementary and secondary schools; and*

(B) *offering programs both during and after matriculation in the program for which the fellowship is received to enable fellows to become highly effective mathematics and science teachers, including mentoring, training, induction, and professional development activities, to fulfill the service requirements of this section, including the requirements of subsection (e), and to exchange ideas with others in their fields.*

(d) SELECTION PROCESS.—

(1) MERIT REVIEW.—Grants shall be awarded under this section on a competitive, merit-reviewed basis.

(2) APPLICATIONS.—An eligible entity desiring 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) in the case of an applicant that is submitting an application on behalf of a consortium of institutions of higher education, a description of the participating institutions of higher education and the roles and responsibilities of each such institution;

(B) a description of the program that the applicant intends to operate, including the number of fellowships the applicant intends to award, the type of activities proposed for the recruitment of students to the program, and the amount of the teaching fellowship salary supplements to be provided in accordance with subsection (f);

(C) evidence that the applicant has the capability to administer the program in accordance with the provisions of this section, which may include a description of any existing programs at the applicant eligible entity (and participating institutions of higher education of the consortium, if applicable) that are targeted to the education of mathematics and science teachers and the number of teachers graduated annually from such programs;

(D) in the case of National Science Foundation Teaching Fellowships, a description of—

(i) the selection process that will be used in awarding fellowships, including a description of the rigorous measures to be used, including the rigorous, nationally recognized assessments to be used, in order to determine whether individuals applying for fellowships have advanced content knowledge of science, technology, engineering, or mathematics;

(ii) the academic courses and clinical teaching experiences described in subsection (c)(2)(A), including—

(I) a description of an educational program that will enable a student to obtain a master's degree and teacher certification or licensing within 1 year; and

(II) evidence of agreements between the applicant and the schools or local educational agencies that are identified as the locations at which clinical teaching experiences will occur;

(iii) a description of the programs described in subsection (c)(2)(B), including activities to assist individuals in fulfilling their service requirements under this section;

(E) evidence that the eligible entity will provide the teaching supplements required under subsection (f); and

(F) a description of the process the applicant will use to fulfill the requirements of section 10(f).

(3) CRITERIA.—In evaluating the applications submitted under paragraph (2), the Director shall consider, at a minimum—

(A) the ability of the applicant (and participating institutions of higher education of the consortium, if applicable) to effectively carry out the program and to meet the requirements of subsection (f);

(B) the extent to which the mathematics, science, or engineering faculty and the education faculty at the eligible entity (and participating institutions of higher education of the consortium, if applicable) have worked or will work collaboratively to design new or revised curricula that recognizes the specialized pedagogy required to teach science, technology, engineering, and mathematics effectively in elementary schools and secondary schools;

(C) the extent to which the applicant (and participating institutions of higher education of the consortium, if applicable) is committed to making the program a central organizational focus;

(D) the degree to which the proposed programming will enable participants to become highly effective mathematics and science teachers and prepare such participants to assume leadership roles in their schools, in addition to their regular classroom duties, including serving as mentor or master teachers, developing curriculum, and assisting in the development and implementation of professional development activities;

(E) the number and quality of the individuals that will be served by the program; and

(F) in the case of the National Science Foundation Teaching Fellowship, the ability of the applicant (and participating institutions of higher education of the consortium, if applicable) to recruit individuals who would otherwise not pursue a career in teaching and individuals identified in section 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1855a or 1855b).

(4) SELECTION OF FELLOWS.—

(A) IN GENERAL.—Individuals shall be selected to receive fellowships under this section primarily on the basis of—

- (i) professional achievement;
- (ii) academic merit;
- (iii) content knowledge of science, technology, engineering, or mathematics, as demonstrated by their performance on an assessment in accordance with paragraph (2)(D)(i); and
- (iv) in the case of National Science Foundation Master Teaching Fellows, demonstrated success in improving student academic achievement in science, technology, engineering, or mathematics.

(B) PROMOTING PARTICIPATION OF CERTAIN INDIVIDUALS.—Among individuals demonstrating equivalent qualifications, consideration may be given 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).

(e) DUTIES OF NATIONAL SCIENCE FOUNDATION TEACHING FELLOWS AND MASTER TEACHING FELLOWS.—A National Science Foundation Teaching Fellow or a National Science Foundation Master Teaching Fellow, while fulfilling the service obligation under [subsection (g)] *subsection (h)* and in addition to regular classroom activities, shall take on a leadership role within the school or local educational agency in which the fellow is employed, as defined by the partnership according to such fellow's expertise, including serving as a mentor or master teacher, developing curricula, and assisting in the development and implementation of professional development activities.

(f) TEACHING FELLOWSHIP SALARY SUPPLEMENTS.—

(1) IN GENERAL.—An eligible entity receiving a grant under this section shall provide salary supplements to individuals who participate in the program under this section during the period of their service obligation under subsection (g). A local educational agency through which the service obligation is fulfilled shall agree not to reduce the base salary normally paid to an individual solely because such individual receives a salary supplement under this subsection.

(2) AMOUNT AND DURATION.—

(A) AMOUNT.—Salary supplements provided under paragraph (1) shall be not less than \$10,000 per year, except that, in the case of a National Science Foundation Teaching Fellow, while enrolled in the master's degree program as described in subsection (c)(2)(A), such fellow shall receive not more than the cost of attendance at such fellow's institution.

(B) SUPPORT WHILE ENROLLED IN MASTER'S DEGREE PROGRAM.—A National Science Foundation Teaching Fellow may receive a maximum of 1 year of fellowship support while enrolled in a master's degree program as described in subsection (c)(2)(A), except that if such fellow is enrolled in a part-time program, such amount shall be prorated according to the length of the program.

(C) DURATION OF SUPPORT.—An eligible entity receiving a grant under this section shall provide teaching fellow-

ship salary supplements through the period of the fellow's service obligation under subsection (g).

(g) *SUPPORT FOR MASTER TEACHING FELLOWS WHILE ENROLLED IN A MASTER'S DEGREE PROGRAM.*—A National Science Foundation Master Teacher Fellow may receive a maximum of 1 year of fellowship support while enrolled in a master's degree program as described in subsection (c)(4)(A), except that if such fellow is enrolled in a part-time program, such amount shall be prorated according to the length of the program.

[(g)] (h) *SERVICE OBLIGATION.*—An individual awarded a fellowship under this section shall serve as a mathematics or science teacher in an elementary school or secondary school served by a high need local educational agency for—

(1) in the case of a National Science Foundation Teaching Fellow, 4 years, to be fulfilled within 6 years of completing the master's program described in subsection (c)(2)(A); and

(2) in the case of a National Science Foundation Master Teaching Fellow, 5 years, to be fulfilled within 7 years of the start of participation in the program under subsection (c)(3).

[(h)] (i) *MATCHING REQUIREMENT.*—

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

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

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

(2) *WAIVER.*—The Director may waive all or part of the matching requirement described in paragraph (1) for any fiscal year for an eligible entity receiving a grant under this section, if the Director determines that applying the matching requirement would result in serious hardship or inability to carry out the authorized activities described in this section.

[(i)] (j) *CONDITIONS OF SUPPORT; COLLECTION FOR NONCOMPLIANCE; FAILURE TO COMPLETE SERVICE OBLIGATION; DATA COLLECTION.*—

(1) *IN GENERAL.*—Except as provided in paragraph (2), subsections (e), (f), (g), and (h) of section 10 shall apply to eligible entities and recipients of fellowships under this section, as applicable, in the same manner as such subsections apply to eligible entities and recipients of scholarships and stipends under section 10, as applicable.

(2) *AMOUNT OF REPAYMENT.*—If a circumstance described in subparagraph (D) or (E) of section 10(g)(1) occurs after the completion of 1 year of a service obligation under this section—

(A) for a National Science Foundation Teaching Fellow, the total amount of fellowship award received by the individual under this section while enrolled in the master's degree program, reduced by one-fourth of the total amount for each year of service completed, plus one-half of the total teaching fellowship salary supplements received by

such individual under this section, shall be repaid or such amount shall be treated as a loan to be repaid in accordance with section 10(g)(1)(C); and

(B) for a National Science Foundation Master Teaching Fellow, the total amount of teaching fellowship salary supplements received by the individual under this section, reduced by one-half, shall be repaid or such amount shall be treated as a loan to be repaid in accordance with section 10(g)(1)(C).

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## AMERICA COMPETES REAUTHORIZATION ACT OF 2010

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### TITLE I—OFFICE OF SCIENCE AND TECHNOLOGY POLICY

#### SEC. 101. COORDINATION OF FEDERAL STEM EDUCATION.

(a) **ESTABLISHMENT.**—The Director shall establish a committee under the National Science and Technology Council, including the Office of Management and Budget, 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.

(b) **RESPONSIBILITIES.**—The committee established under subsection (a) shall—

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

(2) coordinate STEM education activities and programs with the Office of Management and Budget;

(3) *collaborate with the STEM Education Advisory Panel established under section 202 of the America COMPETES Reauthorization Act of 2015 and other outside stakeholders to ensure the engagement of the STEM education community;*

(4) *review evaluation measures used for Federal STEM education programs;*

[(3)] (5) encourage the teaching of innovation and entrepreneurship as part of STEM education activities;

[(4)] (6) review STEM education activities and programs to ensure they are not duplicative of similar efforts within the Federal government;

[(5)] (7) 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

[(6)] (8) 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 women, underrepresented minorities, and persons in rural areas in such programs and activities.

(b) RESPONSIBILITIES OF OSTP.—The Director shall encourage and monitor the efforts of the participating agencies to ensure that the strategic plan under [subsection (b)(5)] *subsection (b)(7)* is developed and executed effectively and that the objectives of the strategic plan are met.

(c) REPORT.—The Director shall transmit a report annually to Congress at the time of the President's budget request describing the plan required under [subsection (b)(5)] *subsection (b)(7)*. 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) an evaluation of the levels of duplication and fragmentation of the programs and activities described under paragraph (1);

(4) 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

(5) a description of how the participating Federal agencies will disseminate information about federally supported resources for STEM education practitioners, including teacher professional development programs, to States and to STEM education practitioners, including to teachers and administrators in schools that meet the criteria described in subsection (c)(1)(A) and (B) of section 3175 of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381j(c)(1)(A) and (B)).

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**STEVENSON-WYDLER TECHNOLOGY INNOVATION ACT  
OF 1980**

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**SEC. 8. GRANTS AND COOPERATIVE AGREEMENTS.**

(a) **IN GENERAL.**—The Secretary may make grants and enter into cooperative agreements according to the provisions of this section in order to assist any activity consistent with this Act, including activities performed by individuals. **【The total amount of any such grant or cooperative agreement may not exceed 75 percent of the total cost of the program.】**

(b) **ELIGIBILITY AND PROCEDURE.**—Any person or institution may apply to the Secretary for a grant or cooperative agreement available under this section. Application shall be made in such form and manner, and with such content and other submissions, as the Assistant Secretary shall prescribe. The Secretary shall act upon each such application within 90 days after the date on which all required information is received.

(c) **TERMS AND CONDITIONS.**—

(1) Any grant made, or cooperative agreement entered into, under this section shall be subject to the limitations and provisions set forth in paragraph (2) of this subsection, and to such other terms, conditions, and requirements as the Secretary deems necessary or appropriate.

(2) Any person who receives or utilizes any proceeds of any grant made or cooperative agreement entered into under this section shall keep such records as the Secretary shall by regulation prescribe as being necessary and appropriate to facilitate effective audit and evaluation, including records which fully disclose the amount and disposition by such recipient of such proceeds, the total cost of the program or project in connection with which such proceeds were used, and the amount, if any, of such costs which was provided through other sources.

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**SEC. 12. COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS.**

(a) **GENERAL AUTHORITY.**—**【Each Federal agency】**

(1) *IN GENERAL.*—*Except as provided in paragraph (2), each Federal agency may permit the director of any of its Government-operated Federal laboratories, and, to the extent provided in an agency-approved joint work statement or, if permitted by the agency, in an agency-approved annual strategic plan, contractor-operated laboratories—*

**【(1)】** (A) to enter into cooperative research and development agreements on behalf of such agency (subject to subsection (c) of this section) with other Federal agencies; units of State or local government; industrial organizations (including corporations, partnerships, and limited partnerships, and industrial development organizations); public and private foundations; nonprofit organizations (including universities); or other persons (including licensees of inventions owned by the Federal agency); and

**【(2)】** (B) to negotiate licensing agreements under section 207 of title 35, United States Code, or under other authorities (in the case of a Government-owned, contractor-operated laboratory, subject to subsection (c) of this section) for inventions made or other intellectual property developed at the laboratory and other inventions or other intellectual

property that may be voluntarily assigned to the Government.

(2) *EXCEPTION.*—Notwithstanding paragraph (1), in accordance with section 722(a) of the America COMPETES Reauthorization Act of 2015, approval by the Secretary of Energy shall not be required for any technology transfer agreement proposed to be entered into by a National Laboratory of the Department of Energy, the total cost of which (including the National Laboratory contributions and project recipient cost share) is less than \$1,000,000.

(b) *ENUMERATED AUTHORITY.*—(1) Under an agreement entered into pursuant to [subsection (a)(1)] *subsection (a)(1)(A)*, the laboratory may grant, or agree to grant in advance, to a collaborating party patent licenses or assignments, or options thereto, in any invention made in whole or in part by a laboratory employee under the agreement, or, subject to section 209 of title 35, United States Code, may grant a license to an invention which is federally owned, for which a patent application was filed before the signing of the agreement, and directly within the scope of the work under the agreement, for reasonable compensation when appropriate. The laboratory shall ensure, through such agreement, that the collaborating party has the option to choose an exclusive license for a pre-negotiated field of use for any such invention under the agreement or, if there is more than one collaborating party, that the collaborating parties are offered the option to hold licensing rights that collectively encompass the rights that would be held under such an exclusive license by one party. In consideration for the Government's contribution under the agreement, grants under this paragraph shall be subject to the following explicit conditions:

(A) A nonexclusive, nontransferable, irrevocable, paid-up license from the collaborating party to the laboratory to practice the invention or have the invention practiced throughout the world by or on behalf of the Government. In the exercise of such license, the Government shall not publicly disclose trade secrets or commercial or financial information that is privileged or confidential within the meaning of section 552(b)(4) of title 5, United States Code, or which would be considered as such if it had been obtained from a non-Federal party.

(B) If a laboratory assigns title or grants an exclusive license to such an invention, the Government shall retain the right—

(i) to require the collaborating party to grant to a responsible applicant a nonexclusive, partially exclusive, or exclusive license to use the invention in the applicant's licensed field of use, on terms that are reasonable under the circumstances; or

(ii) if the collaborating party fails to grant such a license, to grant the license itself.

(C) The Government may exercise its right retained under subparagraph (B) only in exceptional circumstances and only if the Government determines that—

(i) the action is necessary to meet health or safety needs that are not reasonably satisfied by the collaborating party;

(ii) the action is necessary to meet requirements for public use specified by Federal regulations, and such require-

ments are not reasonably satisfied by the collaborating party; or

(iii) the collaborating party has failed to comply with an agreement containing provisions described in subsection (c)(4)(B).

This determination is subject to administrative appeal and judicial review under section 203(2) of title 35, United States Code.

(2) Under agreements entered into pursuant to [subsection (a)(1)] *subsection (a)(1)(A)*, the laboratory shall ensure that a collaborating party may retain title to any invention made solely by its employee in exchange for normally granting the Government a nonexclusive, nontransferable, irrevocable, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government for research or other Government purposes.

(3) Under an agreement entered into pursuant to [subsection (a)(1)] *subsection (a)(1)(A)*, a laboratory may—

(A) accept, retain, and use funds, personnel, services, and property from a collaborating party and provide personnel, services, and property to a collaborating party;

(B) use funds received from a collaborating party in accordance with subparagraph (A) to hire personnel to carry out the agreement who will not be subject to full-time-equivalent restrictions of the agency;

(C) to the extent consistent with any applicable agency requirements or standards of conduct, permit an employee or former employee of the laboratory to participate in an effort to commercialize an invention made by the employee or former employee while in the employment or service of the Government; and

(D) waive, subject to reservation by the Government of a nonexclusive, irrevocable, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government, in advance, in whole or in part, any right of ownership which the Federal Government may have to any subject invention made under the agreement by a collaborating party or employee of a collaborating party.

(4) A collaborating party in an exclusive license in any invention made under an agreement entered into pursuant to [subsection (a)(1)] *subsection (a)(1)(A)* shall have the right of enforcement under chapter 29 of title 35, United States Code.

(5) A Government-owned, contractor-operated laboratory that enters into a cooperative research and development agreement pursuant to [subsection (a)(1)] *subsection (a)(1)(A)* may use or obligate royalties or other income accruing to the laboratory under such agreement with respect to any invention only—

(A) for payments to inventors;

(B) for purposes described in clauses (i), (ii), (iii), and (iv) of section 14(a)(1)(B); and

(C) for scientific research and development consistent with the research and development missions and objectives of the laboratory.

(6)(A) In the case of a laboratory that is part of the National Nuclear Security Administration, a designated official of that Admin-

istration may waive any license retained by the Government under paragraph (1)(A), (2), or (3)(D), in whole or in part and according to negotiated terms and conditions, if the designated official finds that the retention of the license by the Government would substantially inhibit the commercialization of an invention that would otherwise serve an important national security mission.

(B) The authority to grant a waiver under subparagraph (A) shall expire on the date that is five years after the date of the enactment of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001. The expiration under the preceding sentence of authority to grant a waiver under subparagraph (A) shall not affect any waiver granted under that subparagraph before the expiration of such authority.

(C) Not later than February 15 of each year, the Administrator for Nuclear Security shall submit to Congress a report on any waivers granted under this paragraph during the preceding year.

(c) CONTRACT CONSIDERATIONS.—(1) A Federal agency may issue regulations on suitable procedures for implementing the provisions of this section; however, implementation of this section shall not be delayed until issuance of such regulations.

(2) The agency in permitting a Federal laboratory to enter into agreements under this section shall be guided by the purposes of this Act.

(3)(A) Any agency using the authority given it under subsection (a) shall review standards of conduct for its employees for resolving potential conflicts of interest to make sure they adequately establish guidelines for situations likely to arise through the use of this authority, including but not limited to cases where present or former employees or their partners negotiate licenses or assignments of titles to inventions or negotiate cooperative research and development agreements with federal agencies (including the agency with which the employee involved is or was formerly employed).

(B) If, in implementing subparagraph (A), an agency is unable to resolve potential conflicts of interest within its current statutory framework, it shall propose necessary statutory changes to be forwarded to its authorizing committees in Congress.

(4) The laboratory director in deciding what cooperative research and development agreements to enter into shall—

(A) give special consideration to small business firms, and consortia involving small business firms; and

(B) give preference to business units located in the United States which agree that products embodying inventions made under the cooperative research and development agreement or produced through the use of such inventions will be manufactured substantially in the United States and, in the case of any industrial organization or other person subject to the control of a foreign company or government, as appropriate, take into consideration whether or not such foreign government permits United States agencies, organizations, or other persons to enter into cooperative research and development agreements and licensing agreements.

(5)(A) If the head of the agency or his designee desires an opportunity to disapprove or require the modification of any such agreement presented by the director of a Government-operated laboratory, the agreement shall provide a 30-day period within which

such action must be taken beginning on the date the agreement is presented to him or her by the head of the laboratory concerned.

(B) In any case in which the head of an agency or his designee disapproves or requires the modification of an agreement presented by the director of a Government-operated laboratory under this section, the head of the agency or such designee shall transmit a written explanation of such disapproval or modification to the head of the laboratory concerned.

(C)(i) Any non-Federal entity that operates a laboratory pursuant to a contract with a Federal agency shall submit to the agency any cooperative research and development agreement that the entity proposes to enter into and the joint work statement if required with respect to that agreement.

(ii) A Federal agency that receives a proposed agreement and joint work statement under clause (i) shall review and approve, request specific modifications to, or disapprove the proposed agreement and joint work statement within 30 days after such submission. No agreement may be entered into by a Government-owned, contractor-operated laboratory under this section before both approval of the agreement and approval of a joint work statement under this clause.

(iii) In any case in which an agency which has contracted with an entity referred to in clause (i) disapproves or requests the modification of a cooperative research and development agreement or joint work statement submitted under that clause, the agency shall transmit a written explanation of such disapproval or modification to the head of the laboratory concerned.

(iv) Any agency that has contracted with a non-Federal entity to operate a laboratory may develop and provide to such laboratory one or more model cooperative research and development agreements for purposes of standardizing practices and procedures, resolving common legal issues, and enabling review of cooperative research and development agreements to be carried out in a routine and prompt manner.

(v) A Federal agency may waive the requirements of clause (i) or (ii) under such circumstances as the agency considers appropriate.

(6) Each agency shall maintain a record of all agreements entered into under this section.

(7)(A) No trade secrets or commercial or financial information that is privileged or confidential, under the meaning of section 552(b)(4) of title 5, United States Code, which is obtained in the conduct of research or as a result of activities under this Act from a non-Federal party participating in a cooperative research and development agreement shall be disclosed.

(B) The director, or in the case of a contractor-operated laboratory, the agency, for a period of up to 5 years after development of information that results from research and development activities conducted under this Act and that would be a trade secret or commercial or financial information that is privileged or confidential if the information had been obtained from a non-Federal party participating in a cooperative research and development agreement, may provide appropriate protections against the dissemination of such information, including exemption from subchapter II of chapter 5 of title 5, United States Code.

(d) DEFINITION.—As used in this section—

(1) the term “cooperative research and development agreement” means any agreement between one or more Federal laboratories and one or more non-Federal parties under which the Government, through its laboratories, provides personnel, services, facilities, equipment, intellectual property, or other resources with or without reimbursement (but not funds to non-Federal parties) and the non-Federal parties provide funds, personnel, services, facilities, equipment, intellectual property, or other resources toward the conduct of specified research or development efforts which are consistent with the missions of the laboratory; except that such term does not include a procurement contract or cooperative agreement as those terms are used in sections 6303, 6304, and 6305 of title 31, United States Code;

(2) the term “laboratory” means—

(A) a facility or group of facilities owned, leased, or otherwise used by a Federal agency, a substantial purpose of which is the performance of research, development, or engineering by employees of the Federal Government;

(B) a group of Government-owned, contractor-operated facilities (including a weapon production facility of the Department of Energy) under a common contract, when a substantial purpose of the contract is the performance of research and development, or the production, maintenance, testing, or dismantlement of a nuclear weapon or its components, for the Federal Government; and

(C) a Government-owned, contractor-operated facility (including a weapon production facility of the Department of Energy) that is not under a common contract described in subparagraph (B), and the primary purpose of which is the performance of research and development, or the production, maintenance, testing, or dismantlement of a nuclear weapon or its components, for the Federal Government,

but such term does not include any facility covered by Executive Order No. 12344, dated February 1, 1982, pertaining to the naval nuclear propulsion program;

(3) the term “joint work statement” means a proposal prepared for a Federal agency by the director of a Government-owned, contractor-operated laboratory describing the purpose and scope of a proposed cooperative research and development agreement, and assigning rights and responsibilities among the agency, the laboratory, and any other party or parties to the proposed agreement; and

(4) the term “weapon production facility of the Department of Energy” means a facility under the control or jurisdiction of the Secretary of Energy that is operated for national security purposes and is engaged in the production, maintenance, testing, or dismantlement of a nuclear weapon or its components.

(e) DETERMINATION OF LABORATORY MISSIONS.—For purposes of this section, an agency shall make separate determinations of the mission or missions of each of its laboratories.

(f) RELATIONSHIP TO OTHER LAWS.—Nothing in this section is intended to limit or diminish existing authorities of any agency.

(g) PRINCIPLES.—In implementing this section, each agency which has contracted with a non-Federal entity to operate a laboratory shall be guided by the following principles:

(1) The implementation shall advance program missions at the laboratory, including any national security mission.

(2) Classified information and unclassified sensitive information protected by law, regulation, or Executive order shall be appropriately safeguarded.

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#### SEC. 24. PRIZE COMPETITIONS.

(a) DEFINITIONS.—In this section:

(1) AGENCY.—The term “agency” means a Federal agency.

(2) DIRECTOR.—The term “Director” means the Director of the Office of Science and Technology Policy.

(3) FEDERAL AGENCY.—The term “Federal agency” has the meaning given under section 4, except that term shall not include any agency of the legislative branch of the Federal Government.

(4) HEAD OF AN AGENCY.—The term “head of an agency” means the head of a Federal agency.

(b) IN GENERAL.—Each head of an agency, or the heads of multiple agencies in cooperation, may carry out a program to award prizes competitively to stimulate innovation that has the potential to advance the mission of the respective agency.

(c) PRIZES.—For purposes of this section, a prize *competition* may be one or more of the following *types*:

(1) A point solution prize that rewards and spurs the development of solutions for a particular, well-defined problem.

(2) An exposition prize that helps identify and promote a broad range of ideas and practices that may not otherwise attract attention, facilitating further development of the idea or practice by third parties.

(3) Participation prizes that create value during and after the competition by encouraging contestants to change their behavior or develop new skills that may have beneficial effects during and after the competition.

(4) Such other types of [prizes] *prize competitions* as each head of an agency considers appropriate to stimulate innovation that has the potential to advance the mission of the respective agency.

(d) TOPICS.—In selecting topics for prize competitions, the head of an agency shall consult widely both within and outside the Federal Government, and may empanel advisory committees.

(e) ADVERTISING.—The head of an agency shall widely advertise each prize competition to encourage broad participation.

(f) REQUIREMENTS AND REGISTRATION.—For each prize competition, the head of an agency shall publish a notice [in the Federal Register] *on a publicly accessible Government website, such as [www.challenge.gov](http://www.challenge.gov)*, announcing—

(1) the subject of the competition;

(2) the rules for being eligible to participate in the competition;

(3) the process for participants to register for the competition;



- (4) the amount of the **[prize]** *cash prize purse*; and
- (5) the basis on which a winner will be selected.
- (g) **ELIGIBILITY.**—To be eligible to win a **[prize]** *cash prize purse* under this section, an individual or entity—
  - (1) shall have registered to participate in the competition under any rules promulgated by the head of an agency under subsection (f);
  - (2) shall have complied with all the requirements under this section;
  - (3) 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 citizen or permanent resident of the United States; and
  - (4) may not be a Federal entity or Federal employee acting within the scope of their employment.
- (h) **CONSULTATION WITH FEDERAL EMPLOYEES.**—An individual or entity shall not be deemed ineligible under subsection (g) because the individual or entity used Federal facilities or consulted with Federal employees during a *prize* competition if the facilities and employees are made available to all individuals and entities participating in the *prize* competition on an equitable basis.
- (i) **LIABILITY.**—
  - (1) **IN GENERAL.**—
    - (A) **DEFINITION.**—In this paragraph, the term “related entity” means a contractor or subcontractor at any tier, and a supplier, user, customer, cooperating party, grantee, investigator, or detailee.
    - (B) **LIABILITY.**—Registered participants shall be required to agree to assume any and all risks and waive claims against the Federal Government and its related entities, except in the case of willful misconduct, for any injury, death, damage, or loss of property, revenue, or profits, whether direct, indirect, or consequential, arising from their participation in a *prize* competition, whether the injury, death, damage, or loss arises through negligence or otherwise.
  - (2) **INSURANCE.**—Participants shall be required to obtain liability insurance or demonstrate financial responsibility, in amounts determined by the head of an agency, for claims by—
    - (A) a third party for death, bodily injury, or property damage, or loss resulting from an activity carried out in connection with participation in a *prize* competition, with the Federal Government named as an additional insured under the registered participant’s insurance policy and registered participants agreeing to indemnify the Federal Government against third party claims for damages arising from or related to *prize* competition activities; and
    - (B) the Federal Government for damage or loss to Government property resulting from such an activity.
  - (3) **WAIVER.**—*An agency may waive the requirement under paragraph (2). The annual report under subsection (p) shall include a list of such waivers granted during the preceding fiscal year, along with a detailed explanation of the reasons for granting the waivers.*

[(3)] (4) EXCEPTION.—The head of an agency may not require a participant to waive claims against the administering entity arising out of the unauthorized use or disclosure by the agency of the intellectual property, trade secrets, or confidential business information of the participant.

(j) INTELLECTUAL PROPERTY.—

(1) PROHIBITION ON THE GOVERNMENT ACQUIRING INTELLECTUAL PROPERTY RIGHTS.—The Federal Government may not gain an interest in intellectual property developed by a participant in a competition without the written consent of the participant.

(2) LICENSES.—The Federal Government may negotiate a license for the use of intellectual property developed by a participant for a competition.

(k) JUDGES.—

(1) IN GENERAL.—For each competition, the head of an agency, either directly or through an agreement under subsection (l), shall appoint one or more qualified judges to select the winner or winners of the prize competition on the basis described under subsection (f). Judges for each competition may include individuals from outside the agency, including from the private sector.

(2) RESTRICTIONS.—A judge may not—

(A) have personal or financial interests in, or be an employee, officer, director, or agent of any entity that is a registered participant in a *prize* competition; or

(B) have a familial or financial relationship with an individual who is a registered participant.

(3) GUIDELINES.—The heads of agencies who carry out *prize* competitions under this section shall develop guidelines to ensure that the judges appointed for such *prize* competitions are fairly balanced and operate in a transparent manner.

(4) EXEMPTION FROM FACA.—The Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to any committee, board, commission, panel, task force, or similar entity, created solely for the purpose of judging prize competitions under this section.

(l) ADMINISTERING THE COMPETITION.—The head of an agency may enter into [an agreement with a private, nonprofit entity to administer a prize competition, subject to the provisions of this section.] *a grant, contract, cooperative agreement, or other agreement with a private sector for-profit or nonprofit entity to administer the prize competition, subject to the provisions of this section.*

(m) FUNDING.—

[(1) IN GENERAL.—Support for a prize competition under this section, including financial support for the design and administration of a prize or funds for a monetary prize purse, may consist of Federal appropriated funds and funds provided by the private sector for such cash prizes. The head of an agency may accept funds from other Federal agencies to support such competitions. The head of an agency may not give any special consideration to any private sector entity in return for a donation.]

(1) IN GENERAL.—Support for a prize competition under this section, including financial support for the design and adminis-

*tration of a prize competition or funds for a cash prize purse, may consist of Federal appropriated funds and funds provided by private sector for-profit and nonprofit entities. The head of an agency may accept funds from other Federal agencies, private sector for-profit entities, and nonprofit entities to support such prize competitions. The head of an agency may not give any special consideration to any private sector for-profit or nonprofit entity in return for a donation.*

(2) AVAILABILITY OF FUNDS.—Notwithstanding any other provision of law, funds appropriated for **[prize awards]** *cash prize purses* under this section shall remain available until expended. No provision in this section permits obligation or payment of funds in violation of section 1341 of title 31, United States Code.

(3) AMOUNT OF PRIZE.—

(A) ANNOUNCEMENT.—**[No prize]** *No prize competition* may be announced under subsection (f) until all the funds needed to pay out the announced amount of **[the prize]** *the cash prize purse* have been appropriated or committed in writing by a private source.

(B) INCREASE IN AMOUNT.—The head of an agency may increase the amount of **[a prize]** *a cash prize purse* after an initial announcement is made under subsection (f) only if—

(i) notice of the increase is provided in the same manner as the initial notice of the prize *competition*; and

(ii) the funds needed to pay out the announced amount of the increase have been appropriated or committed in writing by a private source.

(4) LIMITATION ON AMOUNT.—

(A) NOTICE TO CONGRESS.—No prize competition under this section may offer **[a prize]** *a cash prize purse* in an amount greater than \$50,000,000 unless 30 days have elapsed after written notice has been transmitted to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science and Technology of the House of Representatives.

(B) APPROVAL OF HEAD OF AGENCY.—No prize competition under this section may result in the award of more than \$1,000,000 in **[cash prizes]** *cash prize purses* without the approval of the head of an agency.

(n) GENERAL SERVICE ADMINISTRATION ASSISTANCE.—Not later than 180 days after the date of the enactment of the America COMPETES Reauthorization Act of 2010, the General Services Administration shall provide government wide services to share best practices and assist agencies in developing guidelines for issuing prize competitions. The General Services Administration shall develop a contract vehicle *for both for-profit and nonprofit entities*, to provide agencies access to relevant products and services, including technical assistance in structuring and conducting prize competitions to take maximum benefit of the marketplace as they identify and pursue prize competitions to further the policy objectives of the Federal Government.

(o) COMPLIANCE WITH EXISTING LAW.—

(1) IN GENERAL.—The Federal Government shall not, by virtue of offering [or providing a prize] *a prize competition or providing a cash prize purse* under this section, be responsible for compliance by registered participants in a prize competition with Federal law, including licensing, export control, and non-proliferation laws, and related regulations.

(2) OTHER PRIZE AUTHORITY.—Nothing in this section affects the prize authority authorized by any other provision of law.

(p) ANNUAL REPORT.—

(1) IN GENERAL.—Not later than March 1 of each year, the Director 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 the activities carried out during the preceding fiscal year under the authority in subsection (b).

(2) INFORMATION INCLUDED.—The report for a fiscal year under this subsection shall include, for each prize competition under subsection (b), the following:

(A) PROPOSED GOALS.—A description of the proposed goals of each prize competition.

(B) PREFERABLE METHOD.—An analysis of why the utilization of the authority in subsection (b) was the preferable method of achieving the goals described in subparagraph (A) as opposed to other authorities available to the agency, such as contracts, grants, and cooperative agreements.

(C) AMOUNT OF CASH PRIZES.—The total amount of [cash prizes] *cash prize purses* awarded for each prize competition, including a description of amount of private funds contributed to the program, the sources of such funds, and the manner in which the amounts of [cash prizes] *cash prize purses* awarded and claimed were allocated among the accounts of the agency for recording as obligations and expenditures.

(D) SOLICITATIONS AND EVALUATION OF SUBMISSIONS.—The methods used for the solicitation and evaluation of submissions under each prize competition, together with an assessment of the effectiveness of such methods and lessons learned for future prize competitions.

(E) RESOURCES.—A description of the resources, including personnel and funding, used in the execution of each prize competition together with a detailed description of the activities for which such resources were used and an accounting of how funding for execution was allocated among the accounts of the agency for recording as obligations and expenditures.

(F) RESULTS.—A description of how each prize competition advanced the mission of the agency concerned.

(G) PLAN.—A *description of crosscutting topical areas and agency-specific mission needs that may be the strongest opportunities for prize competitions during the upcoming 2 fiscal years.*

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**NATIONAL SCIENCE AND TECHNOLOGY POLICY,  
ORGANIZATION, AND PRIORITIES ACT OF 1976**

\* \* \* \* \*

**TITLE II—OFFICE OF SCIENCE AND TECHNOLOGY POLICY**

\* \* \* \* \*

*UNITED STATES CHIEF TECHNOLOGY OFFICER*

*SEC. 210. (a) APPOINTMENT.—The President may appoint a United States Chief Technology Officer. Not later than 1 year after the date of enactment of the America COMPETES Reauthorization Act of 2015, such officer shall be one of the Associate Directors of the Office of Science and Technology Policy.*

*(b) DUTIES.—The duties of the United States Chief Technology Officer should include—*

*(1) advising the President and the Director of the Office of Science and Technology Policy on Federal information systems, technology, data, and innovation policies and initiatives;*

*(2) promoting an improved exchange of information among the Federal Government, the public, and Congress;*

*(3) promoting the use of innovative technological approaches across the Federal Government to ensure a modern information technology infrastructure;*

*(4) working with the Chief Technology Officers and Chief Information Officers of all Federal agencies to ensure the use of best technologies and security practices for information systems;*

*(5) establishing a working group with such Officers to exchange best practices about information systems;*

*(6) promoting transparency and accountability across the Federal Government for all technological implementation by working with agencies to ensure that each arm of the Federal Government, including the executive branch, makes its records open and accessible;*

*(7) promoting security and privacy protection policies for all Federal information technology systems that are consistent with Federal law, regulations, and current best practices;*

*(8) promoting technological interoperability of key Government functions;*

*(9) in consultation with the Office of Management and Budget, providing an annual report to the President, the Director of the Office of Science and Technology Policy, and Congress on the current state of information systems of all Federal agencies, including—*

*(A) the status of information systems, including potential technology and security concerns about these information systems in all Federal agencies;*

*(B) a review of all Federal websites with third-party embedded tools that—*

*(i) identifies each embedded tool, who it belongs to, and the data it collects; and*

*(ii) addresses effects on cybersecurity and consumer privacy, including whether each website provides prominent notice to consumers about the presence of*

*the tool and whether the consumer may opt-out of the tool;*

*(C) the amount of money being spent on various technologies; and*

*(D) technology recommendations and best practices; and*

*(10) such other functions and activities as the President and Director of the Office of Science and Technology Policy may assign.*

*(c) REPORT.—In the absence of a United States Chief Technology Officer, the Director of the Office of Science and Technology Policy shall be responsible for providing the report required under subsection (b)(9).*

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## NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACT

\* \* \* \* \*

### ESTABLISHMENT, FUNCTIONS, AND ACTIVITIES

SEC. 2. (a) There is established within the Department of Commerce a science, engineering, technology, and measurement laboratory to be known as the National Institute of Standards and Technology (hereafter in this Act referred to as the “Institute”).

(b) The Secretary of Commerce (hereafter in this Act referred to as the “Secretary”) acting through the Director of the Institute (hereafter in this Act referred to as the “Director”) is [authorized to take] *authorized to serve as the President’s principal adviser on standards policy pertaining to the Nation’s technological competitiveness and innovation ability and to take all actions necessary and appropriate to accomplish the purposes of this Act, including the following functions of the Institute—*

(1) to assist industry in the development of technology and procedures needed to improve quality, to modernize manufacturing processes, to ensure product reliability, manufacturability, functionality, and cost-effectiveness, and to facilitate the more rapid commercialization, especially by small- and medium-sized companies throughout the United States, of products based on new scientific discoveries in fields such as automation, electronics, advanced materials, biotechnology, and optical technologies;

(2) to develop, maintain, and retain custody of the national standards of measurement, and provide the means and methods for making measurements consistent with those standards;

(3) to [compare standards used in scientific investigations, engineering, manufacturing, commerce, industry, and educational institutions with the standards adopted or recognized by the Federal Government] *facilitate standards-related information sharing and cooperation between Federal agencies and to coordinate the use by Federal agencies of private sector standards, emphasizing where possible the use of standards developed by private, consensus organizations;*

(4) to enter into contracts, including cooperative research and development arrangements, and grants and cooperative agreements, in furtherance of the purposes of this Act;

(5) to provide United States industry, Government, and educational institutions with a national clearinghouse of current information, techniques, and advice for the achievement of higher quality and productivity based on current domestic and international scientific and technical development;

(6) to assist industry in the development of measurements, measurement methods, and basic measurement technology;

(7) to determine, compile, evaluate, and disseminate physical constants and the properties and performance of conventional and advanced materials when they are important to science, engineering, manufacturing, education, commerce, and industry and are not available with sufficient accuracy elsewhere;

(8) to develop a fundamental basis and methods for testing materials, mechanisms, structures, equipment, and systems, including those used by the Federal Government;

(9) to assure the compatibility of United States national measurement standards with those of other nations;

(10) to cooperate with other departments and agencies of the Federal Government, with industry, with State and local governments, with the governments of other nations and international organizations, and with private organizations in establishing standard practices, codes, specifications, and voluntary consensus standards;

(11) to advise government and industry on scientific and technical problems;

(12) to invent, develop, and (when appropriate) promote transfer to the private sector of measurement devices to serve special national needs; and

(13) to coordinate [Federal, State, and local technical standards activities and conformity assessment activities, with private sector] *technical standards activities and conformity assessment activities of Federal, State, and local governments with private sector* technical standards activities and conformity assessment activities, with the goal of eliminating unnecessary duplication and complexity in the development and promulgation of conformity assessment requirements and measures.

(c) In carrying out the functions specified in subsection (b), the Secretary, acting through the Director may, among other things—

(1) construct physical standards;

(2) test, calibrate, and certify standards and standard measuring apparatus;

(3) study and improve instruments, measurement methods, and industrial process control and quality assurance techniques;

(4) cooperate with the States in securing uniformity in weights and measures laws and methods of inspection;

(5) cooperate with foreign scientific and technical institutions to understand technological developments in other countries better;

(6) prepare, certify, and sell standard reference materials for use in ensuring the accuracy of chemical analyses and measurements of physical and other properties of materials;

(7) in furtherance of the purposes of this Act, accept research associates, cash donations, and donated equipment from industry, and also engage with industry in research to develop new basic and generic technologies for traditional and new products and for improved production and manufacturing;

(8) study and develop fundamental scientific understanding and improved measurement, analysis, synthesis, processing, and fabrication methods for chemical substances and compounds, ferrous and nonferrous metals, and all traditional and advanced materials, including processes of degradation;

(9) investigate ionizing and nonionizing radiation and radioactive substances, their uses, and ways to protect people, structures, and equipment from their harmful effects;

(10) determine the atomic and molecular structure of matter, through analysis of spectra and other methods, to provide a basis for predicting chemical and physical structures and reactions and for designing new materials and chemical substances, including biologically active macromolecules;

(11) perform research on electromagnetic waves, including optical waves, and on properties and performance of electrical, electronic, and electromagnetic devices and systems and their essential materials, develop and maintain related standards, and disseminate standard signals through broadcast and other means;

(12) develop and test standard interfaces, communication protocols, and data structures for computer and related telecommunications systems;

(13) study computer systems (as that term is defined in section 20(d) of this Act) and their use to control machinery and processes;

(14) perform research to develop standards and test methods to advance the effective use of computers and related systems and to protect the information stored, processed, and transmitted by such systems and to provide advice in support of policies affecting Federal computer and related telecommunications systems;

(15) on an ongoing basis, facilitate and support the development of a voluntary, consensus-based, industry-led set of standards, guidelines, best practices, methodologies, procedures, and processes to cost-effectively reduce cyber risks to critical infrastructure (as defined under subsection (e));

(16) determine properties of building materials and structural elements, and encourage their standardization and most effective use, including investigation of fire-resisting properties of building materials and conditions under which they may be most efficiently used, and the standardization of types of appliances for fire prevention;

(17) undertake such research in engineering, pure and applied mathematics, statistics, computer science, materials science, and the physical sciences as may be necessary to carry out and support the functions specified in this section;



(18) compile, evaluate, publish, and otherwise disseminate general, specific and technical data resulting from the performance of the functions specified in this section or from other sources when such data are important to science, engineering, or industry, or to the general public, and are not available elsewhere;

(19) collect, create, analyze, and maintain specimens of scientific value;

(20) operate national user facilities;

(21) evaluate promising inventions and other novel technical concepts submitted by inventors and small companies and work with other Federal agencies, States, and localities to provide appropriate technical assistance and support for those inventions which are found in the evaluation process to have commercial promise;

(22) demonstrate the results of the Institute's activities by exhibits or other methods of technology transfer, including the use of scientific or technical personnel of the Institute for part-time or intermittent teaching and training activities at educational institutions of higher learning as part of and incidental to their official duties; [and]

(23) *participate in and support scientific and technical conferences;*

(24) *perform pre-competitive measurement science and technology research in partnership with institutions of higher education and industry to promote United States industrial competitiveness; and*

[(23)] (25) undertake such other activities similar to those specified in this subsection as the Director determines appropriate.

(d) In carrying out the extramural funding programs of the Institute, including the programs established under sections 25, 26, and 28 of this Act, the Secretary may retain reasonable amounts of any funds appropriated pursuant to authorizations for these programs in order to pay for the Institute's management of these programs.

(e) CYBER RISKS.—

(1) IN GENERAL.—In carrying out the activities under subsection (c)(15), the Director—

(A) shall—

(i) coordinate closely and regularly with relevant private sector personnel and entities, critical infrastructure owners and operators, and other relevant industry organizations, including Sector Coordinating Councils and Information Sharing and Analysis Centers, and incorporate industry expertise;

(ii) consult with the heads of agencies with national security responsibilities, sector-specific agencies and other appropriate agencies, State and local governments, the governments of other nations, and international organizations;

(iii) identify a prioritized, flexible, repeatable, performance-based, and cost-effective approach, including information security measures and controls, that may be voluntarily adopted by owners and operators of crit-

ical infrastructure to help them identify, assess, and manage cyber risks;

(iv) include methodologies—

(I) to identify and mitigate impacts of the cybersecurity measures or controls on business confidentiality; and

(II) to protect individual privacy and civil liberties;

(v) incorporate voluntary consensus standards and industry best practices;

(vi) align with voluntary international standards to the fullest extent possible;

(vii) prevent duplication of regulatory processes and prevent conflict with or superseding of regulatory requirements, mandatory standards, and related processes; and

(viii) include such other similar and consistent elements as the Director considers necessary; and

(B) shall not prescribe or otherwise require—

(i) the use of specific solutions;

(ii) the use of specific information or communications technology products or services; or

(iii) that information or communications technology products or services be designed, developed, or manufactured in a particular manner.

(2) LIMITATION.—Information shared with or provided to the Institute for the purpose of the activities described under subsection (c)(15) shall not be used by any Federal, State, tribal, or local department or agency to regulate the activity of any entity. Nothing in this paragraph shall be construed to modify any regulatory requirement to report or submit information to a Federal, State, tribal, or local department or agency.

(3) DEFINITIONS.—In this subsection:

(A) CRITICAL INFRASTRUCTURE.—The term “critical infrastructure” has the meaning given the term in section 1016(e) of the USA PATRIOT Act of 2001 (42 U.S.C. 5195c(e)).

(B) SECTOR-SPECIFIC AGENCY.—The term “sector-specific agency” means the Federal department or agency responsible for providing institutional knowledge and specialized expertise as well as leading, facilitating, or supporting the security and resilience programs and associated activities of its designated critical infrastructure sector in the all-hazards environment.

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#### VISITING COMMITTEE ON ADVANCED TECHNOLOGY

SEC. 10. (a) There is established within the Institute a Visiting Committee on Advanced Technology (hereafter in this Act referred to as the “Committee”). The Committee shall consist of **[15 members]** *not fewer than 11 members* appointed by the Director, **[at least 10]** *at least two-thirds* of whom shall be from United States industry. The Director shall appoint as original members of the Committee any final members of the National Bureau of Standards

Visiting Committee who wish to serve in such capacity. In addition to any powers and functions otherwise granted to it by this Act, the Committee shall review and make recommendations regarding general policy for the Institute, its organization, its budget, and its programs within the framework of applicable national policies as set forth by the President and the Congress. *The Committee may consult with the National Research Council in making recommendations regarding general policy for the Institute.*

(b) The persons appointed as members of the Committee—

(1) shall be eminent in fields such as business, research, new product development, engineering, labor, education, management consulting, environment, and international relations;

(2) shall be selected solely on the basis of established records of distinguished service;

(3) shall not be employees of the Federal Government; and

(4) shall be so selected as to provide representation of a cross-section of the traditional and emerging United States industries.

The Director is requested, in making appointments of persons as members of the Committee, to give due consideration to any recommendations which may be submitted to the Director by the National Academies, professional societies, business associations, labor associations, and other appropriate organizations.

(c)(1) The term of office of each member of the Committee, other than the original members, shall be 3 years; except that any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term. Any person who has completed two consecutive full terms of service on the Committee shall thereafter be ineligible for appointment during the one-year period following the expiration of the second such term.

(2) The original members of the Committee shall be elected to three classes of three members each; one class shall have a term of one year, one a term of two years, and the other a term of three years.

(d) The Committee shall meet at least twice each year at the call of the Chairman or whenever one-third of the members so request in writing. A majority of the members of the Committee not having a conflict of interest in the matter being considered by the Committee shall constitute a quorum. Each member shall be given appropriate notice, whenever possible, not less than 15 days prior to any meeting, of the call of such meeting.

(e) The Committee shall have an executive committee, and may delegate to it or to the Secretary such of the powers and functions granted to the Committee by this Act as it deems appropriate. The Committee is authorized to appoint from among its members such other committees as it deems necessary, and to assign to committees so appointed such survey and advisory functions as the Committee deems appropriate to assist it in exercising its powers and functions under this Act.

(f) The election of the Chairman and Vice Chairman of the Committee shall take place at each annual meeting occurring in an even-numbered year. The Vice Chairman shall perform the duties of the Chairman in his absence. In case a vacancy occurs in the

chairmanship or vice chairmanship, the Committee shall elect a member to fill such vacancy.

(g) The Committee may, with the concurrence of a majority of its members, permit the appointment of a staff consisting of not more than four professional staff members and such clerical staff members as may be necessary. Such staff shall be appointed by the Director, after consultation with the Chairman of the Committee, and assigned at the direction of the Committee. The professional members of such staff may be appointed without regard to the provisions of title 5, United States Code, governing appointments in the competitive service and the provisions of chapter 51 of title 5 of such Code relating to classification, and compensated at a rate not exceeding the appropriate rate provided for individuals in grade GS-18 of the General Schedule under section 5332 of title 5 of such Code, as may be necessary to provide for the performance of such duties as may be prescribed by the Committee in connection with the exercise of its powers and functions under this Act.

(h)(1) The Committee shall render an annual report to the Secretary for submission to the Congress not later than 30 days after the submittal to Congress of the President's annual budget request in each year. Such report shall deal essentially, though not necessarily exclusively, with policy issues or matters which affect the Institute[, including the Program established under section 28,] or with which the Committee in its official role as the private sector policy advisor of the Institute is concerned. Each such report shall identify areas of research and research techniques of the Institute of potential importance to the long-term competitiveness of United States industry, in which the Institute possesses special competence, which could be used to assist United States enterprises and United States industrial joint research and development ventures. Such report also shall comment on the programmatic planning document and updates thereto submitted to Congress by the Director under subsections (c) and (d) of section 23.

(2) The Committee shall render to the Secretary and the Congress such additional reports on specific policy matters as it deems appropriate.

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SEC. 15. In the performance of the functions of the Institute the Secretary of Commerce is authorized to undertake the following activities: (a) The purchase, repair, and cleaning of uniforms for guards; (b) the care, maintenance, protection, repair, and alteration of Institute buildings and other plant facilities, equipment, and property. (c) the rental of field sites and laboratory, office, and warehouse space; (d) the purchase of reprints from technical journals or other periodicals and the payment of page charges for the publication of research papers and reports in such journals; (e) the furnishing of food and shelter without repayment therefor to employees of the Government at Arctic and Antarctic stations; (f) for the conduct of observations on radio propagation phenomena in the Arctic or Antarctic regions, the appointment of employees at base rates established by the Secretary of Commerce which shall not exceed such maximum rates as may be specified from time to time in the appropriation concerned, and without regard to the civil service and classification laws and titles II and III of the Federal Employees Pay Act of 1945; (g) the erection on leased property of

specialized facilities and working and living quarters when the Secretary of Commerce determines that this will best serve the interests [of the Government; and] *of the Government*; (h) the provision of transportation services for employees of the Institute between the facilities of the Institute and nearby public transportation, notwithstanding section 1344 of title 31, [United States Code.] *United States Code*; and (i) *the protection of Institute buildings and other plant facilities, equipment, and property, and of employees, associates, visitors, or other persons located therein or associated therewith, notwithstanding any other provision of law.*

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[SEC. 18. (a) IN GENERAL.—The Director is authorized to expend funds appropriated for activities of the Institute in any fiscal year, as the Director may deem desirable, for awards of research fellowships and other forms of financial assistance to students at institutions of higher learning within the United States who show promise as present or future contributors to the mission of the Institute, and to United States citizens for research and technical activities on Institute programs. The selection of persons to receive such fellowships and assistance shall be made on the basis of ability and of the relevance of the proposed work to the mission and programs of the Institute.

[ (b) MANUFACTURING FELLOWSHIP PROGRAM.—

[(1) ESTABLISHMENT.—To promote the development of a robust research community working at the leading edge of manufacturing sciences, the Director shall establish a program to award—

[(A) postdoctoral research fellowships at the Institute for research activities related to manufacturing sciences; and

[(B) senior research fellowships to established researchers in industry or at institutions of higher education who wish to pursue studies related to the manufacturing sciences at the Institute.

[(2) APPLICATIONS.—To be eligible for an award under this subsection, an individual shall submit an application to the Director at such time, in such manner, and containing such information as the Director may require.

[(3) STIPEND LEVELS.—Under this subsection, the Director shall provide stipends for postdoctoral research fellowships at a level consistent with the National Institute of Standards and Technology Postdoctoral Research Fellowship Program, and senior research fellowships at levels consistent with support for a faculty member in a sabbatical position.

[(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.

[SEC. 19. The Institute shall establish and conduct a post-doctoral fellowship program, subject to the availability of appropriations, which shall be organized and carried out in substantially the same manner as the National Academy of Sciences/National Research Council Post-Doctoral Research Associate Program that was in effect prior to 1986, and which shall include not less than twenty nor more than 120 new fellows per fiscal year. In evaluating appli-

cations for fellowships under this section, the Director shall give consideration to the goal of promoting the participation of under-represented minorities in research areas supported by the Institute.

【SEC. 19A. (a) The Director shall establish within the Institute a teacher science and technology enhancement program to provide for professional development of mathematics and science teachers of elementary, middle, and secondary schools (as those terms are defined by the Director), including providing for the improvement of those teachers with respect to the understanding of science and the impacts of science on commerce.

【(b) In carrying out the program under this section, the Director shall focus on the areas of—

- 【(1) scientific measurements;
- 【(2) tests and standards development;
- 【(3) industrial competitiveness and quality;
- 【(4) manufacturing;
- 【(5) technology transfer; and
- 【(6) any other area of expertise of the Institute that the Director determines to be appropriate.

【(c) The Director shall develop and issue procedures and selection criteria for participants in the program. The Director shall give special consideration 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).

【(d) The program under this section shall be conducted on an annual basis during the summer months, during the period of time when a majority of elementary, middle, and secondary schools have not commenced a school year.

【(e) The program shall provide for teachers' participation in activities at the laboratory facilities of the Institute, or shall utilize other means of accomplishing the goals of the program as determined by the Director, which may include the Internet, video conferencing and recording, and workshops and conferences.】

#### **SEC. 18. EDUCATION AND OUTREACH.**

(a) *IN GENERAL.*—*The Director may support, promote, and coordinate activities and efforts to enhance public awareness and understanding of measurement sciences, standards, and technology by the general public, industry, and academia in support of the Institute's mission.*

(b) *RESEARCH FELLOWSHIPS.*—

(1) *IN GENERAL.*—*The Director may award research fellowships and other forms of financial and logistical assistance, including direct stipend awards, to—*

(A) *students at institutions of higher education within the United States who show promise as present or future contributors to the mission of the Institute; and*

(B) *United States citizens for research and technical activities of the Institute.*

(2) *SELECTION.*—*The Director shall select persons to receive such fellowships and assistance on the basis of ability and of the relevance of the proposed work to the mission and programs of the Institute.*

(3) *DEFINITION.*—*For the purposes of this subsection, financial and logistical assistance includes, notwithstanding section*

*1345 of title 31, United States Code, or any contrary provision of law, temporary housing and local transportation to and from the Institute facilities.*

*(c) POST-DOCTORAL FELLOWSHIP PROGRAM.—The Director shall establish and conduct a post-doctoral fellowship program, subject to the availability of appropriations, that shall include not fewer than 20 fellows per fiscal year. In evaluating applications for fellowships under this subsection, the Director shall give consideration to the goal of promoting the participation of underrepresented students in research areas supported by the Institute.*

SEC. 20. (a) The Institute shall—

(1) have the mission of developing standards, guidelines, and associated methods and techniques for information systems;

(2) develop standards and guidelines, including minimum requirements, for information systems used or operated by an agency or by a contractor of an agency or other organization on behalf of an agency, other than national security systems (as defined in section 3552(b)(5) of title 44, United States Code);

(3) develop standards and guidelines, including minimum requirements, for providing adequate information security for all agency operations and assets, but such standards and guidelines shall not apply to national security systems; and

(4) carry out the responsibilities described in paragraph (3) through the Computer Security Division.

(b) The standards and guidelines required by subsection (a) shall include, at a minimum—

(1)(A) standards to be used by all agencies to categorize all information and information systems collected or maintained by or on behalf of each agency based on the objectives of providing appropriate levels of information security according to a range of risk levels;

(B) guidelines recommending the types of information and information systems to be included in each such category; and

(C) minimum information security requirements for information and information systems in each such category;

(2) a definition of and guidelines concerning detection and handling of information security incidents; and

(3) guidelines developed in coordination with the National Security Agency for identifying an information system as a national security system consistent with applicable requirements for national security systems, issued in accordance with law and as directed by the President.

(c) In developing standards and guidelines required by subsections (a) and (b), the Institute shall—

(1) consult with other agencies and offices (including, but not limited to, the Director of the Office of Management and Budget, the Departments of Defense and Energy, [the National Security Agency,] the General Accounting Office, and the Secretary of Homeland Security) to assure—

(A) use of appropriate information security policies, procedures, and techniques, in order to improve information security and avoid unnecessary and costly duplication of effort; and

- (B) that such standards and guidelines are complementary with standards and guidelines employed for the protection of national security systems and information contained in such systems;
- (2) provide the public with an opportunity to comment on proposed standards and guidelines;
- (3) submit to the Director of the Office of Management and Budget for promulgation under section 11331 of title 40, United States Code—
  - (A) standards, as required under subsection (b)(1)(A), no later than 12 months after the date of the enactment of this section; and
  - (B) minimum information security requirements for each category, as required under subsection (b)(1)(C), no later than 36 months after the date of the enactment of this section;
- (4) issue guidelines as required under subsection (b)(1)(B), no later than 18 months after the date of the enactment of this Act;
- (5) ensure that such standards and guidelines do not require specific technological solutions or products, including any specific hardware or software security solutions;
- (6) ensure that such standards and guidelines provide for sufficient flexibility to permit alternative solutions to provide equivalent levels of protection for identified information security risks; and
- (7) use flexible, performance-based standards and guidelines that, to the greatest extent possible, permit the use of off-the-shelf commercially developed information security products.
- (d) The Institute shall—
  - (1) submit standards developed pursuant to subsection (a), along with recommendations as to the extent to which these should be made compulsory and binding, to the Director of the Office of Management and Budget for promulgation under section 11331 of title 40, United States Code;
  - (2) provide assistance to agencies regarding—
    - (A) compliance with the standards and guidelines developed under subsection (a);
    - (B) detecting and handling information security incidents; and
    - (C) information security policies, procedures, and practices;
  - (3) conduct research, as needed, to determine the nature and extent of information security vulnerabilities and techniques for providing cost-effective information security;
  - (4) develop and periodically revise performance indicators and measures for agency information security policies and practices;
  - (5) evaluate private sector information security policies and practices and commercially available information technologies to assess potential application by agencies to strengthen information security;
  - (6) evaluate security policies and practices developed for national security systems to assess potential application by agencies to strengthen information security;



(7) periodically assess the effectiveness of standards and guidelines developed under this section and undertake revisions as appropriate;

(8) solicit and consider the recommendations of the Information Security and Privacy Advisory Board, established by section 21, regarding standards and guidelines developed under subsection (a) and submit such recommendations to the Director of the Office of Management and Budget with such standards submitted to the Director; and

(9) prepare an annual public report on activities undertaken in the previous year, and planned for the coming year, to carry out responsibilities under this section.

(e) INTRAMURAL SECURITY RESEARCH.—As part of the research activities conducted in accordance with subsection (d)(3), the Institute shall, to the extent practicable and appropriate—

(1) conduct a research program to develop a unifying and standardized identity, privilege, and access control management framework for the execution of a wide variety of resource protection policies and that is amenable to implementation within a wide variety of existing and emerging computing environments;

(2) carry out research associated with improving the security of information systems and networks;

(3) carry out research associated with improving the testing, measurement, usability, and assurance of information systems and networks;

(4) carry out research associated with improving security of industrial control systems;

(5) carry out research associated with improving the security and integrity of the information technology supply chain; and

(6) carry out any additional research the Institute determines appropriate.

(f) As used in this section—

(1) the term “agency” has the same meaning as provided in section 3502(1) of title 44, United States Code;

(2) the term “information security” has the same meaning as provided in section 3532(1) of such title;

(3) the term “information system” has the same meaning as provided in section 3502(8) of such title;

(4) the term “information technology” has the same meaning as provided in section 11101 of title 40, United States Code; and

(5) the term “national security system” has the same meaning as provided in section 3532(b)(2) of such title.

\* \* \* \* \*

#### REPORTS TO CONGRESS

SEC. 23. (a) The Director shall keep the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives fully and currently informed with regard to all of the activities of the Institute.

(b) The Director shall justify in writing all changes in policies regarding fees for standard reference materials and calibration serv-

ices occurring after June 30, 1987, including a description of the anticipated impact of any proposed changes on demand for and anticipated revenues from the materials and services. Changes in policy and fees shall not be effective unless and until the Director has submitted the proposed schedule and justification to the Congress and 30 days on which both Houses of Congress are in session have elapsed since such submission, except that the requirement of this sentence shall not apply with respect to adjustments which are based solely on changes in the costs of raw materials or of producing and delivering standard reference materials or calibration services.

(c) **THREE-YEAR PROGRAMMATIC PLANNING DOCUMENT.**—Concurrent with the submission to Congress of the President's annual budget request in the first year after the date of enactment of this subsection, the Director shall submit to Congress a 3-year programmatic planning document for the Institute, including programs under the Scientific and Technical Research and Services, Industrial Technology Services, and Construction of Research Facilities functions.

(d) **ANNUAL UPDATE ON THREE-YEAR PROGRAMMATIC PLANNING DOCUMENT.**—Concurrent with the submission to the Congress of the President's annual budget request in each year after the date of enactment of this subsection, the Director shall submit to Congress an update to the 3-year programmatic planning document submitted under subsection (c), revised to cover the first 3 fiscal years after the date of that update. *The 3-year programmatic planning document shall also describe how the Director is addressing recommendations from the Visiting Committee on Advanced Technology established under section 10.*

#### 【STUDIES BY THE NATIONAL RESEARCH COUNCIL

【SEC. 24. The Director may periodically contract with the National Research Council for advice and studies to assist the Institute to serve United States industry and science. The subjects of such advice and studies may include—

【(1) the competitive position of the United States in key areas of manufacturing and emerging technologies and research activities which would enhance that competitiveness;

【(2) potential activities of the Institute, in cooperation with industry and the States, to assist in the transfer and dissemination of new technologies for manufacturing and quality assurance; and

【(3) identification and assessment of likely barriers to widespread use of advanced manufacturing technology by the United States workforce, including training and other initiatives which could lead to a higher percentage of manufacturing jobs of United States companies being located within the borders of our country.

#### 【REGIONAL CENTERS FOR THE TRANSFER OF MANUFACTURING TECHNOLOGY

【SEC. 25. (a) The Secretary, through the Director and, if appropriate, through other officials, shall provide assistance for the creation and support of regional centers for the transfer of manufac-

turing technology (hereafter in this Act referred to as the “Centers”). Such centers shall be affiliated with any United States-based nonprofit institution or organization, or group thereof, that applies for and is awarded financial assistance under this section in accordance with the description published by the Secretary in the Federal Register under subsection (c)(2). Individual awards shall be decided on the basis of merit review. The objective of the Centers is to enhance productivity and technological performance in United States manufacturing through—

[(1) the transfer of manufacturing technology and techniques developed at the Institute to Centers and, through them, to manufacturing companies throughout the United States;

[(2) the participation of individuals from industry, universities, State governments, other Federal agencies, and, when appropriate, the Institute in cooperative technology transfer activities;

[(3) efforts to make new manufacturing technology and processes usable by United States-based small- and medium-sized companies;

[(4) the active dissemination of scientific, engineering, technical, and management information about manufacturing to industrial firms, including small- and medium-sized manufacturing companies;

[(5) the utilization, when appropriate, of the expertise and capability that exists in Federal laboratories other than the Institute; and

[(6) providing to community colleges information about the job skills needed in small- and medium-sized manufacturing businesses in the regions they serve.

[(b) The activities of the Centers shall include—

[(1) the establishment of automated manufacturing systems and other advanced production technologies, based on research by the Institute, for the purpose of demonstrations and technology transfer;

[(2) the active transfer and dissemination of research findings and Center expertise to a wide range of companies and enterprises, particularly small- and medium-sized manufacturers; and

[(3) loans, on a selective, short-term basis, of items of advanced manufacturing equipment to small manufacturing firms with less than 100 employees.

[(c)(1) The Secretary may provide financial support to any Center created under subsection (a) for a period not to exceed six years. The Secretary may not provide to a Center more than 50 percent of the capital and annual operating and maintenance funds required to create and maintain such Center.

[(2) The Secretary shall publish in the Federal Register, within 90 days after the date of the enactment of this section, a draft description of a program for establishing Centers, including—

[(A) a description of the program;

[(B) procedures to be followed by applicants;

[(C) criteria for determining qualified applicants;

[(D) criteria, including those listed under paragraph (4), for choosing recipients of financial assistance under this section from among the qualified applicants; and

[(E) maximum support levels expected to be available to Centers under the program in the fourth through sixth years of assistance under this section.

The Secretary shall publish a final description under this paragraph after the expiration of a 30-day comment period.

[(3)(A) Any nonprofit institution, or group thereof, or consortia of nonprofit institutions, including entities existing on August 23, 1988, may submit to the Secretary an application for financial support under this subsection, in accordance with the procedures established by the Secretary and published in the Federal Register under paragraph (2).

[(B) In order to receive assistance under this section, an applicant for financial assistance under subparagraph (A) shall provide adequate assurances that non-Federal assets obtained from the applicant and the applicant's partnering organizations will be used as a funding source to meet not less than 50 percent of the costs incurred for the first 3 years and an increasing share for each of the last 3 years. For purposes of the preceding sentence, the costs incurred means the costs incurred in connection with the activities undertaken to improve the management, productivity, and technological performance of small- and medium-sized manufacturing companies.

[(C) In meeting the 50 percent requirement, it is anticipated that a Center will enter into agreements with other entities such as private industry, universities, and State governments to accomplish programmatic objectives and access new and existing resources that will further the impact of the Federal investment made on behalf of small- and medium-sized manufacturing companies. All non-Federal costs, contributed by such entities and determined by a Center as programmatically reasonable and allocable under MEP program procedures are includable as a portion of the Center's contribution.

[(D) Each applicant under subparagraph (A) shall also submit a proposal for the allocation of the legal rights associated with any invention which may result from the proposed Center's activities.

[(4) The Secretary shall subject each such application to merit review. In making a decision whether to approve such application and provide financial support under this subsection, the Secretary shall consider at a minimum (A) the merits of the application, particularly those portions of the application regarding technology transfer, training and education, and adaptation of manufacturing technologies to the needs of particular industrial sectors, (B) the quality of service to be provided, (C) geographical diversity and extent of service area, and (D) the percentage of funding and amount of in-kind commitment from other sources.

[(5) Each Center which receives financial assistance under this section shall be evaluated during its third year of operation by an evaluation panel appointed by the Secretary. Each such evaluation panel shall be composed of private experts, none of whom shall be connected with the involved Center, and Federal officials. An official of the Institute shall chair the panel. Each evaluation panel shall measure the involved Center's performance against the objectives specified in this section. The Secretary shall not provide funding for the fourth through the sixth years of such Center's operation unless the evaluation is positive. If the evaluation is positive,

the Secretary may provide continued funding through the sixth year at declining levels. A Center that has not received a positive evaluation by the evaluation panel shall be notified by the panel of the deficiencies in its performance and shall be placed on probation for one year, after which time the panel shall reevaluate the Center. If the Center has not addressed the deficiencies identified by the panel, or shown a significant improvement in its performance, the Director shall conduct a new competition to select an operator for the Center or may close the Center. After the sixth year, a Center may receive additional financial support under this section if it has received a positive evaluation through an independent review, under procedures established by the Institute. Such an independent review shall be required at least every two years after the sixth year of operation. Funding received for a fiscal year under this section after the sixth year of operation shall not exceed one third of the capital and annual operating and maintenance costs of the Center under the program.

[(6) The provisions of chapter 18 of title 35, United States Code, shall (to the extent not inconsistent with this section) apply to the promotion of technology from research by Centers under this section except for contracts for such specific technology extension or transfer services as may be specified by statute or by the Director.

[(7) Not later than 90 days after the date of enactment of the National Institute of Standards and Technology Authorization Act of 2010, the Comptroller General 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 effect of such cost share structures on individual Centers and the overall program; and

[(B) include recommendations for how best to structure the cost share requirement to provide for the long-term sustainability of the program.

[(8) If consistent with the recommendations in the report transmitted to Congress under paragraph (7), the Secretary shall alter the cost structure requirements specified under paragraph (3)(B) and (5) provided that the modification does not increase the cost share structure in place before the date of enactment of the America COMPETES Reauthorization Act of 2010, or allow the Secretary to provide a Center more than 50 percent of the costs incurred by that Center.

[(d) ACCEPTANCE OF FUNDS.—

[(1) IN GENERAL.—In addition to such sums as may be appropriated to the Secretary and Director to operate the Centers program, the Secretary and Director also may accept funds from other Federal departments and agencies and under section 2(c)(7) from the private sector for the purpose of strengthening United States manufacturing.

[(2) ALLOCATION OF FUNDS.—

[(A) FUNDS ACCEPTED FROM OTHER FEDERAL DEPARTMENTS OR AGENCIES.—The Director shall determine whether funds accepted from other Federal departments or agencies shall be counted in the calculation of the Federal

share of capital and annual operating and maintenance costs under subsection (c).

[(B) FUNDS ACCEPTED FROM THE PRIVATE SECTOR.—Funds accepted from the private sector under section 2(c)(7), if allocated to a Center, shall not be considered in the calculation of the Federal share under subsection (c) of this section.

[(e) MEP ADVISORY BOARD.—

[(1) ESTABLISHMENT.—There is established within the Institute a Manufacturing Extension Partnership Advisory Board (in this subsection referred to as the “MEP Advisory Board”).

[(2) MEMBERSHIP.—

[(A) IN GENERAL.—The MEP Advisory Board shall consist of 10 members broadly representative of stakeholders, to be appointed by the Director. At least 2 members shall be employed by or on an advisory board for the Centers, and at least 5 other members shall be from United States small businesses in the manufacturing sector. No member shall be an employee of the Federal Government.

[(B) TERM.—Except as provided in subparagraph (C) or (D), the term of office of each member of the MEP Advisory Board shall be 3 years.

[(C) CLASSES.—The original members of the MEP Advisory Board shall be appointed to 3 classes. One class of 3 members shall have an initial term of 1 year, one class of 3 members shall have an initial term of 2 years, and one class of 4 members shall have an initial term of 3 years.

[(D) VACANCIES.—Any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term.

[(E) SERVING CONSECUTIVE TERMS.—Any person who has completed two consecutive full terms of service on the MEP Advisory Board shall thereafter be ineligible for appointment during the one-year period following the expiration of the second such term.

[(3) MEETINGS.—The MEP Advisory Board shall meet not less than 2 times annually, and provide to the Director—

[(A) advice on Manufacturing Extension Partnership programs, plans, and policies;

[(B) assessments of the soundness of Manufacturing Extension Partnership plans and strategies; and

[(C) assessments of current performance against Manufacturing Extension Partnership program plans.

[(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.

[(5) REPORT.—The MEP Advisory Board shall transmit an annual report to the Secretary for transmittal to Congress within 30 days after the submission to Congress of the Presi-

dent's annual budget request in each year. Such report shall address the status of the program established pursuant to this section and comment on the relevant sections of the programmatic planning document and updates thereto transmitted to Congress by the Director under subsections (c) and (d) of section 23.

**[(f) COMPETITIVE GRANT PROGRAM.—**

**[(1) ESTABLISHMENT.—**The Director shall establish, within the Centers program under this section and section 26 of this Act, a program of competitive awards among participants described in paragraph (2) for the purposes described in paragraph (3).

**[(2) PARTICIPANTS.—**Participants receiving awards under this subsection shall be the Centers, or a consortium of such Centers.

**[(3) PURPOSE.—**The purpose of the program under this subsection is to add capabilities to the MEP program, including the development of projects to solve new or emerging manufacturing problems as determined by the Director, in consultation with the Director of the Hollings MEP program, the Manufacturing Extension Partnership Advisory Board, and small and medium-sized manufacturers. One or more themes for the competition may be identified, which may vary from year to year, depending on the needs of manufacturers and the success of previous competitions. Centers may be reimbursed for costs incurred under the program. These themes—

**[(A)]** shall be related to projects designed to increase the viability both of traditional manufacturing sectors and other sectors, such as construction, that increasingly rely on manufacturing through the use of manufactured components and manufacturing techniques, including supply chain integration and quality management;

**[(B)]** shall be related to projects related to the transfer of technology based on the technological needs of manufacturers and available technologies from institutions of higher education, laboratories, and other technology producing entities; and

**[(C)]** may extend beyond these traditional areas to include projects related to construction industry modernization.

**[(4) APPLICATIONS.—**Applications for awards under this subsection shall be submitted in such manner, at such time, and containing such information as the Director shall require, in consultation with the Manufacturing Extension Partnership Advisory Board.

**[(5) SELECTION.—**

**[(A) IN GENERAL.—**Awards under this section shall be peer reviewed and competitively awarded. The Director shall endeavor to select at least one proposal in each of the 9 statistical divisions of the United States (as designated by the Bureau of the Census). The Director shall select proposals to receive awards that will—

**[(i)]** create jobs or train newly hired employees;

[(ii) promote technology transfer and commercialization of environmentally focused materials, products, and processes;

[(iii) increase energy efficiency; and

[(iv) improve the competitiveness of industries in the region in which the Center or Centers are located.

[(B) ADDITIONAL SELECTION CRITERIA.—The Director may select proposals to receive awards that will—

[(i) encourage greater cooperation and foster partnerships in the region with similar Federal, State, and locally funded programs to encourage energy efficiency and building technology; and

[(ii) collect data and analyze the increasing connection between manufactured products and manufacturing techniques, the future of construction practices, and the emerging application of products from the green energy industries.

[(6) PROGRAM CONTRIBUTION.—Recipients of awards under this subsection shall not be required to provide a matching contribution.

[(7) GLOBAL MARKETPLACE PROJECTS.—In making awards under this subsection, the Director, in consultation with the Manufacturing Extension Partnership Advisory Board and the Secretary of Commerce, may—

[(A) take into consideration whether an application has significant potential for enhancing the competitiveness of small and medium-sized United States manufacturers in the global marketplace; and

[(B) give a preference to applications for such projects to the extent the Director deems appropriate, taking into account the broader purposes of this subsection.

[(7) DURATION.—Awards under this section shall last no longer than 3 years.

[(8) ELIGIBLE PARTICIPANTS.—In addition to manufacturing firms eligible to participate in the Centers program, awards under this subsection may be used by the Centers to assist small- or medium-sized construction firms. Centers may be reimbursed under the program for working with such eligible participants.

[(9) AUTHORIZATION OF APPROPRIATIONS.—In addition to any amounts otherwise authorized or appropriated to carry out this section, there are authorized to be appropriated to the Secretary of Commerce \$7,000,000 for each of the fiscal years 2011 through 2013 to carry out this subsection.

[(g) INNOVATIVE SERVICES INITIATIVE.—

[(1) ESTABLISHMENT.—The Director shall 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, greenhouse gas emissions, and environmental waste to improve profitability;

[(B) accelerating the domestic commercialization of new product technologies, including components for renewable energy and energy efficiency systems; and



[(C) identification of and diversification to new markets, including support for transitioning to the production of components for renewable energy and energy efficiency 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.

[(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 the 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)).

[(i) DESIGNATION.—

[(1) HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP.—The program under this section shall be known as the “Hollings Manufacturing Extension Partnership”.

[(2) HOLLINGS MANUFACTURING EXTENSION CENTERS.—The Regional Centers for the Transfer of Manufacturing Technology created and supported under subsection (a) shall be known as the “Hollings Manufacturing Extension Centers” (in this Act referred to as the “Centers”).

[(j) COMMUNITY COLLEGE DEFINED.—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.

[(k) EVALUATION OF OBSTACLES UNIQUE TO SMALL MANUFACTURERS.—The Director shall—

[(1) evaluate obstacles that are unique to small manufacturers that prevent such manufacturers from effectively competing in the global market;

[(2) implement a comprehensive plan to train the Centers to address such obstacles; and

[(3) facilitate improved communication between the Centers to assist such manufacturers in implementing appropriate, targeted solutions to such obstacles.]

#### **SEC. 24. ASSESSMENTS BY THE NATIONAL RESEARCH COUNCIL.**

(a) *IN GENERAL.*—The Institute shall contract with the National Research Council to perform and report on assessments of the technical quality and impact of the work conducted at Institute laboratories.

(b) *SCHEDULE.*—Two laboratories shall be assessed under subsection (a) each year, and each laboratory shall be assessed at least once every 3 years.

(c) *SUMMARY REPORT.*—Beginning in the year after the first assessment is conducted under subsection (a), and once every two years thereafter, the Institute shall contract with the National Re-

search Council to prepare a report that summarizes the findings common across the individual assessment reports.

(d) *ADDITIONAL ASSESSMENTS.*—The Institute, at the discretion of the Director, also may contract with the National Research Council to conduct additional assessments of Institute programs and projects that involve collaboration across the Institute laboratories and centers and assessments of selected scientific and technical topics.

(e) *CONSULTATION WITH VISITING COMMITTEE ON ADVANCED TECHNOLOGY.*—The National Research Council may consult with the Visiting Committee on Advanced Technology established under section 10 in performing the assessments under this section.

(f) *REPORTS.*—Not later than 30 days after the completion of each assessment, the Institute shall transmit the report on such assessment to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

#### **SEC. 25. HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP.**

(a) *ESTABLISHMENT AND PURPOSE.*—

(1) *IN GENERAL.*—The Secretary, through the Director and, if appropriate, through other officials, shall provide assistance for the creation and support of manufacturing extension centers, to be known as the “Hollings Manufacturing Extension Centers”, for the transfer of manufacturing technology and best business practices (in this Act referred to as the “Centers”). The program under this section shall be known as the “Hollings Manufacturing Extension Partnership”.

(2) *AFFILIATIONS.*—Such Centers shall be affiliated with any United States-based public or nonprofit institution or organization, or group thereof, that applies for and is awarded financial assistance under this section.

(3) *OBJECTIVE.*—The objective of the Centers is to enhance competitiveness, productivity, and technological performance in United States manufacturing through—

(A) the transfer of manufacturing technology and techniques developed at the Institute to Centers and, through them, to manufacturing companies throughout the United States;

(B) the participation of individuals from industry, institutions of higher education, State governments, other Federal agencies, and, when appropriate, the Institute in cooperative technology transfer activities;

(C) efforts to make new manufacturing technology and processes usable by United States-based small and medium-sized companies;

(D) the active dissemination of scientific, engineering, technical, and management information about manufacturing to industrial firms, including small and medium-sized manufacturing companies;

(E) the utilization, when appropriate, of the expertise and capability that exists in Federal laboratories other than the Institute;

(F) the provision to community colleges and area career and technical education schools of information about the

*job skills needed in small and medium-sized manufacturing businesses in the regions they serve; and*

*(G) promoting and expanding certification systems offered through industry, associations, and local colleges, when appropriate.*

*(b) ACTIVITIES.—The activities of the Centers shall include—*

*(1) the establishment of automated manufacturing systems and other advanced production technologies, based on Institute-supported research, for the purpose of demonstrations and technology transfer;*

*(2) the active transfer and dissemination of research findings and Center expertise to a wide range of companies and enterprises, particularly small and medium-sized manufacturers; and*

*(3) the facilitation of collaborations and partnerships between small and medium-sized manufacturing companies and community colleges and area career and technical education schools to help such colleges and schools better understand the specific needs of manufacturers and to help manufacturers better understand the skill sets that students learn in the programs offered by such colleges and schools.*

*(c) OPERATIONS.—*

*(1) FINANCIAL SUPPORT.—The Secretary may provide financial support to any Center created under subsection (a). The Secretary may not provide to a Center more than 50 percent of the capital and annual operating and maintenance funds required to create and maintain such Center.*

*(2) REGULATIONS.—The Secretary shall implement, review, and update the sections of the Code of Federal Regulations related to this section at least once every 3 years.*

*(3) APPLICATION.—*

*(A) IN GENERAL.—Any nonprofit institution, or consortium thereof, or State or local government, may submit to the Secretary an application for financial support under this section, in accordance with the procedures established by the Secretary.*

*(B) COST SHARING.—In order to receive assistance under this section, an applicant for financial assistance under subparagraph (A) shall provide adequate assurances that non-Federal assets obtained from the applicant and the applicant's partnering organizations will be used as a funding source to meet not less than 50 percent of the costs incurred. For purposes of the preceding sentence, the costs incurred means the costs incurred in connection with the activities undertaken to improve the competitiveness, management, productivity, and technological performance of small and medium-sized manufacturing companies.*

*(C) AGREEMENTS WITH OTHER ENTITIES.—In meeting the 50 percent requirement, it is anticipated that a Center will enter into agreements with other entities such as private industry, institutions of higher education, and State governments to accomplish programmatic objectives and access new and existing resources that will further the impact of the Federal investment made on behalf of small and medium-sized manufacturing companies.*

(D) *LEGAL RIGHTS.*—Each applicant under subparagraph (A) shall also submit a proposal for the allocation of the legal rights associated with any invention which may result from the proposed Center's activities.

(4) *MERIT REVIEW.*—The Secretary shall subject each such application to merit review. In making a decision whether to approve such application and provide financial support under this section, the Secretary shall consider, at a minimum, the following:

(A) The merits of the application, particularly those portions of the application regarding technology transfer, training and education, and adaptation of manufacturing technologies to the needs of particular industrial sectors.

(B) The quality of service to be provided.

(C) Geographical diversity and extent of service area.

(D) The percentage of funding and amount of in-kind commitment from other sources.

(5) *EVALUATION.*—

(A) *IN GENERAL.*—Each Center that receives financial assistance under this section shall be evaluated during its third year of operation by an evaluation panel appointed by the Secretary.

(B) *COMPOSITION.*—Each such evaluation panel shall be composed of private experts, none of whom shall be connected with the involved Center, and Federal officials.

(C) *CHAIR.*—An official of the Institute shall chair the panel.

(D) *PERFORMANCE MEASUREMENT.*—Each evaluation panel shall measure the involved Center's performance against the objectives specified in this section.

(E) *POSITIVE EVALUATION.*—If the evaluation is positive, the Secretary may provide continued funding through the sixth year.

(F) *PROBATION.*—The Secretary shall not provide funding unless the Center has received a positive evaluation. A Center that has not received a positive evaluation by the evaluation panel shall be notified by the panel of the deficiencies in its performance and shall be placed on probation for one year, after which time the panel shall reevaluate the Center. If the Center has not addressed the deficiencies identified by the panel, or shown a significant improvement in its performance, the Director shall conduct a new competition to select an operator for the Center or may close the Center.

(G) *ADDITIONAL FINANCIAL SUPPORT.*—After the sixth year, a Center may receive additional financial support under this section if it has received a positive evaluation through an independent review, under procedures established by the Institute.

(H) *EIGHT-YEAR REVIEW.*—A Center shall undergo an independent review in the 8th year of operation. Each evaluation panel shall measure the Center's performance against the objectives specified in this section. A Center that has not received a positive evaluation as a result of an independent review shall be notified by the Program of the

deficiencies in its performance and shall be placed on probation for one year, after which time the Program shall re-evaluate the Center. If the Center has not addressed the deficiencies identified by the review, or shown a significant improvement in its performance, the Director shall conduct a new competition to select an operator for the Center or may close the Center.

(I) *RECOMPETITION*.—If a recipient of a Center award has received financial assistance for 10 consecutive years, the Director shall conduct a new competition to select an operator for the Center consistent with the plan required in this Act. Incumbent Center operators in good standing shall be eligible to compete for the new award.

(J) *REPORTS*.—

(i) *PLAN*.—Not later than 180 days after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Director shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a plan as to how the Institute will conduct reviews, assessments, and reapplication competitions under this paragraph.

(ii) *INDEPENDENT ASSESSMENT*.—The Director shall contract with an independent organization to perform an assessment of the implementation of the reapplication competition process under this paragraph within 3 years after the transmittal of the report under clause (i). The organization conducting the assessment under this clause may consult with the MEP Advisory Board.

(iii) *COMPARISON OF CENTERS*.—Not later than 2 years after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Director shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report providing information on the first and second years of operations for centers operating from new competitions or recompetition as compared to longstanding centers. The report shall provide detail on the engagement in services provided by Centers and the characteristics of services provided, including volume and type of services, so that the Committees can evaluate whether the cost-sharing ratio has an effect on the services provided at Centers.

(6) *PATENT RIGHTS*.—The provisions of chapter 18 of title 35, United States Code, shall apply, to the extent not inconsistent with this section, to the promotion of technology from research by Centers under this section except for contracts for such specific technology extension or transfer services as may be specified by statute or by the Director.

(7) *PROTECTION OF CENTER CLIENT CONFIDENTIAL INFORMATION*.—Section 552 of title 5, United States Code, shall apply to the following information obtained by the Federal Government on a confidential basis in connection with the activities of any

participant involved in the Hollings Manufacturing Extension Partnership:

(A) Information on the business operation of any participant in a Hollings Manufacturing Extension Partnership program or of a client of a Center.

(B) Trade secrets possessed by any client of a Center.

(8) **ADVISORY BOARDS.**—Each Center's advisory boards shall institute a conflict of interest policy, approved by the Director, that ensures the Board represents local small and medium-sized manufacturers in the Center's region. Board Members may not serve as a vendor or provide services to the Center, nor may they serve on more than one Center's oversight board simultaneously.

(d) **ACCEPTANCE OF FUNDS.**—

(1) **IN GENERAL.**—In addition to such sums as may be appropriated to the Secretary and Director to operate the Hollings Manufacturing Extension Partnership, the Secretary and Director also may accept funds from other Federal departments and agencies and, under section 2(c)(7), from the private sector for the purpose of strengthening United States manufacturing.

(2) **ALLOCATION OF FUNDS.**—

(A) **FUNDS ACCEPTED FROM OTHER FEDERAL DEPARTMENTS OR AGENCIES.**—The Director shall determine whether funds accepted from other Federal departments or agencies shall be counted in the calculation of the Federal share of capital and annual operating and maintenance costs under subsection (c).

(B) **FUNDS ACCEPTED FROM THE PRIVATE SECTOR.**—Funds accepted from the private sector under section 2(c)(7), if allocated to a Center, may not be considered in the calculation of the Federal share under subsection (c) of this section.

(e) **MEP ADVISORY BOARD.**—

(1) **ESTABLISHMENT.**—There is established within the Institute a Manufacturing Extension Partnership Advisory Board (in this subsection referred to as the "MEP Advisory Board").

(2) **MEMBERSHIP.**—

(A) **IN GENERAL.**—The MEP Advisory Board shall consist of not fewer than 10 members broadly representative of stakeholders, to be appointed by the Director. At least 2 members shall be employed by or on an advisory board for the Centers, at least 1 member shall represent a community college, and at least 5 other members shall be from United States small businesses in the manufacturing sector. No member shall be an employee of the Federal Government.

(B) **TERM.**—Except as provided in subparagraph (C) or (D), the term of office of each member of the MEP Advisory Board shall be 3 years.

(C) **VACANCIES.**—Any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term.

(D) **SERVING CONSECUTIVE TERMS.**—Any person who has completed two consecutive full terms of service on the MEP Advisory Board shall thereafter be ineligible for appoint-

ment during the one-year period following the expiration of the second such term.

(3) *MEETINGS.*—The MEP Advisory Board shall meet not less than 2 times annually and shall provide to the Director—

(A) advice on Hollings Manufacturing Extension Partnership programs, plans, and policies;

(B) assessments of the soundness of Hollings Manufacturing Extension Partnership plans and strategies; and

(C) assessments of current performance against Hollings Manufacturing Extension Partnership program plans.

(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.

(5) *REPORT.*—The MEP Advisory Board shall transmit an annual report to the Secretary for transmittal to Congress within 30 days after the submission to Congress of the President's annual budget request in each year. Such report shall address the status of the program established pursuant to this section and comment on the relevant sections of the programmatic planning document and updates thereto transmitted to Congress by the Director under subsections (c) and (d) of section 23.

(f) *COMPETITIVE GRANT PROGRAM.*—

(1) *ESTABLISHMENT.*—The Director shall establish, within the Hollings Manufacturing Extension Partnership, under this section and section 26, a program of competitive awards among participants described in paragraph (2) for the purposes described in paragraph (3).

(2) *PARTICIPANTS.*—Participants receiving awards under this subsection shall be the Centers, or a consortium of such Centers.

(3) *PURPOSE.*—The purpose of the program under this subsection is to add capabilities to the Hollings Manufacturing Extension Partnership, including the development of projects to solve new or emerging manufacturing problems as determined by the Director, in consultation with the Director of the Hollings Manufacturing Extension Partnership program, the MEP Advisory Board, and small and medium-sized manufacturers. One or more themes for the competition may be identified, which may vary from year to year, depending on the needs of manufacturers and the success of previous competitions. Centers may be reimbursed for costs incurred under the program.

(4) *APPLICATIONS.*—Applications for awards under this subsection shall be submitted in such manner, at such time, and containing such information as the Director shall require, in consultation with the MEP Advisory Board.

(5) *SELECTION.*—Awards under this subsection shall be peer reviewed and competitively awarded. The Director shall endeavor to have broad geographic diversity among selected proposals. The Director shall select proposals to receive awards that will—

(A) improve the competitiveness of industries in the region in which the Center or Centers are located;

(B) create jobs or train newly hired employees; and  
 (C) promote the transfer and commercialization of research and technology from institutions of higher education, national laboratories, and nonprofit research institutes.

(6) *PROGRAM CONTRIBUTION.*—Recipients of awards under this subsection shall not be required to provide a matching contribution.

(7) *GLOBAL MARKETPLACE PROJECTS.*—In making awards under this subsection, the Director, in consultation with the MEP Advisory Board and the Secretary, may take into consideration whether an application has significant potential for enhancing the competitiveness of small and medium-sized United States manufacturers in the global marketplace.

(8) *DURATION.*—Awards under this subsection shall last no longer than 3 years.

(g) *EVALUATION OF OBSTACLES UNIQUE TO SMALL MANUFACTURERS.*—The Director shall—

(1) evaluate obstacles that are unique to small manufacturers that prevent such manufacturers from effectively competing in the global market;

(2) implement a comprehensive plan to train the Centers to address such obstacles; and

(3) facilitate improved communication between the Centers to assist such manufacturers in implementing appropriate, targeted solutions to such obstacles.

(h) *DEFINITIONS.*—In this section—

(1) the term “area career and technical education school” has the meaning given such term in section 3 of the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (20 U.S.C. 2302); and

(2) 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.

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## **SEC. 28. TECHNOLOGY INNOVATION PROGRAM.**

(a) *ESTABLISHMENT.*—There is established within the Institute a program linked to the purpose and functions of the Institute, to be known as the “Technology Innovation Program” for the purpose of assisting United States businesses and institutions of higher education or other organizations, such as national laboratories and nonprofit research institutions, to support, promote, and accelerate innovation in the United States through high-risk, high-reward research in areas of critical national need.

(b) *EXTERNAL FUNDING.*—

(1) *IN GENERAL.*—The Director shall award competitive, merit-reviewed grants, cooperative agreements, or contracts to—

(A) eligible companies that are small-sized businesses or medium-sized businesses; or

(B) joint ventures.



(2) SINGLE COMPANY AWARDS.—No award given to a single company shall exceed \$3,000,000 over 3 years.

(3) JOINT VENTURE AWARDS.—No award given to a joint venture shall exceed \$9,000,000 over 5 years.

(4) FEDERAL COST SHARE.—The Federal share of a project funded by an award under the program shall not be more than 50 percent of total project costs.

(5) PROHIBITIONS.—Federal funds awarded under this program may be used only for direct costs and not for indirect costs, profits, or management fees of a contractor. Any business that is not a small-sized or medium-sized business may not receive any funding under this program.

(c) AWARD CRITERIA.—The Director shall only provide assistance under this section to an entity—

(1) whose proposal has scientific and technical merit and may result in intellectual property vesting in a United States entity that can commercialize the technology in a timely manner;

(2) whose application establishes that the proposed technology has strong potential to address critical national needs through transforming the Nation's capacity to deal with major societal challenges that are not currently being addressed, and generate substantial benefits to the Nation that extend significantly beyond the direct return to the applicant;

(3) whose application establishes that the research has strong potential for advancing the state-of-the-art and contributing significantly to the United States science and technology knowledge base;

(4) whose proposal explains why Technology Innovation Program support is necessary, including evidence that the research will not be conducted within a reasonable time period in the absence of financial assistance under this section;

(5) whose application demonstrates that reasonable efforts have been made to secure funding from alternative funding sources and no other alternative funding sources are reasonably available to support the proposal; and

(6) whose application explains the novelty of the technology and demonstrates that other entities have not already developed, commercialized, marketed, distributed, or sold similar technologies.

(d) COMPETITIONS.—The Director shall solicit proposals at least annually to address areas of critical national need for high-risk, high-reward projects.

(e) INTELLECTUAL PROPERTY RIGHTS OWNERSHIP.—

(1) IN GENERAL.—Title to any intellectual property developed by a joint venture from assistance provided under this section may vest in any participant in the joint venture, as agreed by the members of the joint venture, notwithstanding section 202 (a) and (b) of title 35, United States Code. The United States may reserve a nonexclusive, nontransferable, irrevocable paid-up license, to have practice for or on behalf of the United States in connection with any such intellectual property, but shall not in the exercise of such license publicly disclose proprietary information related to the license. Title to any such intellectual property shall not be transferred or passed, except to a

participant in the joint venture, until the expiration of the first patent obtained in connection with such intellectual property.

(2) LICENSING.—Nothing in this subsection shall be construed to prohibit the licensing to any company of intellectual property rights arising from assistance provided under this section.

(3) DEFINITION.—For purposes of this subsection, the term “intellectual property” means an invention patentable under title 35, United States Code, or any patent on such an invention, or any work for which copyright protection is available under title 17, United States Code.

(f) PROGRAM OPERATION.—Not later than 9 months after the date of the enactment of this section, the Director shall promulgate regulations—

(1) establishing criteria for the selection of recipients of assistance under this section;

(2) establishing procedures regarding financial reporting and auditing to ensure that awards are used for the purposes specified in this section, are in accordance with sound accounting practices, and are not funding existing or planned research programs that would be conducted within a reasonable time period in the absence of financial assistance under this section; and

(3) providing for appropriate dissemination of Technology Innovation Program research results.

[(g) CONTINUATION OF ATP GRANTS.—The Director shall, through the Technology Innovation Program, continue to provide support originally awarded under the Advanced Technology Program, in accordance with the terms of the original award and consistent with the goals of the Technology Innovation Program.]

(h) COORDINATION WITH OTHER STATE AND FEDERAL TECHNOLOGY PROGRAMS.—In carrying out this section, the Director shall, as appropriate, coordinate with other senior State and Federal officials to ensure cooperation and coordination in State and Federal technology programs and to avoid unnecessary duplication of efforts.

(i) ACCEPTANCE OF FUNDS FROM OTHER FEDERAL AGENCIES.—In addition to amounts appropriated to carry out this section, the Secretary and the Director may accept funds from other Federal agencies to support awards under the Technology Innovation Program. Any award under this section which is supported with funds from other Federal agencies shall be selected and carried out according to the provisions of this section. Funds accepted from other Federal agencies shall be included as part of the Federal cost share of any project funded under this section.

(j) TIP ADVISORY BOARD.—

(1) ESTABLISHMENT.—There is established within the Institute a TIP Advisory Board.

(2) MEMBERSHIP.—

(A) IN GENERAL.—The TIP Advisory Board shall consist of 10 members appointed by the Director, at least 7 of whom shall be from United States industry, chosen to reflect the wide diversity of technical disciplines and industrial sectors represented in Technology Innovation Pro-

gram projects. No member shall be an employee of the Federal Government.

(B) TERM.—Except as provided in subparagraph (C) or (D), the term of office of each member of the TIP Advisory Board shall be 3 years.

(C) CLASSES.—The original members of the TIP Advisory Board shall be appointed to 3 classes. One class of 3 members shall have an initial term of 1 year, one class of 3 members shall have an initial term of 2 years, and one class of 4 members shall have an initial term of 3 years.

(D) VACANCIES.—Any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term.

(E) SERVING CONSECUTIVE TERMS.—Any person who has completed 2 consecutive full terms of service on the TIP Advisory Board shall thereafter be ineligible for appointment during the 1-year period following the expiration of the second such term.

(3) PURPOSE.—The TIP Advisory Board shall meet not less than 2 times annually, and provide the Director—

(A) advice on programs, plans, and policies of the Technology Innovation Program;

(B) reviews of the Technology Innovation Program's efforts to accelerate the research and development of challenging, high-risk, high-reward technologies in areas of critical national need;

(C) reports on the general health of the program and its effectiveness in achieving its legislatively mandated mission; and

(D) guidance on investment areas that are appropriate for Technology Innovation Program funding;

(4) ADVISORY CAPACITY.—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.

(k) DEFINITIONS.—In this section—

(1) the term “eligible company” means a small-sized or medium-sized business that is incorporated in the United States and does a majority of its business in the United States, and that either—

(A) is majority owned by citizens of the United States; or

(B) is owned by a parent company incorporated in another country and the Director finds that—

(i) the company's participation in the Technology Innovation Program would be in the economic interest of the United States, as evidenced by—

(I) investments in the United States in research and manufacturing;

(II) significant contributions to employment in the United States; and

(III) agreement with respect to any technology arising from assistance provided under this section to promote the manufacture within the

United States of products resulting from that technology; and

(ii) the company is incorporated in a country which—

(I) affords to United States-owned companies opportunities, comparable to those afforded to any other company, to participate in any joint venture similar to those receiving funding under this section;

(II) affords to United States-owned companies local investment opportunities comparable to those afforded any other company; and

(III) affords adequate and effective protection for intellectual property rights of United States-owned companies;

(2) the term “high-risk, high-reward research” means research that—

(A) has the potential for yielding transformational results with far-ranging or wide-ranging implications;

(B) addresses critical national needs within the National Institute of Standards and Technology’s areas of technical competence; and

(C) is too novel or spans too diverse a range of disciplines to fare well in the traditional peer-review process;

(3) the term “institution of higher education” has the meaning given that term in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001); *and*

(4) the term “joint venture” means a joint venture that—

(A) includes either—

(i) at least 2 separately owned for-profit companies that are both substantially involved in the project and both of which are contributing to the cost-sharing required under this section, with the lead entity of the joint venture being one of those companies that is a small-sized or medium-sized business; or

(ii) at least 1 small-sized or medium-sized business and 1 institution of higher education or other organization, such as a national laboratory or nonprofit research institute, that are both substantially involved in the project and both of which are contributing to the cost-sharing required under this section, with the lead entity of the joint venture being either that small-sized or medium-sized business or that institution of higher education; and

(B) may include additional for-profit companies, institutions of higher education, and other organizations, such as national laboratories and nonprofit research institutes, that may or may not contribute non-Federal funds to the project[; and].

[(5) the term “TIP Advisory Board” means the advisory board established under subsection (j).]

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## DEPARTMENT OF ENERGY ORGANIZATION ACT

\* \* \* \* \*

### TITLE II—ESTABLISHMENT OF THE DEPARTMENT

\* \* \* \* \*

#### PRINCIPAL OFFICERS

SEC. 202. (a) There shall be in the Department a Deputy Secretary, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall be compensated at the rate provided for level II of the Executive Schedule under section 5313 of title 5, United States Code. The Deputy Secretary shall act for and exercise the functions of the Secretary during the absence or disability of the Secretary or in the event the office of Secretary becomes vacant. The Secretary shall designate the order in which the Under Secretary and other officials shall act for and perform the functions of the Secretary during the absence or disability of both the Secretary and Deputy Secretary or in the event of vacancies in both of those offices.

(b)(1) There shall be in the Department an **Under Secretary for Science** *Under Secretary for Science and Energy*, who shall be appointed by the President, by and with the advice and consent of the Senate.

(2) The Under Secretary shall be compensated at the rate provided for level III of the Executive Schedule under section 5314 of title 5, United States Code.

(3) The **Under Secretary for Science** *Under Secretary for Science and Energy* shall be appointed from among persons who—

(A) have extensive background in scientific or engineering fields; and

(B) are well qualified to manage the civilian research and development programs of the Department.

(4) The **Under Secretary for Science** *Under Secretary for Science and Energy* shall—

(A) serve as the Science and Technology Advisor to the Secretary;

(B) monitor the research and development programs of the Department in order to advise the Secretary with respect to any undesirable duplication or gaps in the programs;

(C) advise the Secretary with respect to the well-being and management of the multipurpose laboratories under the jurisdiction of the Department;

(D) advise the Secretary with respect to education and training activities required for effective short- and long-term basic and applied research activities of the Department;

(E) advise the Secretary with respect to grants and other forms of financial assistance required for effective short- and long-term basic and applied research activities of the Department;

(F) advise the Secretary with respect to long-term planning, coordination, and development of a strategic framework for Department research and development activities; **and**

(G) carry out such additional duties assigned to the Under Secretary by the Secretary relating to basic and applied re-

search, including supervision or support of research activities carried out by any of the Assistant Secretaries designated by section 203 of this Act, as the Secretary considers advantageous[.];

*(H) establish appropriate linkages between offices under the jurisdiction of the Under Secretary; and*

*(I) perform such functions and duties as the Secretary shall prescribe, consistent with this section.*

(c)(1) There shall be in the Department an Under Secretary for Nuclear Security, who shall be appointed by the President, by and with the advice and consent of the Senate. The Under Secretary shall be compensated at the rate provided for at level III of the Executive Schedule under section 5314 of title 5, United States Code.

(2) The Under Secretary for Nuclear Security shall be appointed from among persons who—

(A) have extensive background in national security, organizational management, and appropriate technical fields; and

(B) are well qualified to manage the nuclear weapons, non-proliferation, and materials disposition programs of the National Nuclear Security Administration in a manner that advances and protects the national security of the United States.

(3) The Under Secretary for Nuclear Security shall serve as the Administrator for Nuclear Security under section 3212 of the National Nuclear Security Administration Act. In carrying out the functions of the Administrator, the Under Secretary shall be subject to the authority, direction, and control of the Secretary. Such authority, direction, and control may be delegated only to the Deputy Secretary of Energy, without redelegation.

(d)(1) There shall be in the Department an Under Secretary, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall perform such functions and duties as the Secretary shall prescribe, consistent with this section.

(2) The Under Secretary shall be compensated at the rate provided for level III of the Executive Schedule under section 5314 of title 5, United States Code.

(e)(1) There shall be in the Department a General Counsel, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall perform such functions and duties as the Secretary shall prescribe.

(2) The General Counsel shall be compensated at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code.

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#### OFFICE OF SCIENCE

SEC. 209. (a) There shall be within the Department an Office of Science to be headed by a Director, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall be compensated at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code.

(b) It shall be the duty and responsibility of the Director—

(1) to advise the Secretary with respect to the physical research program transferred to the Department from the Energy Research and Development Administration;

(2) to monitor the Department's energy research and development programs in order to advise the Secretary with respect to any undesirable duplication or gaps in such programs;

(3) to advise the Secretary with respect to the well-being and management of the multipurpose laboratories under the jurisdiction of the Department, excluding laboratories that constitute part of the nuclear weapons complex;

(4) to advise the Secretary with respect to education and training activities required for effective short- and long-term basic and applied research activities of the Department;

(5) to advise the Secretary with respect to grants and other forms of financial assistance required for effective short- and long-term basic and applied research activities of the Department; and

(6) to carry out such additional duties assigned to the Office by the Secretary.

(c) *MISSION.*—*The mission of the Office of Science shall be the delivery of scientific discoveries, capabilities, and major scientific tools to transform the understanding of nature and to advance the energy, economic, and national security of the United States. In support of this mission, the Director shall carry out programs on basic energy sciences, advanced scientific computing research, high energy physics, biological and environmental research, fusion energy sciences, and nuclear physics, including as provided under subtitle A of title V of the America COMPETES Reauthorization Act of 2015, through activities focused on—*

(1) *fundamental scientific discoveries through the study of matter and energy;*

(2) *science in the national interest, including—*

(A) *advancing an agenda for American energy security through research on energy production, storage, transmission, efficiency, and use; and*

(B) *advancing our understanding of the Earth's climate through research in atmospheric and environmental sciences; 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 materials science.*

(d) *COORDINATION WITH OTHER DEPARTMENT OF ENERGY PROGRAMS.*—*The Under Secretary for Science and Energy shall ensure the coordination of Office of Science activities and programs with other activities of the Department.*

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**DEPARTMENT OF ENERGY HIGH-END COMPUTING  
REVITALIZATION ACT OF 2004**

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**SEC. 2. DEFINITIONS.**

In this Act:

[(1) CENTER.—The term “Center” means a High-End Software Development Center established under section 3(d).

[(2) HIGH-END COMPUTING SYSTEM.—The term “high-end computing system” means a computing system with performance that substantially exceeds that of systems that are commonly available for advanced scientific and engineering applications.

[(3) LEADERSHIP SYSTEM.—The term “Leadership System” means a high-end computing system that is among the most advanced in the world in terms of performance in solving scientific and engineering problems.

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

[(5) SECRETARY.—The term “Secretary” means the Secretary of Energy, acting through the Director of the Office of Science of the Department of Energy.]

(1) *CO-DESIGN.*—The term “co-design” means the joint development of application algorithms, models, and codes with computer technology architectures and operating systems to maximize effective use of high-end computing systems.

(2) *DEPARTMENT.*—The term “Department” means the Department of Energy.

(3) *EXASCALE.*—The term “exascale” means computing system performance at or near 10 to the 18th power floating point operations per second.

(4) *HIGH-END COMPUTING SYSTEM.*—The term “high-end computing system” means a computing system with performance that substantially exceeds that of systems that are commonly available for advanced scientific and engineering applications.

(5) *INSTITUTION OF HIGHER EDUCATION.*—The term “institution of higher education” has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(6) *LEADERSHIP SYSTEM.*—The term “leadership system” means a high-end computing system that is among the most advanced in the world in terms of performance in solving scientific and engineering problems.

(7) *NATIONAL LABORATORY.*—The term “National Laboratory” means any one of the seventeen laboratories owned by the Department.

(8) *SECRETARY.*—The term “Secretary” means the Secretary of Energy.

(9) *SOFTWARE TECHNOLOGY.*—The term “software technology” includes optimal algorithms, programming environments, tools, languages, and operating systems for high-end computing systems.

**SEC. 3. DEPARTMENT OF ENERGY HIGH-END COMPUTING RESEARCH AND DEVELOPMENT PROGRAM.**

(a) *IN GENERAL.*—The Secretary shall—

(1) carry out a [program] coordinated program across the Department of research and development (including develop-



ment of software and hardware) to advance high-end computing systems; **[and]**

(2) develop and deploy high-end computing systems for advanced scientific and engineering applications**[.]**; and

(3) *partner with universities, National Laboratories, and industry to ensure the broadest possible application of the technology developed in this program to other challenges in science, engineering, medicine, and industry.*

(b) PROGRAM.—The program shall—

(1) support both individual investigators and multidisciplinary teams of investigators;

(2) conduct research in multiple architectures, which may include **[vector, reconfigurable logic, streaming, processor-in-memory, and multithreading architectures]** *computer technologies that show promise of substantial reductions in power requirements and substantial gains in parallelism of multicore processors, concurrency, memory and storage, bandwidth, and reliability*;

(3) conduct research on software for high-end computing systems, including research on algorithms, programming environments, tools, languages, and operating systems for high-end computing systems, in collaboration with architecture development efforts;

(4) provide for sustained access by the research community in the United States to high-end computing systems and to Leadership Systems, including provision of technical support for users of such systems;

(5) support technology transfer to the private sector and others in accordance with applicable law; and

(6) ensure that the high-end computing activities of the Department of Energy are coordinated with relevant activities in industry and with other Federal agencies, including the National Science Foundation, the Defense Advanced Research Projects Agency, the National Nuclear Security Administration, the National Security Agency, the National Institutes of Health, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the National Institutes of Standards and Technology, and the Environmental Protection Agency.

(c) LEADERSHIP SYSTEMS FACILITIES.—

(1) IN GENERAL.—As part of the program carried out under this Act, the Secretary shall establish and operate 1 or more Leadership Systems facilities to—

(A) conduct advanced scientific and engineering research and development using Leadership Systems; and

(B) develop potential advancements in high-end computing system hardware and software.

(2) ADMINISTRATION.—In carrying out this subsection, the Secretary shall provide to Leadership Systems, on a competitive, merit-reviewed basis, access to researchers in United States industry, institutions of higher education, national laboratories, and other Federal agencies.

**[(d) HIGH-END SOFTWARE DEVELOPMENT CENTER.—**

[(1) IN GENERAL.—As part of the program carried out under this Act, the Secretary shall establish at least 1 High-End Software Development Center.

[(2) DUTIES.—A Center shall concentrate efforts to develop, test, maintain, and support optimal algorithms, programming environments, tools, languages, and operating systems for high-end computing systems.

[(3) PROPOSALS.—In soliciting proposals for the Center, the Secretary shall encourage staffing arrangements that include both permanent staff and a rotating staff of researchers from other institutions and industry to assist in coordination of research efforts and promote technology transfer to the private sector.

[(4) USE OF EXPERTISE.—The Secretary shall use the expertise of a Center to assess research and development in high-end computing system architecture.

[(5) SELECTION.—The selection of a Center shall be determined by a competitive proposal process administered by the Secretary.]

(d) *EXASCALE COMPUTING PROGRAM.*—

(1) *IN GENERAL.*—*The Secretary shall conduct a coordinated research program to develop exascale computing systems to advance the missions of the Department.*

(2) *EXECUTION.*—*The Secretary shall, through competitive merit review, establish two or more National Laboratory-industry-university partnerships to conduct integrated research, development, and engineering of multiple exascale architectures, and—*

*(A) conduct mission-related co-design activities in developing such exascale platforms;*

*(B) develop those advancements in hardware and software technology required to fully realize the potential of an exascale production system in addressing Department target applications and solving scientific problems involving predictive modeling and simulation and large-scale data analytics and management; and*

*(C) explore the use of exascale computing technologies to advance a broad range of science and engineering.*

(3) *ADMINISTRATION.*—*In carrying out this program, the Secretary shall—*

*(A) provide, on a competitive, merit-reviewed basis, access for researchers in United States industry, institutions of higher education, National Laboratories, and other Federal agencies to these exascale systems, as appropriate; and*

*(B) conduct outreach programs to increase the readiness for the use of such platforms by domestic industries, including manufacturers.*

(4) *REPORTS.*—

*(A) INTEGRATED STRATEGY AND PROGRAM MANAGEMENT PLAN.*—*The Secretary shall submit to Congress, not later than 90 days after the date of enactment of the America COMPETES Reauthorization Act of 2015, a report outlining an integrated strategy and program management plan, including target dates for prototypical and production exascale platforms, interim milestones to reaching these*

*targets, functional requirements, roles and responsibilities of National Laboratories and industry, acquisition strategy, and estimated resources required, to achieve this exascale system capability. The report shall include the Secretary's plan for Departmental organization to manage and execute the Exascale Computing Program, including definition of the roles and responsibilities within the Department to ensure an integrated program across the Department. The report shall also include a plan for ensuring balance and prioritizing across ASCR subprograms in a flat or slow-growth budget environment.*

*(B) STATUS REPORTS.—At the time of the budget submission of the Department for each fiscal year, the Secretary shall submit a report to Congress that describes the status of milestones and costs in achieving the objectives of the exascale computing program.*

*(C) EXASCALE MERIT REPORT.—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—*

*(i) the proposed facility's cost projections and capabilities to significantly accelerate the development of new energy technologies;*

*(ii) technical risks and challenges that must be overcome to achieve successful completion and operation of the facility; and*

*(iii) an independent assessment of the scientific and technological advances expected from such a facility relative to those expected from a comparable investment in expanded research and applications at terascale-class and petascale-class computing facilities, including an evaluation of where investments should be made in the system software and algorithms to enable these advances.*

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## ATOMIC ENERGY ACT OF 1954

### TITLE I—ATOMIC ENERGY

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#### CHAPTER 4. RESEARCH

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SEC. 33. RESEARCH FOR OTHERS.—Where the Commission finds private facilities or laboratories are inadequate to the purpose, it is authorized to conduct for other persons, through its own facilities, such of those activities and studies of the types specified in section 31 as it deems appropriate to the development of atomic energy. To the extent the Commission determines that private facilities or laboratories are inadequate to the purpose, and that the Commission's facilities, or scientific or technical resources have the potential of lending significant assistance to other persons in the

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

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

\* \* \* \* \*

## TITLE IX—RESEARCH AND DEVELOPMENT

\* \* \* \* \*

### Subtitle A—Energy Efficiency

\* \* \* \* \*

**[Sec. 912. Next Generation Lighting Initiative.]**

\* \* \* \* \*

**[Sec. 915. Secondary electric vehicle battery use program.]**

\* \* \* \* \*

## Subtitle B—Distributed Energy and Electric Energy Systems

\* \* \* \* \*

**[Sec. 925. Electric transmission and distribution programs.]**

*Sec. 925. Electric transmission and distribution research and development.*

## Subtitle C—Renewable Energy

\* \* \* \* \*

**[Sec. 934. Concentrating solar power research program.**

**[Sec. 935. Renewable energy in public buildings.]**

## Subtitle E—Nuclear Energy

\* \* \* \* \*

[Sec. 953. Advanced fuel cycle initiative.]

*Sec. 953. Fuel cycle research and development.*

\* \* \* \* \*

*Sec. 958. Nuclear energy enabling technologies.*

\* \* \* \* \*

## Subtitle I—Research Administration and Operations

\* \* \* \* \*

**[Sec. 993. Strategy and plan for science and energy facilities and infrastructure.]**

*Sec. 993. Strategy for facilities and infrastructure.*

\* \* \* \* \*

## TITLE IX—RESEARCH AND DEVELOPMENT

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### Subtitle A—Energy Efficiency

#### SEC. 911. ENERGY EFFICIENCY.

##### (a) IN GENERAL.—

(1) OBJECTIVES.—The Secretary shall conduct programs of energy efficiency research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall take into consideration the following objectives:

(A) Increasing the energy efficiency of vehicles, buildings, and industrial processes.

(B) Reducing the demand of the United States for energy, especially energy from foreign sources.

(C) Reducing the cost of energy and making the economy more efficient and competitive.

(D) Improving the energy security of the United States.

(E) Reducing the environmental impact of energy-related activities.

(2) PROGRAMS.—Programs under this subtitle shall include research, development, demonstration, and commercial application of—

(A) advanced, cost-effective technologies to improve the energy efficiency and environmental performance of vehicles, including—

(i) hybrid and electric propulsion systems;

(ii) plug-in hybrid systems;

(iii) advanced combustion engines;

(iv) weight and drag reduction technologies;

(v) whole-vehicle design optimization; and

(vi) advanced drive trains;

(B) cost-effective technologies, for new construction and retrofit, to improve the energy efficiency and environmental performance of buildings, using a whole-buildings approach, including onsite renewable energy generation;

(C) advanced technologies to improve the energy efficiency, environmental performance, and process efficiency of energy-intensive and waste-intensive industries;

(D) advanced control devices to improve the energy efficiency of electric motors, including those used in industrial processes, heating, ventilation, and cooling; and

(E) technologies to improve the energy efficiency of appliances and mechanical systems for buildings in cold climates, including combined heat and power units and increased use of renewable resources, including fuel.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out energy efficiency and conservation research, development, demonstration, and com-

mercial application activities, including activities authorized under this subtitle—

- [(1) \$783,000,000 for fiscal year 2007;
- [(2) \$865,000,000 for fiscal year 2008; and
- [(3) \$952,000,000 for fiscal year 2009.

[(c) ALLOCATIONS.—From amounts authorized under subsection (b), the following sums are authorized:

- [(1) For activities under section 912, \$50,000,000 for each of fiscal years 2007 through 2009.
- [(2) For activities under section 915, \$7,000,000 for each of fiscal years 2007 through 2009.
- [(3) For activities under subsection (a)(2)(A)—
  - [(A) \$200,000,000 for fiscal year 2007;
  - [(B) \$270,000,000 for fiscal year 2008; and
  - [(C) \$310,000,000 for fiscal year 2009.
- [(4) For activities under subsection (a)(2)(D), \$2,000,000 for each of fiscal years 2007 and 2008.

[(d) EXTENDED AUTHORIZATION.—There are authorized to be appropriated to the Secretary to carry out section 912 \$50,000,000 for each of fiscal years 2010 through 2013.

[(e) LIMITATIONS.—None of the funds authorized to be appropriated under this section may be used for—

- [(1) the issuance or implementation of energy efficiency regulations;
- [(2) the weatherization program established under part A of title IV of the Energy Conservation and Production Act (42 U.S.C. 6861 et seq.);
- [(3) a State energy conservation plan established under part D of title III of the Energy Policy and Conservation Act (42 U.S.C. 6321 et seq.); or
- [(4) a Federal energy management measure carried out under part 3 of title V of the National Energy Conservation Policy Act (42 U.S.C. 8251 et seq.).

#### **[SEC. 912. NEXT GENERATION LIGHTING INITIATIVE.**

[(a) DEFINITIONS.—In this section:

- [(1) ADVANCED SOLID-STATE LIGHTING.—The term “advanced solid-state lighting” means a semiconducting device package and delivery system that produces white light using externally applied voltage.
- [(2) INDUSTRY ALLIANCE.—The term “Industry Alliance” means an entity selected by the Secretary under subsection (d).
- [(3) INITIATIVE.—The term “Initiative” means the Next Generation Lighting Initiative carried out under this section.
- [(4) RESEARCH.—The term “research” includes research on the technologies, materials, and manufacturing processes required for white light emitting diodes.
- [(5) WHITE LIGHT EMITTING DIODE.—The term “white light emitting diode” means a semiconducting package, using either organic or inorganic materials, that produces white light using externally applied voltage.

[(b) INITIATIVE.—The Secretary shall carry out a Next Generation Lighting Initiative in accordance with this section to support research, development, demonstration, and commercial application activities related to advanced solid-state lighting technologies based on white light emitting diodes.

[(c) OBJECTIVES.—The objectives of the Initiative shall be to develop advanced solid-state organic and inorganic lighting technologies based on white light emitting diodes that, compared to incandescent and fluorescent lighting technologies, are longer lasting, are more energy-efficient and cost-competitive, and have less environmental impact.

[(d) INDUSTRY ALLIANCE.—Not later than 90 days after the date of enactment of this Act, the Secretary shall competitively select an Industry Alliance to represent participants who are private, for-profit firms, open to large and small businesses, that, as a group, are broadly representative of United States solid-state lighting research, development, infrastructure, and manufacturing expertise as a whole.

[(e) RESEARCH.—

[(1) GRANTS.—The Secretary shall carry out the research activities of the Initiative through competitively awarded grants to—

[(A) researchers, including Industry Alliance participants;

[(B) small businesses;

[(C) National Laboratories; and

[(D) institutions of higher education.

[(2) INDUSTRY ALLIANCE.—The Secretary shall annually solicit from the Industry Alliance—

[(A) comments to identify solid-state lighting technology needs;

[(B) an assessment of the progress of the research activities of the Initiative; and

[(C) assistance in annually updating solid-state lighting technology roadmaps.

[(3) AVAILABILITY TO PUBLIC.—The information and roadmaps under paragraph (2) shall be available to the public.

[(f) DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION.—

[(1) IN GENERAL.—The Secretary shall carry out a development, demonstration, and commercial application program for the Initiative through competitively selected awards.

[(2) PREFERENCE.—In making the awards, the Secretary may give preference to participants in the Industry Alliance.

[(g) COST SHARING.—In carrying out this section, the Secretary shall require cost sharing in accordance with section 988.

[(h) INTELLECTUAL PROPERTY.—The Secretary may require (in accordance with section 202(a)(ii) of title 35, United States Code, section 152 of the Atomic Energy Act of 1954 (42 U.S.C. 2182), and section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908)) that for any new invention developed under subsection (e)—

[(1) that the Industry Alliance participants who are active participants in research, development, and demonstration activities related to the advanced solid-state lighting technologies that are covered by this section shall be granted the first option to negotiate with the invention owner, at least in the field of solid-state lighting, nonexclusive licenses and royalties on terms that are reasonable under the circumstances;

[(2)(A) that, for 1 year after a United States patent is issued for the invention, the patent holder shall not negotiate any license or royalty with any entity that is not a participant in the Industry Alliance described in paragraph (1); and

[(B) that, during the year described in subparagraph (A), the patent holder shall negotiate nonexclusive licenses and royalties in good faith with any interested participant in the Industry Alliance described in paragraph (1); and

[(3) such other terms as the Secretary determines are required to promote accelerated commercialization of inventions made under the Initiative.

[(i) NATIONAL ACADEMY REVIEW.—The Secretary shall enter into an arrangement with the National Academy of Sciences to conduct periodic reviews of the Initiative.]

**SEC. 911. ENERGY EFFICIENCY.**

(a) *OBJECTIVES.*—The Secretary shall conduct programs of energy efficiency research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall prioritize activities that industry by itself is not likely to undertake because of technical challenges or regulatory uncertainty, and take into consideration the following objectives:

(1) *Increasing energy efficiency.*

(2) *Reducing the cost of energy.*

(3) *Reducing the environmental impact of energy-related activities.*

(b) *PROGRAMS.*—Programs under this subtitle shall include research, development, demonstration, and commercial application of—

(1) *innovative, affordable technologies to improve the energy efficiency and environmental performance of vehicles, including weight and drag reduction technologies, technologies, modeling, and simulation for increasing vehicle connectivity and automation, and whole-vehicle design optimization;*

(2) *cost-effective technologies, for new construction and retrofit, to improve the energy efficiency and environmental performance of buildings, using a whole-buildings approach;*

(3) *advanced technologies to improve the energy efficiency, environmental performance, and process efficiency of energy-intensive and waste-intensive industries;*

(4) *technologies to improve the energy efficiency of appliances and mechanical systems for buildings in extreme climates, including cogeneration, trigeneration, and polygeneration units;*

(5) *advanced battery technologies; and*

(6) *fuel cell and hydrogen technologies.*

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**SEC. 914. BUILDING STANDARDS.**

(a) *DEFINITION OF HIGH PERFORMANCE BUILDING.*—In this section, the term “high performance building” means a building that integrates and optimizes all major high-performance building attributes, including energy efficiency, durability, life-cycle performance, and occupant productivity.

(b) *ASSESSMENT.*—Not later than 120 days after the date of enactment of this Act, the Secretary shall enter into an agreement with the National Institute of Building Sciences to—



(1) conduct an assessment (in cooperation with industry, standards development organizations, and other entities, as appropriate) of whether the current voluntary consensus standards and rating systems for high performance buildings are consistent with the current technological state of the art, including relevant results from the research, development and demonstration activities of the Department;

(2) determine if additional research is required, based on the findings of the assessment; and

(3) recommend steps for the Secretary to accelerate the development of voluntary consensus-based standards for high performance buildings that are based on the findings of the assessment.

[(c) GRANT AND TECHNICAL ASSISTANCE PROGRAM.—Consistent with subsection (b) and section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note), the Secretary shall establish a grant and technical assistance program to support the development of voluntary consensus-based standards for high performance buildings.]

**[SEC. 915. SECONDARY ELECTRIC VEHICLE BATTERY USE PROGRAM.]**

[(a) DEFINITIONS.—In this section:

[(1) BATTERY.—The term “battery” means an energy storage device that previously has been used to provide motive power in a vehicle powered in whole or in part by electricity.

[(2) ASSOCIATED EQUIPMENT.—The term “associated equipment” means equipment located where the batteries will be used that is necessary to enable the use of the energy stored in the batteries.

[(b) PROGRAM.—

[(1) IN GENERAL.—The Secretary shall establish and conduct a program of research, development, demonstration, and commercial application of energy technology for the secondary use of batteries, if the Secretary finds that there are sufficient numbers of batteries to support the program.

[(2) ADMINISTRATION.—The program shall be—

[(A) designed to demonstrate the use of batteries in secondary applications, including utility and commercial power storage and power quality;

[(B) structured to evaluate the performance, including useful service life and costs, of such batteries in field operations, and the necessary supporting infrastructure, including reuse and disposal of batteries; and

[(C) coordinated with ongoing secondary battery use programs at the National Laboratories and in industry.

[(c) SOLICITATION.—

[(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary shall solicit proposals to demonstrate the secondary use of batteries and associated equipment and supporting infrastructure in geographic locations throughout the United States.

[(2) ADDITIONAL SOLICITATIONS.—The Secretary may make additional solicitations for proposals if the Secretary determines that the solicitations are necessary to carry out this section.

[(d) SELECTION OF PROPOSALS.—

[(1) IN GENERAL.—Not later than 90 days after the closing date established by the Secretary for receipt of proposals under subsection (c), the Secretary shall select up to five proposals that may receive financial assistance under this section once the Department receives appropriated funds to carry out this section.

[(2) FACTORS.—In selecting proposals, the Secretary shall consider—

[(A) the diversity of battery type;

[(B) geographic and climatic diversity; and

[(C) life-cycle environmental effects of the approaches.

[(3) LIMITATION.—No one project selected under this section shall receive more than 25 percent of the funds made available to carry out the program under this section.

[(4) NON-FEDERAL INVOLVEMENT.—In selecting proposals, the Secretary shall consider the extent of involvement of State or local government and other persons in each demonstration project to optimize use of Federal resources.

[(5) OTHER CRITERIA.—In selecting proposals, the Secretary may consider such other criteria as the Secretary considers appropriate.

[(e) CONDITIONS.—In carrying out this section, the Secretary shall require that—

[(1) relevant information be provided to—

[(A) the Department;

[(B) the users of the batteries;

[(C) the proposers of a project under this section; and

[(D) the battery manufacturers; and

[(2) the costs of carrying out projects and activities under this section are shared in accordance with section 988.]

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#### **SEC. 917. ADVANCED ENERGY TECHNOLOGY TRANSFER CENTERS.**

(a) GRANTS.—Not later than 18 months after the date of enactment of the National Forests, Parks, Public Land, and Reclamation Projects Authorization Act of 2008, the Secretary shall make grants to nonprofit institutions, State and local governments, cooperative extension services, or institutions of higher education (or consortia thereof), to establish a geographically dispersed network of Advanced Energy Technology Transfer Centers, to be located in areas the Secretary determines have the greatest need of the services of such Centers. In making awards under this section, the Secretary shall—

(1) give priority to applicants already operating or partnered with an outreach program capable of transferring knowledge and information about advanced energy efficiency methods and technologies;

(2) ensure that, to the extent practicable, the program enables the transfer of knowledge and information—

(A) about a variety of technologies; and

(B) in a variety of geographic areas; and

(3) give preference to applicants that would significantly expand on or fill a gap in existing programs in a geographical region; and

[(4) consider the special needs and opportunities for increased energy efficiency for manufactured and site-built housing, including construction, renovation, and retrofit.]

(b) ACTIVITIES.—Each Center shall operate a program to encourage demonstration and commercial application of advanced energy methods and technologies through education and outreach to building and industrial professionals, and to other individuals and organizations with an interest in efficient energy use. Funds awarded under this section may be used for the following activities:

[(1) Developing and distributing informational materials on technologies that could use energy more efficiently.]

[(2)] (1) Carrying out demonstrations of advanced energy methods and technologies.

[(3)] (2) Developing and conducting seminars, workshops, long-distance learning sessions, and other activities to aid in the dissemination of knowledge and information on technologies that could use energy more efficiently.

[(4)] (3) Providing or coordinating onsite energy evaluations, including instruction on the commissioning of building heating and cooling systems, for a wide range of energy end-users.

[(5)] (4) Examining the energy efficiency needs of energy end-users to develop recommended research projects for the Department.

[(6) Hiring experts in energy efficient technologies to carry out activities described in paragraphs (1) through (5).]

(c) APPLICATION.—A person seeking a grant under this section shall submit to the Secretary an application in such form and containing such information as the Secretary may require. The Secretary may award a grant under this section to an entity already in existence if the entity is otherwise eligible under this section. The application shall include, at a minimum—

(1) a description of the applicant's outreach program, and the geographic region it would serve, and of why the program would be capable of transferring knowledge and information about advanced energy technologies that increase efficiency of energy use;

(2) a description of the activities the applicant would carry out, of the technologies that would be transferred, and of any other organizations that will help facilitate a regional approach to carrying out those activities;

(3) a description of how the proposed activities would be appropriate to the specific energy needs of the geographic region to be served;

(4) an estimate of the number and types of energy end-users expected to be reached through such activities; and

(5) a description of how the applicant will assess the success of the program.

(d) SELECTION CRITERIA.—The Secretary shall award grants under this section on the basis of the following criteria, at a minimum:

(1) The ability of the applicant to carry out the proposed activities.

(2) The extent to which the applicant will coordinate the activities of the Center with other entities as appropriate, such

as State and local governments, utilities, institutions of higher education, and National Laboratories.

(3) The appropriateness of the applicant's outreach program for carrying out the program described in this section.

(4) The likelihood that proposed activities could be expanded or used as a model for other areas.

(e) COST-SHARING.—In carrying out this section, the Secretary shall require cost-sharing in accordance with the requirements of section 988 for commercial application activities.

(f) DURATION.—

(1) INITIAL GRANT PERIOD.—A grant awarded under this section shall be for a period of 5 years.

(2) INITIAL EVALUATION.—Each grantee under this section shall be evaluated during its third year of operation under procedures established by the Secretary to determine if the grantee is accomplishing the purposes of this section described in subsection (a). The Secretary shall terminate any grant that does not receive a positive evaluation. If an evaluation is positive, the Secretary may extend the grant for 3 additional years beyond the original term of the grant.

(3) ADDITIONAL EXTENSION.—If a grantee receives an extension under paragraph (2), the grantee shall be evaluated again during the second year of the extension. The Secretary shall terminate any grant that does not receive a positive evaluation. If an evaluation is positive, the Secretary may extend the grant for a final additional period of 3 additional years beyond the original extension.

(4) LIMITATION.—No grantee may receive more than 11 years of support under this section without reapplying for support and competing against all other applicants seeking a grant at that time.

[(g) PROHIBITION.—None of the funds awarded under this section may be used for the construction of facilities.]

(g) *PROHIBITION.—None of the funds awarded under this section may be used for the construction of facilities or the deployment of commercially available technologies.*

(h) DEFINITIONS.—For purposes of this section:

(1) ADVANCED ENERGY METHODS AND TECHNOLOGIES.—The term “advanced energy methods and technologies” means all methods and technologies that promote energy efficiency and conservation, including distributed generation technologies, and life-cycle analysis of energy use.

(2) CENTER.—The term “Center” means an Advanced Energy Technology Transfer Center established pursuant to this section.

(3) DISTRIBUTED GENERATION.—The term “distributed generation” means an electric power generation technology, including photovoltaic, small wind, and micro-combined heat and power, that serves electric consumers at or near the site of production.

(4) COOPERATIVE EXTENSION.—The term “Cooperative Extension” means the extension services established at the land-grant colleges and universities under the Smith-Lever Act of May 8, 1914.

(5) LAND-GRANT COLLEGES AND UNIVERSITIES.—The term “land-grant colleges and universities” means—

(A) 1862 Institutions (as defined in section 2 of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7601));

(B) 1890 Institutions (as defined in section 2 of that Act); and

(C) 1994 Institutions (as defined in section 2 of that Act).

[(i) AUTHORIZATION OF APPROPRIATIONS.—In addition to amounts otherwise authorized to be appropriated in section 911, there are authorized to be appropriated for the program under this section such sums as may be appropriated.]

## **Subtitle B—Distributed Energy and Electric Energy Systems**

### **[SEC. 921. DISTRIBUTED ENERGY AND ELECTRIC ENERGY SYSTEMS.**

[(a) IN GENERAL.—The Secretary shall carry out programs of research, development, demonstration, and commercial application on distributed energy resources and systems reliability and efficiency, to improve the reliability and efficiency of distributed energy resources and systems, integrating advanced energy technologies with grid connectivity, including activities described in this subtitle. The programs shall address advanced energy technologies and systems and advanced grid reliability technologies.

[(b) AUTHORIZATION OF APPROPRIATIONS.—

[(1) DISTRIBUTED ENERGY AND ELECTRIC ENERGY SYSTEMS ACTIVITIES.—There are authorized to be appropriated to the Secretary to carry out distributed energy and electric energy systems activities, including activities authorized under this subtitle—

[(A) \$240,000,000 for fiscal year 2007;

[(B) \$255,000,000 for fiscal year 2008; and

[(C) \$273,000,000 for fiscal year 2009.

[(2) POWER DELIVERY RESEARCH INITIATIVE.—There are authorized to be appropriated to the Secretary to carry out the Power Delivery Research Initiative under subsection 925(e) such sums as may be necessary for each of fiscal years 2007 through 2009.

[(c) MICRO-COGENERATION ENERGY TECHNOLOGY.—From amounts authorized under subsection (b), \$20,000,000 for each of fiscal years 2007 and 2008 shall be available to carry out activities under section 923.

[(d) HIGH-VOLTAGE TRANSMISSION LINES.—From amounts authorized under subsection (b), \$2,000,000 for fiscal year 2007 shall be available to carry out activities under section 925(g).]

### **SEC. 921. DISTRIBUTED ENERGY AND ELECTRIC ENERGY SYSTEMS.**

(a) *IN GENERAL.*—The Secretary shall carry out programs of research, development, demonstration, and commercial application on distributed energy resources and systems reliability and efficiency, to improve the reliability and efficiency of distributed energy resources and systems, integrating advanced energy technologies with grid connectivity, including activities described in this subtitle. The

*programs shall address advanced energy technologies and systems and advanced grid security, resiliency, and reliability technologies.*

*(b) OBJECTIVES.—To the maximum extent practicable, the Secretary shall seek to—*

- (1) leverage existing programs;*
- (2) consolidate and coordinate activities throughout the Department to promote collaboration and crosscutting approaches;*
- (3) ensure activities are undertaken in a manner that does not duplicate other activities within the Department or other Federal Government activities; and*
- (4) identify programs that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.*

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**SEC. 925. [ELECTRIC TRANSMISSION AND DISTRIBUTION PROGRAMS.]  
ELECTRIC TRANSMISSION AND DISTRIBUTION RESEARCH  
AND DEVELOPMENT.**

**[(a) PROGRAM.—The Secretary shall establish a comprehensive research, development, and demonstration program to ensure the reliability, efficiency, and environmental integrity of electrical transmission and distribution systems, which shall include—**

**[(1) advanced energy delivery technologies, energy storage technologies, materials, and systems, giving priority to new transmission technologies, including composite conductor materials and other technologies that enhance reliability, operational flexibility, or power-carrying capability;**

**[(2) advanced grid reliability and efficiency technology development;**

**[(3) technologies contributing to significant load reductions;**

**[(4) advanced metering, load management, and control technologies;**

**[(5) technologies to enhance existing grid components;**

**[(6) the development and use of high-temperature superconductors to—**

**[(A) enhance the reliability, operational flexibility, or power-carrying capability of electric transmission or distribution systems; or**

**[(B) increase the efficiency of electric energy generation, transmission, distribution, or storage systems;**

**[(7) integration of power systems, including systems to deliver high-quality electric power, electric power reliability, and combined heat and power;**

**[(8) supply of electricity to the power grid by small scale, distributed and residential-based power generators;**

**[(9) the development and use of advanced grid design, operation, and planning tools;**

**[(10) any other infrastructure technologies, as appropriate; and**

**[(11) technology transfer and education.]**

*(a) PROGRAM.—The Secretary shall establish a comprehensive research, development, and demonstration program to ensure the reliability, efficiency, and environmental integrity of electrical transmission and distribution systems, which shall include innovations for—*

(1) *advanced energy delivery technologies, energy storage technologies, materials, and systems;*

(2) *advanced grid reliability and efficiency technology development;*

(3) *technologies contributing to significant load reductions;*

(4) *advanced metering, load management, and control technologies;*

(5) *technologies to enhance existing grid components;*

(6) *the development and use of high-temperature superconductors to—*

(A) *enhance the reliability, operational flexibility, or power-carrying capability of electric transmission or distribution systems; or*

(B) *increase the efficiency of electric energy generation, transmission, distribution, or storage systems;*

(7) *integration of power systems, including systems to deliver high-quality electric power, electric power reliability, and combined heat and power;*

(8) *supply of electricity to the power grid by small scale, distributed, and residential-based power generators;*

(9) *the development and use of advanced grid design, operation, and planning tools; and*

(10) *any other infrastructure technologies, as appropriate.*

(b) **PROGRAM PLAN.**—

(1) **IN GENERAL.**—Not later than 1 year after the date of enactment of this Act, the Secretary, in consultation with other appropriate Federal agencies, shall prepare and submit to Congress a 5-year program plan to guide activities under this section.

(2) **CONSULTATION.**—In preparing the program plan, the Secretary shall consult with—

(A) utilities;

(B) energy service providers;

(C) manufacturers;

(D) institutions of higher education;

(E) other appropriate State and local agencies;

(F) environmental organizations;

(G) professional and technical societies; and

(H) any other persons the Secretary considers appropriate.

[(c) **IMPLEMENTATION.**—The Secretary shall consider implementing the program under this section using a consortium of participants from industry, institutions of higher education, and National Laboratories.]

(c) **IMPLEMENTATION.**—

(1) **CONSORTIUM.**—*The Secretary shall consider implementing the program under this section using a consortium of participants from industry, institutions of higher education, and National Laboratories.*

(2) **OBJECTIVES.**—*To the maximum extent practicable the Secretary shall seek to—*

(A) *leverage existing programs;*

(B) *consolidate and coordinate activities, throughout the Department to promote collaboration and crosscutting approaches;*

(C) *ensure activities are undertaken in a manner that does not duplicate other activities within the Department or other Federal Government activities; and*

(D) *identify programs that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.*

(d) REPORT.—Not later than 2 years after the submission of the plan under subsection (b), the Secretary shall submit to Congress a report—

(1) describing the progress made under this section; and

(2) identifying any additional resources needed to continue the development and commercial application of transmission and distribution of infrastructure technologies.

(e) POWER DELIVERY RESEARCH INITIATIVE.—

(1) IN GENERAL.—The Secretary shall establish a research, development, and demonstration initiative specifically focused on power delivery using components incorporating high temperature superconductivity.

(2) GOALS.—The goals of the Initiative shall be—

(A) to establish world-class facilities to develop high temperature superconductivity power applications in partnership with manufacturers and utilities;

(B) to provide technical leadership for establishing reliability for high temperature superconductivity power applications, including suitable modeling and analysis;

(C) to facilitate the commercial transition toward direct current power transmission, storage, and use for high power systems using high temperature superconductivity; and

(D) to facilitate the integration of very low impedance high temperature superconducting wires and cables in existing electric networks to improve system performance, power flow control, and reliability.

(3) INCLUSIONS.—The Initiative shall include—

(A) feasibility analysis, planning, research, and design to construct demonstrations of superconducting links in high power, direct current, and controllable alternating current transmission systems;

(B) public-private partnerships to demonstrate deployment of high temperature superconducting cable into testbeds simulating a realistic transmission grid and under varying transmission conditions, including actual grid insertions; and

(C) testbeds developed in cooperation with National Laboratories, industries, and institutions of higher education to—

(i) demonstrate those technologies;

(ii) prepare the technologies for commercial introduction; and

(iii) address cost or performance roadblocks to successful commercial use.

(f) TRANSMISSION AND DISTRIBUTION GRID PLANNING AND OPERATIONS INITIATIVE.—

(1) IN GENERAL.—The Secretary shall establish a research, development, and demonstration initiative specifically focused



on tools needed to plan, operate, and expand the transmission and distribution grids in the presence of competitive market mechanisms for energy, load demand, customer response, and ancillary services.

(2) GOALS.—The goals of the Initiative shall be—

(A)(i) to develop and use a geographically distributed center, consisting of institutions of higher education, and National Laboratories, with expertise and facilities to develop the underlying theory and software for power system application; and

(ii) to ensure commercial development in partnership with software vendors and utilities;

(B) to provide technical leadership in engineering and economic analysis for the reliability and efficiency of power systems planning and operations in the presence of competitive markets for electricity;

(C) to model, simulate, and experiment with new market mechanisms and operating practices to understand and optimize those new methods before actual use; and

(D) to provide technical support and technology transfer to electric utilities and other participants in the domestic electric industry and marketplace.

(g) HIGH-VOLTAGE TRANSMISSION LINES.—As part of the program described in subsection (a), the Secretary shall award a grant to a university research program to design and test, in consultation with the Tennessee Valley Authority, state-of-the-art optimization techniques for power flow through existing high voltage transmission lines.

## Subtitle C—Renewable Energy

### [SEC. 931. RENEWABLE ENERGY.

[(a) IN GENERAL.—

[(1) OBJECTIVES.—The Secretary shall conduct programs of renewable energy research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall take into consideration the following objectives:

[(A) Increasing the conversion efficiency of all forms of renewable energy through improved technologies.

[(B) Decreasing the cost of renewable energy generation and delivery.

[(C) Promoting the diversity of the energy supply.

[(D) Decreasing the dependence of the United States on foreign energy supplies.

[(E) Improving United States energy security.

[(F) Decreasing the environmental impact of energy-related activities.

[(G) Increasing the export of renewable generation equipment from the United States.

[(2) PROGRAMS.—

[(A) SOLAR ENERGY.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for solar energy, including—

- [(i) photovoltaics;
- [(ii) solar hot water and solar space heating;
- [(iii) concentrating solar power;
- [(iv) lighting systems that integrate sunlight and electrical lighting in complement to each other in common lighting fixtures for the purpose of improving energy efficiency;
- [(v) manufacturability of low cost, high quality solar systems; and
- [(vi) development of products that can be easily integrated into new and existing buildings.

[(B) WIND ENERGY.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for wind energy, including—

- [(i) low speed wind energy;
- [(ii) offshore wind energy;
- [(iii) testing and verification (including construction and operation of a research and testing facility capable of testing wind turbines); and
- [(iv) distributed wind energy generation.

[(C) GEOTHERMAL.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for geothermal energy. The program shall focus on developing improved technologies for reducing the costs of geothermal energy installations, including technologies for—

- [(i) improving detection of geothermal resources;
- [(ii) decreasing drilling costs;
- [(iii) decreasing maintenance costs through improved materials;
- [(iv) increasing the potential for other revenue sources, such as mineral production; and
- [(v) increasing the understanding of reservoir life cycle and management.

[(D) HYDROPOWER.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for cost competitive technologies that enable the development of new and incremental hydropower capacity, adding to the diversity of the energy supply of the United States, including:

- [(i) Fish-friendly large turbines.
- [(ii) Advanced technologies to enhance environmental performance and yield greater energy efficiencies.

[(E) MISCELLANEOUS PROJECTS.—The Secretary shall conduct research, development, demonstration, and commercial application programs for—

- [(i) ocean energy, including wave energy;
- [(ii) the combined use of renewable energy technologies with one another and with other energy technologies, including the combined use of wind power and coal gasification technologies;
- [(iii) renewable energy technologies for cogeneration of hydrogen and electricity; and
- [(iv) kinetic hydro turbines.

[(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out renewable energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle—

- [(1) \$632,000,000 for fiscal year 2007;
- [(2) \$743,000,000 for fiscal year 2008;
- [(3) \$852,000,000 for fiscal year 2009; and
- [(4) \$963,000,000 for fiscal year 2010.

[(c) BIOENERGY.—From the amounts authorized under subsection (b), there are authorized to be appropriated to carry out section 932—

- [(1) \$213,000,000 for fiscal year 2007, of which \$100,000,000 shall be for section 932(d);
- [(2) \$377,000,000 for fiscal year 2008, of which \$125,000,000 shall be for section 932(d);
- [(3) \$398,000,000 for fiscal year 2009, of which \$150,000,000 shall be for section 932(d); and
- [(4) \$419,000,000 for fiscal year 2010, of which \$150,000,000 shall be for section 932(d).

[(d) SOLAR POWER.—From amounts authorized under subsection (b), there is authorized to be appropriated to carry out activities under subsection (a)(2)(A)—

- [(1) \$140,000,000 for fiscal year 2007, of which \$40,000,000 shall be for activities under section 935;
- [(2) \$200,000,000 for fiscal year 2008, of which \$50,000,000 shall be for activities under section 935; and
- [(3) \$250,000,000 for fiscal year 2009, of which \$50,000,000 shall be for activities under section 935.

[(e) ADMINISTRATION.—Of the funds authorized under subsection (c), not less than \$5,000,000 for each fiscal year shall be made available for grants to—

- [(1) part B institutions;
- [(2) Tribal Colleges or Universities (as defined in section 316(b) of the Higher Education Act of 1965 (20 U.S.C. 1059c(b))); and
- [(3) Hispanic-serving institutions.

[(f) RURAL DEMONSTRATION PROJECTS.—In carrying out this section, the Secretary, in consultation with the Secretary of Agriculture, shall demonstrate the use of renewable energy technologies to assist in delivering electricity to rural and remote locations including —

- [(1) advanced wind power technology, including combined use with coal gasification;
- [(2) biomass; and
- [(3) geothermal energy systems.

[(g) ANALYSIS AND EVALUATION.—

[(1) IN GENERAL.—The Secretary shall conduct analysis and evaluation in support of the renewable energy programs under this subtitle. These activities shall be used to guide budget and program decisions, and shall include—

- [(A) economic and technical analysis of renewable energy potential, including resource assessment;
- [(B) analysis of past program performance, both in terms of technical advances and in market introduction of renewable energy; and

[(C) any other analysis or evaluation that the Secretary considers appropriate.

[(2) FUNDING.—The Secretary may designate up to 1 percent of the funds appropriated for carrying out this subtitle for analysis and evaluation activities under this subsection.

**[SEC. 932. BIOENERGY PROGRAM.**

[(a) DEFINITIONS.—In this section:

[(1) BIOMASS.—The term “biomass” means—

[(A) any organic material grown for the purpose of being converted to energy;

[(B) any organic byproduct of agriculture (including wastes from food production and processing) that can be converted into energy; or

[(C) any waste material that can be converted to energy, is segregated from other waste materials, and is derived from—

[(i) any of the following forest-related resources: mill residues, precommercial thinnings, slash, brush, or otherwise nonmerchantable material; or

[(ii) wood waste materials, including waste pallets, crates, dunnage, manufacturing and construction wood wastes (other than pressure-treated, chemically-treated, or painted wood wastes), and landscape or right-of-way tree trimmings, but not including municipal solid waste, gas derived from the biodegradation of municipal solid waste, or paper that is commonly recycled.

[(2) LIGNOCELLULOSIC FEEDSTOCK.—The term “lignocellulosic feedstock” means any portion of a plant or coproduct from conversion, including crops, trees, forest residues, and agricultural residues not specifically grown for food, including from barley grain, rapeseed, rice bran, rice hulls, rice straw, soybean matter, and sugarcane bagasse.

[(b) PROGRAM.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for bioenergy, including—

[(1) biopower energy systems;

[(2) biofuels;

[(3) bioproducts;

[(4) integrated biorefineries that may produce biopower, biofuels, and bioproducts;

[(5) cross-cutting research and development in feedstocks; and

[(6) economic analysis.

[(c) BIOFUELS AND BIOPRODUCTS.—The goals of the biofuels and bioproducts programs shall be to develop, in partnership with industry and institutions of higher education—

[(1) advanced biochemical and thermochemical conversion technologies capable of making fuels from lignocellulosic feedstocks that are price-competitive with gasoline or diesel in either internal combustion engines or fuel cell-powered vehicles;

[(2) advanced biotechnology processes capable of making biofuels and bioproducts with emphasis on development of biorefinery technologies using enzyme-based processing systems;

[(3) advanced biotechnology processes capable of increasing energy production from lignocellulosic feedstocks, with empha-

sis on reducing the dependence of industry on fossil fuels in manufacturing facilities; and

[(4) other advanced processes that will enable the development of cost-effective bioproducts, including biofuels.

**[(d) INTEGRATED BIOREFINERY DEMONSTRATION PROJECTS.—**

[(1) IN GENERAL.—The Secretary shall carry out a program to demonstrate the commercial application of integrated biorefineries. The Secretary shall ensure geographical distribution of biorefinery demonstrations under this subsection. The Secretary shall not provide more than \$100,000,000 under this subsection for any single biorefinery demonstration. In making awards under this subsection, the Secretary shall encourage—

[(A) the demonstration of a wide variety of lignocellulosic feedstocks;

[(B) the commercial application of biomass technologies for a variety of uses, including—

[(i) liquid transportation fuels;

[(ii) high-value biobased chemicals;

[(iii) substitutes for petroleum-based feedstocks and products; and

[(iv) energy in the form of electricity or useful heat; and

[(C) the demonstration of the collection and treatment of a variety of biomass feedstocks.

[(2) PROPOSALS.—Not later than 6 months after the date of enactment of this Act, the Secretary shall solicit proposals for demonstration of advanced biorefineries. The Secretary shall select only proposals that—

[(A) demonstrate that the project will be able to operate profitably without direct Federal subsidy after initial construction costs are paid; and

[(B) enable the biorefinery to be easily replicated.

**[(e) UNIVERSITY BIODIESEL PROGRAM.—**The Secretary shall establish a demonstration program to determine the feasibility of the operation of diesel electric power generators, using biodiesel fuels with ratings as high as B100, at electric generation facilities owned by institutions of higher education. The program shall examine—

[(1) heat rates of diesel fuels with large quantities of cellulosic content;

[(2) the reliability of operation of various fuel blends;

[(3) performance in cold or freezing weather;

[(4) stability of fuel after extended storage; and

[(5) other criteria, as determined by the Secretary.

**[(g) BIOREFINERY ENERGY EFFICIENCY.—**The Secretary shall establish a program of research, development, demonstration, and commercial application for increasing energy efficiency and reducing energy consumption in the operation of biorefinery facilities.

**[(h) RETROFIT TECHNOLOGIES FOR THE DEVELOPMENT OF ETHANOL FROM CELLULOSIC MATERIALS.—**The Secretary shall establish a program of research, development, demonstration, and commercial application on technologies and processes to enable biorefineries that exclusively use corn grain or corn starch as a feedstock to produce ethanol to be retrofitted to accept a range of biomass, including lignocellulosic feedstocks.]

**SEC. 931. RENEWABLE ENERGY.****(a) IN GENERAL.—**

(1) **OBJECTIVES.**—*The Secretary shall conduct programs of renewable energy research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall prioritize discovery research and development and take into consideration the following objectives:*

(A) *Increasing the conversion efficiency of all forms of renewable energy through improved technologies.*

(B) *Decreasing the cost of renewable energy generation and delivery.*

(C) *Promoting the diversity of the energy supply.*

(D) *Decreasing the dependence of the United States on foreign mineral resources.*

(E) *Decreasing the environmental impact of renewable energy-related activities.*

(F) *Increasing the export of renewable generation technologies from the United States.*

**(2) PROGRAMS.—**

(A) **SOLAR ENERGY.**—*The Secretary shall conduct a program of research, development, demonstration, and commercial application for solar energy, including innovations in—*

- (i) *photovoltaics;*
- (ii) *solar heating;*
- (iii) *concentrating solar power;*
- (iv) *lighting systems that integrate sunlight and electrical lighting in complement to each other; and*
- (v) *development of technologies that can be easily integrated into new and existing buildings.*

(B) **WIND ENERGY.**—*The Secretary shall conduct a program of research, development, demonstration, and commercial application for wind energy, including innovations in—*

- (i) *low speed wind energy;*
- (ii) *testing and verification technologies;*
- (iii) *distributed wind energy generation; and*
- (iv) *transformational technologies for harnessing wind energy.*

(C) **GEOTHERMAL.**—*The Secretary shall conduct a program of research, development, demonstration, and commercial application for geothermal energy, including technologies for—*

- (i) *improving detection of geothermal resources;*
- (ii) *decreasing drilling costs;*
- (iii) *decreasing maintenance costs through improved materials;*
- (iv) *increasing the potential for other revenue sources, such as mineral production; and*
- (v) *increasing the understanding of reservoir life cycle and management.*

(D) **HYDROPOWER.**—*The Secretary shall conduct a program of research, development, demonstration, and commercial application for technologies that enable the devel-*

opment of new and incremental hydropower capacity, including:

- (i) Advanced technologies to enhance environmental performance and yield greater energy efficiencies.
- (ii) Ocean energy, including wave energy.

(E) MISCELLANEOUS PROJECTS.—The Secretary shall conduct research, development, demonstration, and commercial application programs for—

- (i) the combined use of renewable energy technologies with one another and with other energy technologies, including the combined use of renewable power and fossil technologies;
- (ii) renewable energy technologies for cogeneration of hydrogen and electricity; and
- (iii) kinetic hydro turbines.

(b) RURAL DEMONSTRATION PROJECTS.—In carrying out this section, the Secretary, in consultation with the Secretary of Agriculture, shall give priority to demonstrations that assist in delivering electricity to rural and remote locations including—

- (1) advanced renewable power technology, including combined use with fossil technologies;
- (2) biomass; and
- (3) geothermal energy systems.

(c) ANALYSIS AND EVALUATION.—

(1) IN GENERAL.—The Secretary shall conduct analysis and evaluation in support of the renewable energy programs under this subtitle. These activities shall be used to guide budget and program decisions, and shall include—

(A) economic and technical analysis of renewable energy potential, including resource assessment;

(B) analysis of past program performance, both in terms of technical advances and in market introduction of renewable energy;

(C) assessment of domestic and international market drivers, including the impacts of any Federal, State, or local grants, loans, loan guarantees, tax incentives, statutory or regulatory requirements, or other government initiatives; and

(D) any other analysis or evaluation that the Secretary considers appropriate.

(2) FUNDING.—The Secretary may designate up to 1 percent of the funds appropriated for carrying out this subtitle for analysis and evaluation activities under this subsection.

(3) SUBMITTAL TO CONGRESS.—This analysis and evaluation shall be submitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate at least 30 days before each annual budget request is submitted to Congress.

#### **SEC. 932. BIOENERGY PROGRAM.**

(a) PROGRAM.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for bioenergy, including innovations in—

- (1) biopower energy systems;
- (2) biofuels;
- (3) bioproducts;

(4) *integrated biorefineries that may produce biopower, biofuels, and bioproducts; and*

(5) *cross-cutting research and development in feedstocks.*

(b) **BIOFUELS AND BIOPRODUCTS.**—*The goals of the biofuels and bioproducts programs shall be to develop, in partnership with industry and institutions of higher education—*

(1) *advanced biochemical and thermochemical conversion technologies capable of making fuels from lignocellulosic feedstocks that are price-competitive with fossil-based fuels and fully compatible with either internal combustion engines or fuel cell-powered vehicles;*

(2) *advanced conversion of biomass to biofuels and bioproducts as part of integrated biorefineries based on either biochemical processes, thermochemical processes, or hybrids of these processes; and*

(3) *other advanced processes that will enable the development of cost-effective bioproducts, including biofuels.*

(c) **RETROFIT TECHNOLOGIES FOR THE DEVELOPMENT OF ETHANOL FROM CELLULOSIC MATERIALS.**—*The Secretary shall establish a program of research, development, demonstration, and commercial application for technologies and processes to enable biorefineries that exclusively use corn grain or corn starch as a feedstock to produce ethanol to be retrofitted to accept a range of biomass, including lignocellulosic feedstocks.*

(d) **LIMITATIONS.**—*None of the funds authorized for carrying out this section may be used to fund commercial biofuels production for defense purposes.*

(e) **DEFINITIONS.**—*In this section:*

(1) **BIOMASS.**—*The term “biomass” means—*

(A) *any organic material grown for the purpose of being converted to energy;*

(B) *any organic byproduct of agriculture (including wastes from food production and processing) that can be converted into energy; or*

(C) *any waste material that can be converted to energy, is segregated from other waste materials, and is derived from—*

(i) *any of the following forest-related resources: mill residues, precommercial thinnings, slash, brush, or otherwise nonmerchandise material;*

(ii) *wood waste materials, including waste pallets, crates, dunnage, manufacturing and construction wood wastes (other than pressure-treated, chemically treated, or painted wood wastes), and landscape or right-of-way tree trimmings, but not including municipal solid waste, gas derived from the biodegradation of municipal solid waste, or paper that is commonly recycled; or*

(iii) *solids derived from waste water treatment processes.*

(2) **LIGNOCELLULOSIC FEEDSTOCK.**—*The term “lignocellulosic feedstock” means any portion of a plant or coproduct from conversion, including crops, trees, forest residues, grasses, and agricultural residues not specifically grown for food, including*



*from barley grain, grapeseed, rice bran, rice hulls, rice straw, soybean matter, cornstover, and sugarcane bagasse.*

\* \* \* \* \*

**[SEC. 934. CONCENTRATING SOLAR POWER RESEARCH PROGRAM.]**

[(a) IN GENERAL.—The Secretary shall conduct a program of research and development to evaluate the potential for concentrating solar power for hydrogen production, including cogeneration approaches for both hydrogen and electricity.

[(b) ADMINISTRATION.—The program shall take advantage of existing facilities to the extent practicable and shall include—

[(1) development of optimized technologies that are common to both electricity and hydrogen production;

[(2) evaluation of thermochemical cycles for hydrogen production at the temperatures attainable with concentrating solar power;

[(3) evaluation of materials issues for the thermochemical cycles described in paragraph (2);

[(4) cogeneration of solar thermal electric power and photo-synthetic-based hydrogen production;

[(5) system architectures and economics studies; and

[(6) coordination with activities under the Next Generation Nuclear Plant Project established under subtitle C of title VI on high temperature materials, thermochemical cycles, and economic issues.

[(c) ASSESSMENT.—In carrying out the program under this section, the Secretary shall—

[(1) assess conflicting guidance on the economic potential of concentrating solar power for electricity production received from the National Research Council in the report entitled “Renewable Power Pathways: A Review of the U.S. Department of Energy’s Renewable Energy Programs” and dated 2000 and subsequent reviews of that report funded by the Department; and

[(2) provide an assessment of the potential impact of technology used to concentrate solar power for electricity before, or concurrent with, submission of the budget for fiscal year 2008.

[(d) REPORT.—Not later than 5 years after the date of enactment of this Act, the Secretary shall provide to Congress a report on the economic and technical potential for electricity or hydrogen production, with or without cogeneration, with concentrating solar power, including the economic and technical feasibility of potential construction of a pilot demonstration facility suitable for commercial production of electricity or hydrogen from concentrating solar power.

**[SEC. 935. RENEWABLE ENERGY IN PUBLIC BUILDINGS.]**

[(a) DEMONSTRATION AND TECHNOLOGY TRANSFER PROGRAM.—The Secretary shall establish a program for the demonstration of innovative technologies for solar and other renewable energy sources in buildings owned or operated by a State or local government, and for the dissemination of information resulting from such demonstration to interested parties.

[(b) LIMIT ON FEDERAL FUNDING.—Notwithstanding section 988, the Secretary shall provide under this section no more than 40 per-

cent of the incremental costs of the solar or other renewable energy source project funded.

[(c) REQUIREMENTS.—As part of the application for awards under this section, the Secretary shall require all applicants—

[(1) to demonstrate a continuing commitment to the use of solar and other renewable energy sources in buildings they own or operate; and

[(2) to state how they expect any award to further their transition to the significant use of renewable energy.]

\* \* \* \* \*

## Subtitle E—Nuclear Energy

### SEC. 951. NUCLEAR ENERGY.

[(a) IN GENERAL.—The Secretary shall conduct programs of civilian nuclear energy research, development, demonstration, and commercial application, including activities described in this subtitle. Programs under this subtitle shall take into consideration the following objectives:

[(1) Enhancing nuclear power's viability as part of the United States energy portfolio.

[(2) Providing the technical means to reduce the likelihood of nuclear proliferation.

[(3) Maintaining a cadre of nuclear scientists and engineers.

[(4) Maintaining National Laboratory and university nuclear programs, including their infrastructure.

[(5) Supporting both individual researchers and multidisciplinary teams of researchers to pioneer new approaches in nuclear energy, science, and technology.

[(6) Developing, planning, constructing, acquiring, and operating special equipment and facilities for the use of researchers.

[(7) Supporting technology transfer and other appropriate activities to assist the nuclear energy industry, and other users of nuclear science and engineering, including activities addressing reliability, availability, productivity, component aging, safety, and security of nuclear power plants.

[(8) Reducing the environmental impact of nuclear energy-related activities.

[(b) AUTHORIZATION OF APPROPRIATIONS FOR CORE PROGRAMS.—There are authorized to be appropriated to the Secretary to carry out nuclear energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle, other than those described in subsection (c)—

[(1) \$330,000,000 for fiscal year 2007;

[(2) \$355,000,000 for fiscal year 2008; and

[(3) \$495,000,000 for fiscal year 2009.

[(c) NUCLEAR INFRASTRUCTURE AND FACILITIES.—There are authorized to be appropriated to the Secretary to carry out activities under section 955—

[(1) \$135,000,000 for fiscal year 2007;

[(2) \$140,000,000 for fiscal year 2008; and

[(3) \$145,000,000 for fiscal year 2009.

[(d) ALLOCATIONS.—From amounts authorized under subsection (a), the following sums are authorized:

[(1) For activities under section 953—

[(A) \$150,000,000 for fiscal year 2007;

[(B) \$155,000,000 for fiscal year 2008; and

[(C) \$275,000,000 for fiscal year 2009.

[(2) For activities under section 954—

[(A) \$43,600,000 for fiscal year 2007;

[(B) \$50,100,000 for fiscal year 2008; and

[(C) \$56,000,000 for fiscal year 2009.

[(3) For activities under section 957, \$6,000,000 for each of fiscal years 2007 through 2009.]

(a) *IN GENERAL.*—*The Secretary shall conduct programs of civilian nuclear energy research, development, demonstration, and commercial application, including activities described in this subtitle. Such programs shall take into consideration the following objectives:*

(1) *Enhancing nuclear power's viability as part of the United States energy portfolio.*

(2) *Reducing used nuclear fuel and nuclear waste products generated by civilian nuclear energy.*

(3) *Supporting technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty.*

(4) *Providing the technical means to reduce the likelihood of nuclear proliferation.*

(5) *Maintaining a cadre of nuclear scientists and engineers.*

(6) *Maintaining National Laboratory and university nuclear programs, including their infrastructure.*

(7) *Supporting both individual researchers and multidisciplinary teams of researchers to pioneer new approaches in nuclear energy, science, and technology.*

(8) *Developing, planning, constructing, acquiring, and operating special equipment and facilities for the use of researchers.*

(9) *Supporting technology transfer and other appropriate activities to assist the nuclear energy industry, and other users of nuclear science and engineering, including activities addressing reliability, availability, productivity, component aging, safety, and security of nuclear power plants.*

(10) *Reducing the environmental impact of nuclear energy-related activities.*

(11) *Researching and developing technologies and processes to meet Federal and State requirements and standards for nuclear power systems.*

[(e)] (b) *LIMITATION.*—None of the funds authorized under this section may be used to decommission the Fast Flux Test Facility.

(c) *PROGRAM OBJECTIVES STUDY.*—*In furtherance of the program objectives listed in subsection (a) of this section, the Government Accountability Office shall, within one year after the date of enactment of this subsection, transmit to the Congress a report on the results of a study on the scientific and technical merit of major Federal and State requirements and standards, including moratoria, that delay or impede the further development and commercialization of nuclear power, and how the Department can assist in overcoming such delays or impediments.*

**SEC. 952. NUCLEAR ENERGY RESEARCH PROGRAMS.**

(a) **NUCLEAR ENERGY RESEARCH INITIATIVE.**—The Secretary shall carry out a Nuclear Energy Research Initiative for research and development related to nuclear energy.

(b) **NUCLEAR ENERGY SYSTEMS SUPPORT PROGRAM.**—The Secretary shall carry out a Nuclear Energy Systems Support Program to support research and development activities addressing reliability, availability, productivity, component aging, safety, and security of existing nuclear power plants.

[(c) **NUCLEAR POWER 2010 PROGRAM.**—

[(1) **IN GENERAL.**—The Secretary shall carry out a Nuclear Power 2010 Program, consistent with recommendations of the Nuclear Energy Research Advisory Committee of the Department in the report entitled “A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010” and dated October 2001.

[(2) **ADMINISTRATION.**—The Program shall include—

[(A) use of the expertise and capabilities of industry, institutions of higher education, and National Laboratories in evaluation of advanced nuclear fuel cycles and fuels testing;

[(B) consideration of a variety of reactor designs suitable for both developed and developing nations;

[(C) participation of international collaborators in research, development, and design efforts, as appropriate; and

[(D) encouragement for participation by institutions of higher education and industry.

[(d) **GENERATION IV NUCLEAR ENERGY SYSTEMS INITIATIVE.**—

[(1) **IN GENERAL.**—The Secretary shall carry out a Generation IV Nuclear Energy Systems Initiative to develop an overall technology plan for and to support research and development necessary to make an informed technical decision about the most promising candidates for eventual commercial application.

[(2) **ADMINISTRATION.**—In conducting the Initiative, the Secretary shall examine advanced proliferation-resistant and passively safe reactor designs, including designs that—

[(A) are economically competitive with other electric power generation plants;

[(B) have higher efficiency, lower cost, and improved safety compared to reactors in operation on the date of enactment of this Act;

[(C) use fuels that are proliferation resistant and have substantially reduced production of high-level waste per unit of output; and

[(D) use improved instrumentation.

[(e) **REACTOR PRODUCTION OF HYDROGEN.**—The Secretary shall carry out research to examine designs for high-temperature reactors capable of producing large-scale quantities of hydrogen.]

(c) **REACTOR CONCEPTS.**—

(1) *IN GENERAL.*—*The Secretary shall carry out a program of research, development, demonstration, and commercial application to advance nuclear power systems as well as technologies to sustain currently deployed systems.*

(2) *DESIGNS AND TECHNOLOGIES.*—In conducting the program under this subsection, the Secretary shall examine advanced reactor designs and nuclear technologies, including those that—

(A) have higher efficiency, lower cost, and improved safety compared to reactors in operation as of the date of enactment of the America COMPETES Reauthorization Act of 2015;

(B) utilize passive safety features;

(C) minimize proliferation risks;

(D) substantially reduce production of high-level waste per unit of output;

(E) increase the life and sustainability of reactor systems currently deployed;

(F) use improved instrumentation;

(G) are capable of producing large-scale quantities of hydrogen or process heat;

(H) minimize water usage or use alternatives to water as a cooling mechanism; or

(I) use nuclear energy as part of an integrated energy system.

(3) *INTERNATIONAL COOPERATION.*—In carrying out the program under this subsection, the Secretary shall seek opportunities to enhance the progress of the program through international cooperation through such organizations as the Generation IV International Forum or any other international collaboration the Secretary considers appropriate.

(4) *EXCEPTIONS.*—No funds authorized to be appropriated to carry out the activities described in this subsection shall be used to fund the activities authorized under sections 641 through 645.

(d) *SMALL MODULAR REACTOR PROGRAM.*—

(1) *IN GENERAL.*—The Secretary shall carry out a small modular reactor program to promote research, development, demonstration, and commercial application of small modular reactors, including through cost-shared projects for commercial application of reactor systems designs.

(2) *CONSULTATION.*—The Secretary shall consult with and utilize the expertise of the Secretary of the Navy in establishing and carrying out such program.

(3) *ADDITIONAL ACTIVITIES.*—Activities may also include development of advanced computer modeling and simulation tools, by Federal and non-Federal entities, which demonstrate and validate new design capabilities of innovative small modular reactor designs.

(4) *DEFINITION.*—For the purposes of this subsection, the term “small modular reactor” means a nuclear reactor meeting generally accepted industry standards—

(A) with a rated capacity of less than 300 electrical megawatts;

(B) with respect to which most parts can be factory assembled and shipped as modules to a reactor plant site for assembly; and

(C) that can be constructed and operated in combination with similar reactors at a single site.

**SEC. 953. [ADVANCED FUEL CYCLE INITIATIVE] FUEL CYCLE RESEARCH AND DEVELOPMENT.**

[(a) *IN GENERAL.*—The Secretary, acting through the Director of the Office of Nuclear Energy, Science and Technology, shall conduct an advanced fuel recycling technology research, development, and demonstration program (referred to in this section as the “program”) to evaluate proliferation-resistant fuel recycling and transmutation technologies that minimize environmental and public health and safety impacts as an alternative to aqueous reprocessing technologies deployed as of the date of enactment of this Act in support of evaluation of alternative national strategies for spent nuclear fuel and the Generation IV advanced reactor concepts.]

(a) *IN GENERAL.*—The Secretary shall conduct a fuel cycle research, development, demonstration, and commercial application program (referred to in this section as the “program”) on fuel cycle options that improve uranium resource utilization, maximize energy generation, minimize nuclear waste creation, improve safety, mitigate risk of proliferation, and improve waste management in support of a national strategy for spent nuclear fuel and the reactor concepts research, development, demonstration, and commercial application program under section 952(c).

(b) *FUEL CYCLE OPTIONS.*—Under this section the Secretary may consider implementing the following initiatives:

(1) *OPEN CYCLE.*—Developing fuels, including the use of non-uranium materials and alternate claddings, for use in reactors that increase energy generation, improve safety performance and margins, and minimize the amount of nuclear waste produced in an open fuel cycle.

(2) *RECYCLE.*—Developing advanced recycling technologies, including advanced reactor concepts to improve resource utilization, reduce proliferation risks, and minimize radiotoxicity, decay heat, and mass and volume of nuclear waste to the greatest extent possible.

(3) *ADVANCED STORAGE METHODS.*—Developing advanced storage technologies for both onsite and long-term storage that substantially prolong the effective life of current storage devices or that substantially improve upon existing nuclear waste storage technologies and methods, including repositories.

(4) *FAST TEST REACTOR.*—Investigating the potential research benefits of a fast test reactor user facility to conduct experiments on fuels and materials related to fuel forms and fuel cycles that will increase fuel utilization, reduce proliferation risks, and reduce nuclear waste products.

(5) *ADVANCED REACTOR INNOVATION.*—Developing an advanced reactor innovation testbed where national laboratories, universities, and industry can address advanced reactor design challenges to enable construction and operation of privately funded reactor prototypes to resolve technical uncertainty for United States-based designs for future domestic and international markets.

(6) *OTHER TECHNOLOGIES.*—Developing any other technology or initiative that the Secretary determines is likely to advance the objectives of the program.

(c) *ADDITIONAL ADVANCED RECYCLING AND CROSSCUTTING ACTIVITIES.*—In addition to and in support of the specific initiatives de-

scribed in paragraphs (1) through (5) of subsection (b), the Secretary may support the following activities:

(1) Development and testing of integrated process flow sheets for advanced nuclear fuel recycling processes.

(2) Research to characterize the byproducts and waste streams resulting from fuel recycling processes.

(3) Research and development on reactor concepts or transmutation technologies that improve resource utilization or reduce the radiotoxicity of waste streams.

(4) Research and development on waste treatment processes and separations technologies, advanced waste forms, and quantification of proliferation risks.

(5) Identification and evaluation of test and experimental facilities necessary to successfully implement the advanced fuel cycle initiative.

(6) Advancement of fuel cycle-related modeling and simulation capabilities.

(7) Research to understand the behavior of high-burnup fuels.

[(b)] (d) ANNUAL REVIEW.—The program shall be subject to annual review by the Nuclear Energy Research Advisory Committee of the Department or other independent entity, as appropriate.

[(c)] (e) INTERNATIONAL COOPERATION.—In carrying out the program, the Secretary is encouraged to seek opportunities to enhance the progress of the program through international cooperation.

[(d)] (f) REPORTS.—The Secretary shall submit, as part of the annual budget submission of the Department, a report on the activities of the program.

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#### **SEC. 958. NUCLEAR ENERGY ENABLING TECHNOLOGIES.**

(a) *IN GENERAL.*—The Secretary shall conduct a program to support the integration of activities undertaken through the reactor concepts research, development, demonstration, and commercial application program under section 952(c) and the fuel cycle research and development program under section 953, and support crosscutting nuclear energy concepts. Activities commenced under this section shall be concentrated on broadly applicable research and development focus areas.

(b) *ACTIVITIES.*—Activities conducted under this section may include research involving—

(1) advanced reactor materials;

(2) advanced radiation mitigation methods;

(3) advanced proliferation and security risk assessment methods;

(4) advanced sensors and instrumentation;

(5) high performance computation modeling, including multi-physics, multidimensional modeling simulation for nuclear energy systems, and continued development of advanced modeling simulation capabilities through national laboratory, industry, and university partnerships for operations and safety performance improvements of light water reactors for currently deployed and near-term reactors and advanced reactors and for the development of small modular reactors; and

(6) any crosscutting technology or transformative concept aimed at establishing substantial and revolutionary enhance-

*ments in the performance of future nuclear energy systems that the Secretary considers relevant and appropriate to the purpose of this section.*

*(c) REPORT.—The Secretary shall submit, as part of the annual budget submission of the Department, a report on the activities of the program conducted under this section, which shall include a brief evaluation of each activity's progress.*

## Subtitle F—Fossil Energy

### ISEC. 961. FOSSIL ENERGY.

[(a) IN GENERAL.—The Secretary shall carry out research, development, demonstration, and commercial application programs in fossil energy, including activities under this subtitle, with the goal of improving the efficiency, effectiveness, and environmental performance of fossil energy production, upgrading, conversion, and consumption. Such programs take into consideration the following objectives:

[(1) Increasing the energy conversion efficiency of all forms of fossil energy through improved technologies.

[(2) Decreasing the cost of all fossil energy production, generation, and delivery.

[(3) Promoting diversity of energy supply.

[(4) Decreasing the dependence of the United States on foreign energy supplies.

[(5) Improving United States energy security.

[(6) Decreasing the environmental impact of energy-related activities.

[(7) Increasing the export of fossil energy-related equipment, technology, and services from the United States.

[(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out fossil energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle—

[(1) \$611,000,000 for fiscal year 2007;

[(2) \$626,000,000 for fiscal year 2008; and

[(3) \$641,000,000 for fiscal year 2009.

[(c) ALLOCATIONS.—From amounts authorized under subsection (a), the following sums are authorized:

[(1) For activities under section 962—

[(A) \$367,000,000 for fiscal year 2007;

[(B) \$376,000,000 for fiscal year 2008; and

[(C) \$394,000,000 for fiscal year 2009.

[(2) For activities under section 964—

[(A) \$20,000,000 for fiscal year 2007;

[(B) \$25,000,000 for fiscal year 2008; and

[(C) \$30,000,000 for fiscal year 2009.

[(3) For activities under section 966—

[(A) \$1,500,000 for fiscal year 2007; and

[(B) \$450,000 for each of fiscal years 2008 and 2009.

[(4) For the Office of Arctic Energy under section 3197 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (42 U.S.C. 7144d) \$25,000,000 for each of fiscal years 2007 through 2009.



[(d) EXTENDED AUTHORIZATION.—There are authorized to be appropriated to the Secretary for the Office of Arctic Energy established under section 3197 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (42 U.S.C. 7144d) \$25,000,000 for each of fiscal years 2010 through 2012.

[(e) LIMITATIONS.—

[(1) USES.—None of the funds authorized under this section may be used for Fossil Energy Environmental Restoration or Import/Export Authorization.

[(2) INSTITUTIONS OF HIGHER EDUCATION.—Of the funds authorized under subsection (c)(2), not less than 20 percent of the funds appropriated for each fiscal year shall be dedicated to research and development carried out at institutions of higher education.]

**SEC. 961. FOSSIL ENERGY.**

(a) *IN GENERAL.*—*The Secretary shall carry out research, development, demonstration, and commercial application programs in fossil energy, including activities under this subtitle, with the goal of improving the efficiency, effectiveness, and environmental performance of fossil energy production, upgrading, conversion, and consumption. Such programs shall take into consideration the following objectives:*

(1) *Increasing the energy conversion efficiency of all forms of fossil energy through improved technologies.*

(2) *Decreasing the cost of all fossil energy production, generation, and delivery.*

(3) *Promoting diversity of energy supply.*

(4) *Decreasing the dependence of the United States on foreign energy supplies.*

(5) *Decreasing the environmental impact of energy-related activities.*

(6) *Increasing the export of fossil energy-related equipment, technology, and services from the United States.*

(b) *OBJECTIVES.*—*To the maximum extent practicable, the Secretary shall seek to—*

(1) *leverage existing programs;*

(2) *consolidate and coordinate activities throughout the Department to promote collaboration and crosscutting approaches;*

(3) *ensure activities are undertaken in a manner that does not duplicate other activities within the Department or other Federal Government activities; and*

(4) *identify programs that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.*

(c) *LIMITATIONS.*—

(1) *USES.*—*None of the funds authorized for carrying out this section may be used for Fossil Energy Environmental Restoration.*

(2) *INSTITUTIONS OF HIGHER EDUCATION.*—*Not less than 20 percent of the funds appropriated for carrying out section 964 of this Act for each fiscal year shall be dedicated to research and development carried out at institutions of higher education.*

(3) *USE FOR REGULATORY ASSESSMENTS OR DETERMINATIONS.*—*The results of any research, development, demonstration, or commercial application projects or activities of the De-*

partment authorized under this subtitle may not be used for regulatory assessments or determinations by Federal regulatory authorities.

(d) **ASSESSMENTS.**—

(1) **CONSTRAINTS AGAINST BRINGING RESOURCES TO MARKET.**—Not later than 1 year after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Secretary shall transmit to Congress an assessment of the technical, institutional, policy, and regulatory constraints to bringing new domestic fossil resources to market.

(2) **TECHNOLOGY CAPABILITIES.**—Not later than 2 years after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Secretary shall transmit to Congress a long-term assessment of existing and projected technological capabilities for expanded production from domestic unconventional oil, gas, and methane reserves.

**SEC. 962. COAL AND RELATED TECHNOLOGIES PROGRAM.**

(a) **IN GENERAL.**—In addition to the programs authorized under title IV, the Secretary shall conduct a program of technology research, development, demonstration, and commercial application for coal and power systems, including programs to facilitate production and generation of coal-based power through—

- (1) innovations for existing plants (including mercury removal);
- (2) gasification systems;
- (3) advanced combustion systems;
- (4) turbines for synthesis gas derived from coal;
- (5) carbon capture and sequestration research and development;
- (6) coal-derived chemicals and transportation fuels;
- (7) liquid fuels derived from low rank coal water slurry;
- (8) solid fuels and feedstocks;
- (9) advanced coal-related research;
- (10) advanced separation technologies; [and]
- (11) fuel cells for the operation of synthesis gas derived from coal[.];

(12) specific additional programs to address water use and reuse;

(13) the testing, including the construction of testing facilities, of high temperature materials for use in advanced systems for combustion or use of coal; and

(14) innovations to application of existing coal conversion systems designed to increase efficiency of conversion, flexibility of operation, and other modifications to address existing usage requirements.

(b) **TRANSFORMATIONAL COAL TECHNOLOGY PROGRAM.**—

(1) **IN GENERAL.**—As part of the program established under subsection (a), the Secretary may carry out a program designed to undertake research, development, demonstration, and commercial application of technologies, including the accelerated development of—

- (A) chemical looping technology;
- (B) supercritical carbon dioxide power generation cycles;
- (C) pressurized oxycombustion, including new and retrofit technologies; and

(D) *other technologies that are characterized by the use of—*

- (i) *alternative energy cycles;*
- (ii) *thermionic devices using waste heat;*
- (iii) *fuel cells;*
- (iv) *replacement of chemical processes with biotechnology;*
- (v) *nanotechnology;*
- (vi) *new materials in applications (other than extending cycles to higher temperature and pressure), such as membranes or ceramics;*
- (vii) *carbon utilization, such as in construction materials, using low quality energy to reconvert back to a fuel, or manufactured food;*
- (viii) *advanced gas separation concepts; and*
- (ix) *other technologies, including—*
  - (I) *modular, manufactured components; and*
  - (II) *innovative production or research techniques, such as using 3-D printer systems, for the production of early research and development prototypes.*

(2) *COST SHARE.—In carrying out the program described in paragraph (1), the Secretary shall enter into partnerships with private entities to share the costs of carrying out the program. The Secretary may reduce the non-Federal cost share requirement if the Secretary determines that the reduction is necessary and appropriate considering the technological risks involved in the project.*

**[(b)] (c) COST AND PERFORMANCE GOALS.—**

**[(1) IN GENERAL.—**In carrying out programs authorized by this section, during each of calendar years 2008, 2010, 2012, and 2016, and during each fiscal year beginning after September 30, 2021, the Secretary shall identify cost and performance goals for coal-based technologies that would permit the continued cost-competitive use of coal for the production of electricity, chemical feedstocks, and transportation fuels.**]**

*(1) IN GENERAL.—In carrying out programs authorized by this section, the Secretary shall identify cost and performance goals for coal-based technologies that would permit the continued cost-competitive use of coal for the production of electricity, chemical feedstocks, transportation fuels, and other marketable products.*

(2) **ADMINISTRATION.—**In establishing the cost and performance goals, the Secretary shall—

(A) consider activities and studies undertaken as of the date of enactment of this Act by industry in cooperation with the Department in support of the identification of the goals;

(B) consult with interested entities, including—

- (i) coal producers;
- (ii) industries using coal;
- (iii) organizations that promote coal and advanced coal technologies;
- (iv) environmental organizations;
- (v) organizations representing workers; and

- (vi) organizations representing consumers;
- (C) not later than 120 days after the date of enactment of this Act, publish in the Federal Register proposed draft cost and performance goals for public comments; and
- (D) not later than 180 days after the date of enactment of this Act and every 4 years thereafter, submit to Congress a report describing the final cost and performance goals for the technologies that includes—
  - (i) a list of technical milestones; and
  - (ii) an explanation of how programs authorized in this section will not duplicate the activities authorized under the Clean Coal Power Initiative authorized under title IV.

**[(c)] (d) POWDER RIVER BASIN AND FORT UNION LIGNITE COAL MERCURY REMOVAL.—**

(1) IN GENERAL.—In addition to the programs authorized by subsection (a), the Secretary shall establish a program to test and develop technologies to control and remove mercury emissions from subbituminous coal mined in the Powder River Basin, and Fort Union lignite coals, that are used for the generation of electricity.

(2) EFFICACY OF MERCURY REMOVAL TECHNOLOGY.—In carrying out the program under paragraph (1), the Secretary shall examine the efficacy of mercury removal technologies on coals described in that paragraph that are blended with other types of coal.

**[(d)] (e) FUEL CELLS.—**

(1) IN GENERAL.—The Secretary shall conduct a program of research, development, demonstration, and commercial application on fuel cells for low-cost, high-efficiency, fuel-flexible, modular power systems.

(2) DEMONSTRATIONS.—The demonstrations referred to in paragraph (1) shall include solid oxide fuel cell technology for commercial, residential, and transportation applications, and distributed generation systems, using improved manufacturing production and processes.

**SEC. 963. CARBON CAPTURE AND SEQUESTRATION RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.**

(a) IN GENERAL.—The Secretary shall carry out a 10-year carbon capture and sequestration research, development, and demonstration program to develop carbon dioxide capture and sequestration technologies related to industrial sources of carbon dioxide for use—

- (1) in new coal utilization facilities; and
- (2) on the fleet of coal-based units in existence on the date of enactment of this Act.

(b) OBJECTIVES.—The objectives of the program under subsection (a) shall be—

- (1) to develop carbon dioxide capture technologies, including adsorption and absorption techniques and chemical processes, to remove the carbon dioxide from gas streams containing carbon dioxide potentially amenable to sequestration;
- (2) to develop technologies that would directly produce concentrated streams of carbon dioxide potentially amenable to sequestration;

(3) to increase the efficiency of the overall system to reduce the quantity of carbon dioxide emissions released from the system per megawatt generated;

(4) in accordance with the carbon dioxide capture program, to promote a robust carbon sequestration program and continue the work of the Department, in conjunction with the private sector, through regional carbon sequestration partnerships; and

(5) to expedite and carry out large-scale testing of carbon sequestration systems in a range of geologic formations that will provide information on the cost and feasibility of deployment of sequestration technologies.

(c) PROGRAMMATIC ACTIVITIES.—

(1) FUNDAMENTAL SCIENCE AND ENGINEERING RESEARCH AND DEVELOPMENT AND DEMONSTRATION SUPPORTING CARBON CAPTURE AND SEQUESTRATION TECHNOLOGIES AND CARBON USE ACTIVITIES.—

(A) IN GENERAL.—The Secretary shall carry out fundamental science and engineering research (including laboratory-scale experiments, numeric modeling, and simulations) to develop and document the performance of new approaches to capture and sequester, or use carbon dioxide to lead to an overall reduction of carbon dioxide emissions.

(B) PROGRAM INTEGRATION.—The Secretary shall ensure that fundamental research carried out under this paragraph is appropriately applied to energy technology development activities, the field testing of carbon sequestration, and carbon use activities, including—

(i) development of new or advanced technologies for the capture and sequestration of carbon dioxide;

(ii) development of new or advanced technologies that reduce the cost and increase the efficacy of advanced compression of carbon dioxide required for the sequestration of carbon dioxide;

(iii) modeling and simulation of geologic sequestration field demonstrations;

(iv) quantitative assessment of risks relating to specific field sites for testing of sequestration technologies;

(v) research and development of new and advanced technologies for carbon use, including recycling and reuse of carbon dioxide; and

(vi) research and development of new and advanced technologies for the separation of oxygen from air.

(2) FIELD VALIDATION TESTING ACTIVITIES.—

(A) IN GENERAL.—The Secretary shall promote, to the maximum extent practicable, regional carbon sequestration partnerships to conduct geologic sequestration tests involving carbon dioxide injection and monitoring, mitigation, and verification operations in a variety of candidate geologic settings, including—

(i) operating oil and gas fields;

(ii) depleted oil and gas fields;

(iii) unmineable coal seams;

(iv) deep saline formations;

(v) deep geologic systems that may be used as engineered reservoirs to extract economical quantities of heat from geothermal resources of low permeability or porosity; and

(vi) deep geologic systems containing basalt formations.

(B) OBJECTIVES.—The objectives of tests conducted under this paragraph shall be—

(i) to develop and validate geophysical tools, analysis, and modeling to monitor, predict, and verify carbon dioxide containment;

(ii) to validate modeling of geologic formations;

(iii) to refine sequestration capacity estimated for particular geologic formations;

(iv) to determine the fate of carbon dioxide concurrent with and following injection into geologic formations;

(v) to develop and implement best practices for operations relating to, and monitoring of, carbon dioxide injection and sequestration in geologic formations;

(vi) to assess and ensure the safety of operations related to geologic sequestration of carbon dioxide;

(vii) to allow the Secretary to promulgate policies, procedures, requirements, and guidance to ensure that the objectives of this subparagraph are met in large-scale testing and deployment activities for carbon capture and sequestration that are funded by the Department of Energy; and

(viii) to provide information to States, the Environmental Protection Agency, and other appropriate entities to support development of a regulatory framework for commercial-scale sequestration operations that ensure the protection of human health and the environment.

(3) LARGE-SCALE CARBON DIOXIDE SEQUESTRATION TESTING.—

(A) IN GENERAL.—The Secretary shall conduct not less than 7 initial large-scale sequestration tests, not including the FutureGen project, for geologic containment of carbon dioxide to collect and validate information on the cost and feasibility of commercial deployment of technologies for geologic containment of carbon dioxide. These 7 tests may include any Regional Partnership projects awarded as of the date of enactment of the Department of Energy Carbon Capture and Sequestration Research, Development, and Demonstration Act of 2007.

(B) DIVERSITY OF FORMATIONS TO BE STUDIED.—In selecting formations for study under this paragraph, the Secretary shall consider a variety of geologic formations across the United States, and require characterization and modeling of candidate formations, as determined by the Secretary.

(C) SOURCE OF CARBON DIOXIDE FOR LARGE-SCALE SEQUESTRATION TESTS.—In the process of any acquisition of carbon dioxide for sequestration tests under subparagraph (A), the Secretary shall give preference to sources of car-

bon dioxide from industrial sources. To the extent feasible, the Secretary shall prefer tests that would facilitate the creation of an integrated system of capture, transportation and sequestration of carbon dioxide. The preference provided for under this subparagraph shall not delay the implementation of the large-scale sequestration tests under this paragraph.

(D) DEFINITION.—For purposes of this paragraph, the term “large-scale” means the injection of more than 1,000,000 tons of carbon dioxide from industrial sources annually or a scale that demonstrates the ability to inject and sequester several million metric tons of industrial source carbon dioxide for a large number of years.

(4) PREFERENCE IN PROJECT SELECTION FROM MERITORIOUS PROPOSALS.—In making competitive awards under this subsection, subject to the requirements of section 989, the Secretary shall—

(A) give preference to proposals from partnerships among industrial, academic, and government entities; and

(B) require recipients to provide assurances that all laborers and mechanics employed by contractors and subcontractors in the construction, repair, or alteration of new or existing facilities performed in order to carry out a demonstration or commercial application activity authorized under this subsection shall be paid wages at rates not less than those prevailing on similar construction in the locality, as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code, and the Secretary of Labor shall, with respect to the labor standards in this paragraph, have the authority and functions set forth in Reorganization Plan Numbered 14 of 1950 (15 Fed. Reg. 3176; 5 U.S.C. Appendix) and section 3145 of title 40, United States Code.

(5) COST SHARING.—Activities under this subsection shall be considered research and development activities that are subject to the cost sharing requirements of section 988(b).

[(6) PROGRAM REVIEW AND REPORT.—During fiscal year 2011, the Secretary shall—

[(A) conduct a review of programmatic activities carried out under this subsection; and

[(B) make recommendations with respect to continuation of the activities.]]

(6) ADVISORY COMMITTEE.—

(A) *IN GENERAL.*—*Subject to subparagraph (B), the Secretary shall establish an advisory committee to undertake, not less frequently than once every 3 years, a review and prepare a report on the progress being made by the Department of Energy to achieve the goals described in subsections (a) and (b) of section 962 and subsection (b) of this section.*

(B) *MEMBERSHIP REQUIREMENTS.*—*Members of the advisory committee established under subparagraph (A) shall be appointed by the Secretary.*

[(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section—

- [(1) \$240,000,000 for fiscal year 2008;
- [(2) \$240,000,000 for fiscal year 2009;
- [(3) \$240,000,000 for fiscal year 2010;
- [(4) \$240,000,000 for fiscal year 2011; and
- [(5) \$240,000,000 for fiscal year 2012.]]

(d) *STUDY OF CARBON DIOXIDE PIPELINES.*—*Not later than 1 year after the date of enactment of the America COMPETES Reauthorization Act of 2015, the Secretary shall transmit to Congress the results of a study to assess the cost and feasibility of engineering, permitting, building, maintaining, regulating, and insuring a national system of carbon dioxide pipelines.*

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## Subtitle I—Research Administration and Operations

\* \* \* \* \*

### SEC. 988. COST SHARING.

(a) **APPLICABILITY.**—Notwithstanding any other provision of law, in carrying out a research, development, demonstration, or commercial application program or activity that is initiated after the date of enactment of this section, the Secretary shall require cost-sharing in accordance with this section.

(b) **RESEARCH AND DEVELOPMENT.**—

(1) **IN GENERAL.**—[Except as provided in paragraphs (2) and (3)] *Except as provided in paragraphs (2), (3), and (4) and subsection (f), the Secretary shall require not less than 20 percent of the cost of a research or development activity described in subsection (a) to be provided by a non-Federal source.*

(2) **EXCLUSION.**—Paragraph (1) shall not apply to a research or development activity described in subsection (a) that is of a basic or fundamental nature, as determined by the appropriate officer of the Department.

(3) **REDUCTION.**—The Secretary may reduce or eliminate the requirement of paragraph (1) for a research and development activity of an applied nature if the Secretary determines that the reduction is necessary and appropriate.

(4) **EXEMPTION FOR INSTITUTIONS OF HIGHER EDUCATION AND OTHER NONPROFIT INSTITUTIONS.**—

(A) **IN GENERAL.**—*Paragraph (1) shall not apply to a research or development activity performed by an institution of higher education or nonprofit institution (as defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703)).*

(B) **TERMINATION DATE.**—*The exemption under subparagraph (A) shall apply during the 6-year period beginning on the date of enactment of this paragraph.*

(c) **DEMONSTRATION AND COMMERCIAL APPLICATION.**—

(1) **IN GENERAL.**—Except as provided in paragraph (2) and subsection (f), the Secretary shall require that not less than 50 percent of the cost of a demonstration or commercial application activity described in subsection (a) to be provided by a non-Federal source.



- (2) REDUCTION OF NON-FEDERAL SHARE.—The Secretary may reduce the non-Federal share required under paragraph (1) if the Secretary determines the reduction to be necessary and appropriate, taking into consideration any technological risk relating to the activity.
- (d) CALCULATION OF AMOUNT.—In calculating the amount of a non-Federal contribution under this section, the Secretary—
- (1) may include allowable costs in accordance with the applicable cost principles, including—
    - (A) cash;
    - (B) personnel costs;
    - (C) the value of a service, other resource, or third party in-kind contribution determined in accordance with the applicable circular of the Office of Management and Budget;
    - (D) indirect costs or facilities and administrative costs;
 or
    - (E) any funds received under the power program of the Tennessee Valley Authority (except to the extent that such funds are made available under an annual appropriation Act); and
  - (2) shall not include—
    - (A) revenues or royalties from the prospective operation of an activity beyond the time considered in the award;
    - (B) proceeds from the prospective sale of an asset of an activity; or
    - (C) other appropriated Federal funds.
- (e) REPAYMENT OF FEDERAL SHARE.—The Secretary shall not require repayment of the Federal share of a cost-shared activity under this section as a condition of making an award.
- (f) EXCLUSIONS.—This section shall not apply to—
- (1) a cooperative research and development agreement under the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.);
  - (2) a fee charged for the use of a Department facility; or
  - (3) an award under—
    - (A) the small business innovation research program under section 9 of the Small Business Act (15 U.S.C. 638);
    - or
    - (B) the small business technology transfer program under that section.

\* \* \* \* \*

**SEC. 993. [STRATEGY AND PLAN FOR SCIENCE AND ENERGY FACILITIES AND INFRASTRUCTURE.] STRATEGY FOR FACILITIES AND INFRASTRUCTURE.**

- (a) FACILITY AND INFRASTRUCTURE POLICY.—
- (1) IN GENERAL.—The Secretary shall develop and implement a strategy for facilities and infrastructure supported primarily from the Office of Science, the Office of Energy Efficiency and Renewable Energy, the Office of Fossil Energy, or the Office of Nuclear Energy, Science and Technology Programs at all National Laboratories and single-purpose research facilities.
  - (2) STRATEGY.—The strategy shall provide cost-effective means for—
    - (A) maintaining existing facilities and infrastructure;
    - (B) closing unneeded facilities;

- (C) making facility modifications; and
- (D) building new facilities.

(b) REPORT.—

(1) IN GENERAL.—The Secretary shall prepare and submit, along with the budget request of the President submitted to Congress for fiscal year **2008** 2018, a report describing the strategy developed under subsection (a).

(2) CONTENTS.—For each National Laboratory and single-purpose research facility that is primarily used for science and energy research, the report shall contain—

(A) the current priority list of proposed facilities and infrastructure projects, including cost and schedule requirements;

(B) a current 10-year plan that demonstrates the reconfiguration of its facilities and infrastructure to meet its missions and to address its long-term operational costs and return on investment;

(C) the total current budget for all facilities and infrastructure funding; and

(D) the current status of each facility and infrastructure project compared to the original baseline cost, schedule, and scope.

**[SEC. 994. STRATEGIC RESEARCH PORTFOLIO ANALYSIS AND COORDINATION PLAN.]**

**[(a) IN GENERAL.]**—The Secretary shall periodically review all of the science and technology activities of the Department in a strategic framework that takes into account both the frontiers of science to which the Department can contribute and the national needs relevant to the Department's statutory missions.

**[(b) COORDINATION ANALYSIS AND PLAN.]**—As part of the review under subsection (a), the Secretary shall develop a coordination plan to improve coordination and collaboration in research, development, demonstration, and commercial application activities across Department organizational boundaries.

**[(c) PLAN CONTENTS.]**—The plan shall describe—

**[(1)]** cross-cutting scientific and technical issues and research questions that span more than one program or major office of the Department;

**[(2)]** how the applied technology programs of the Department are coordinating their activities, and addressing those questions;

**[(3)]** ways in which the technical interchange within the Department, particularly between the Office of Science and the applied technology programs, can be enhanced, including ways in which the research agendas of the Office of Science and the applied programs can interact and assist each other;

**[(4)]** a description of how the Secretary will ensure that the Department's overall research agenda include, in addition to fundamental, curiosity-driven research, fundamental research related to topics of concern to the applied programs, and applications in Departmental technology programs of research results generated by fundamental, curiosity-driven research.

**[(d) PLAN TRANSMITTAL.]**—Not later than 12 months after the date of enactment of this Act, and every 4 years thereafter, the Secretary shall transmit to Congress the results of the review

under subsection (a) and the coordination plan under subsection (b).**]**

**SEC. 994. STRATEGIC RESEARCH PORTFOLIO ANALYSIS AND COORDINATION PLAN.**

(a) *IN GENERAL.*—*The Secretary shall periodically review all of the science and technology activities of the Department in a strategic framework that takes into account the frontiers of science to which the Department can contribute, the national needs relevant to the Department's statutory missions, and global energy dynamics.*

(b) *COORDINATION ANALYSIS AND PLAN.*—*As part of the review under subsection (a), the Secretary shall develop a plan to improve coordination and collaboration in research, development, demonstration, and commercial application activities across Department organizational boundaries.*

(c) *PLAN CONTENTS.*—*The plan shall describe—*

(1) *cross-cutting scientific and technical issues and research questions that span more than one program or major office of the Department;*

(2) *how the applied technology programs of the Department are coordinating their activities, and addressing those questions;*

(3) *ways in which the technical interchange within the Department, particularly between the Office of Science and the applied technology programs, can be enhanced, including limited ways in which the research agendas of the Office of Science and the applied programs can better interact and assist each other;*

(4) *a description of how the Secretary will ensure that the Department's overall research agenda include, in addition to fundamental, curiosity-driven research, fundamental research related to topics of concern to the applied programs, and applications in Departmental technology programs of research results generated by fundamental, curiosity-driven research;*

(5) *critical assessments of any ongoing programs that have experienced sub-par performance or cost over-runs of 10 percent or more over one or more years; and*

(6) *activities that may be more effectively left to the States, industry, nongovernmental organizations, institutions of higher education, or other stakeholders.*

(d) *PLAN TRANSMITTAL.*—*Not later than 1 year after the date of enactment of the America COMPETES Reauthorization Act of 2015, and every 4 years thereafter, the Secretary shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate the results of the review under subsection (a) and the coordination plan under subsection (b).*

\* \* \* \* \*

## TITLE X—DEPARTMENT OF ENERGY MANAGEMENT

### SEC. 1001. IMPROVED TECHNOLOGY TRANSFER OF ENERGY TECHNOLOGIES.

(a) **TECHNOLOGY TRANSFER COORDINATOR.**—The Secretary shall appoint a Technology Transfer Coordinator to be the principal advisor to the Secretary on all matters relating to technology transfer and commercialization.

(b) **QUALIFICATIONS.**—The Coordinator shall be an individual who, by reason of professional background and experience, is specially qualified to advise the Secretary on matters pertaining to technology transfer at the Department.

(c) **DUTIES OF THE COORDINATOR.**—The Coordinator shall oversee—

(1) the activities of the Technology Transfer Working Group established under subsection (d);

(2) the expenditure of funds allocated for technology transfer within the Department;

(3) the activities of each technology partnership ombudsman appointed under section 11 of the Technology Transfer Commercialization Act of 2000 (42 U.S.C. 7261c); and

(4) efforts to engage private sector entities, including venture capital companies.

(d) **TECHNOLOGY TRANSFER WORKING GROUP.**—The Secretary shall establish a Technology Transfer Working Group, which shall consist of representatives of the National Laboratories and single-purpose research facilities, to—

(1) coordinate technology transfer activities occurring at National Laboratories and single-purpose research facilities;

(2) exchange information about technology transfer practices, including alternative approaches to resolution of disputes involving intellectual property rights and other technology transfer matters; and

(3) develop and disseminate to the public and prospective technology partners information about opportunities and procedures for technology transfer with the Department, including opportunities and procedures related to alternative approaches to resolution of disputes involving intellectual property rights and other technology transfer matters.

(e) **TECHNOLOGY COMMERCIALIZATION FUND.**—The Secretary shall establish an Energy Technology Commercialization Fund, using 0.9 percent of the amount made available to the Department for applied energy research, development, demonstration, and commercial application for each fiscal year based on future planned activities and the amount of the appropriations for the fiscal year, to be used to provide matching funds with private partners to promote promising energy technologies for commercial purposes.

(f) **TECHNOLOGY TRANSFER RESPONSIBILITY.**—Nothing in this section affects the technology transfer responsibilities of Federal employees under the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.).

(g) **EARLY-STAGE TECHNOLOGY DEMONSTRATION.**—*The Secretary shall permit the directors of the National Laboratories to use funds*

*authorized to support technology transfer within the Department to carry out early-stage and pre-commercial technology demonstration activities to remove technology barriers that limit private sector interest and demonstrate potential commercial applications of any research and technologies arising from National Laboratory activities.*

[(g)] (h) PLANNING AND REPORTING.—

(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary shall submit to Congress a technology transfer execution plan.

(2) UPDATES.—Each year after the submission of the plan under paragraph (1), the Secretary shall submit to Congress an updated execution plan and reports that describe progress toward meeting goals set forth in the execution plan and the funds expended under subsection (e).

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## AMERICA COMPETES ACT

\* \* \* \* \*

## TITLE V—DEPARTMENT OF ENERGY

\* \* \* \* \*

### SEC. 5012. ADVANCED RESEARCH PROJECTS AGENCY—ENERGY.

(a) DEFINITIONS.—In this section:

(1) ARPA-E.—The term “ARPA-E” means the Advanced Research Projects Agency—Energy established by subsection (b).

(2) DIRECTOR.—The term “Director” means the Director of ARPA-E appointed under subsection (d).

(3) FUND.—The term “Fund” means the Energy Transformation Acceleration Fund established under subsection (n)(1).

(b) ESTABLISHMENT.—There is established the Advanced Research Projects Agency—Energy within the Department to overcome the long-term and high-risk technological barriers in the development of energy technologies.

(c) GOALS.—

[(1) IN GENERAL.—The goals of ARPA-E shall be—

[(A) to enhance the economic and energy security of the United States through the development of energy technologies that result in—

[(i) reductions of imports of energy from foreign sources;

[(ii) reductions of energy-related emissions, including greenhouse gases; and

[(iii) improvement in the energy efficiency of all economic sectors; and

[(B) to ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies.]

(1) IN GENERAL.—*The goals of ARPA-E shall be to enhance the economic and energy security of the United States and to*

*ensure that the United States maintains a technological lead through the development of advanced energy technologies.*

(2) MEANS.—ARPA-E shall achieve the goals established under paragraph (1) through energy technology projects by—

(A) identifying and promoting revolutionary advances in fundamental and applied sciences;

(B) translating scientific discoveries and cutting-edge inventions into technological innovations; and

(C) accelerating transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty.

(d) DIRECTOR.—

(1) APPOINTMENT.—There shall be in the Department of Energy a Director of ARPA-E, who shall be appointed by the President, by and with the advice and consent of the Senate.

(2) QUALIFICATIONS.—The Director shall be an individual who, by reason of professional background and experience, is especially qualified to advise the Secretary on, and manage research programs addressing, matters pertaining to long-term and high-risk technological barriers to the development of energy technologies.

(3) RELATIONSHIP TO SECRETARY.—The Director shall report to the Secretary.

(4) RELATIONSHIP TO OTHER PROGRAMS.—No other programs within the Department shall report to the Director.

(e) RESPONSIBILITIES.—The responsibilities of the Director shall include—

(1) approving all new programs within ARPA-E;

(2) developing funding criteria and assessing the success of programs through the establishment of technical milestones;

(3) administering the Fund through awards to institutions of higher education, companies, research foundations, trade and industry research collaborations, or consortia of such entities, which may include federally-funded research and development centers, to achieve the goals described in subsection (c) through targeted acceleration of—

(A) novel early-stage energy research with possible technology applications;

(B) development of techniques, processes, and technologies, and related testing and evaluation;

(C) research and development of advanced manufacturing process and technologies for the domestic manufacturing of novel energy technologies; and

(D) coordination with nongovernmental entities for demonstration of technologies and research applications to facilitate technology transfer;

(4) terminating programs carried out under this section that are not achieving the goals of the programs; and

(5) pursuant to subsection (c)(2)(C)—

(A) ensuring that applications for funding disclose the extent of current and prior efforts, including monetary investments as appropriate, in pursuit of the technology area for which funding is being requested;

(B) adopting measures to ensure that, in making awards, program managers adhere to the purposes of subsection (c)(2)(C); and

(C) providing as part of the annual report required by subsection (h)(1) a summary of the instances of and reasons for ARPA-E funding projects in technology areas already being undertaken by industry.

(f) AWARDS.—In carrying out this section, the Director may provide awards in the form of grants, contracts, cooperative agreements, cash prizes, and other transactions.

(g) PERSONNEL.—

(1) IN GENERAL.—The Director shall establish and maintain within ARPA-E a staff with sufficient qualifications and expertise to enable ARPA-E to carry out the responsibilities of ARPA-E under this section in conjunction with other operations of the Department.

(2) PROGRAM DIRECTORS.—

(A) IN GENERAL.—The Director shall designate employees to serve as program directors for the programs established pursuant to the responsibilities established for ARPA-E under subsection (e).

(B) RESPONSIBILITIES.—A program director of a program shall be responsible for—

(i) establishing research and development goals for the program, including through the convening of workshops and conferring with outside experts, and publicizing the goals of the program to the public and private sectors;

(ii) soliciting applications for specific areas of particular promise, especially areas that the private sector or the Federal Government are not likely to undertake alone;

(iii) building research collaborations for carrying out the program;

(iv) selecting on the basis of merit each of the projects to be supported under the program after considering—

(I) the novelty and scientific and technical merit of the proposed projects;

(II) the demonstrated capabilities of the applicants to successfully carry out the proposed project;

(III) the consideration by the applicant of future commercial applications of the project, including the feasibility of partnering with 1 or more commercial entities; and

(IV) such other criteria as are established by the Director;

(v) identifying innovative cost-sharing arrangements for ARPA-E projects, including through use of the authority provided under section 988(b)(3) of the Energy Policy Act of 2005 (42 U.S.C. 16352(b)(3));

(vi) monitoring the progress of projects supported under the program;

(vii) identifying mechanisms for commercial application of successful energy technology development projects, including through establishment of partnerships between awardees and commercial entities; and  
 (viii) recommending program restructure or termination of research partnerships or whole projects.

(C) TERM.—The term of a program manager shall be not more than 3 years and may be renewed.

(3) HIRING AND MANAGEMENT.—

(A) IN GENERAL.—The Director shall have the authority to—

(i) make appointments of scientific, engineering, and professional personnel without regard to the civil service laws;

(ii) fix the basic pay of such personnel at a rate to be determined by the Director at rates not in excess of Level II of the Executive Schedule (EX-II) without regard to the civil service laws; and

(iii) pay any employee appointed under this subpart payments in addition to basic pay, except that the total amount of additional payments paid to an employee under this subpart for any 12-month period shall not exceed the least of the following amounts:

(I) \$25,000.

(II) The amount equal to 25 percent of the annual rate of basic pay of the employee.

(III) The amount of the limitation that is applicable for a calendar year under section 5307(a)(1) of title 5, United States Code.

(B) NUMBER.—The Director shall appoint not more than 120 personnel under this section.

(C) PRIVATE RECRUITING FIRMS.—The Secretary, or the Director serving as an agent of the Secretary, may contract with private recruiting firms for the hiring of qualified technical staff to carry out this section.

(D) ADDITIONAL STAFF.—The Director may use all authorities in existence on the date of enactment of this Act that are provided to the Secretary to hire administrative, financial, and clerical staff as necessary to carry out this section.

(h) REPORTS AND ROADMAPS.—

(1) ANNUAL REPORT.—As part of the annual budget request submitted for each fiscal year, the Director shall provide to the relevant authorizing and appropriations committees of Congress a report describing projects supported by ARPA-E during the previous fiscal year.

(2) STRATEGIC VISION ROADMAP.—Not later than October 1, 2010, and October 1, 2013, the Director shall provide to the relevant authorizing and appropriations committees of Congress a roadmap describing the strategic vision that ARPA-E will use to guide the choices of ARPA-E for future technology investments over the following 3 fiscal years.

(i) COORDINATION AND NONDUPLICATION.—

(1) IN GENERAL.—To the maximum extent practicable, the Director shall ensure that the activities of ARPA-E are coordi-



nated with, and do not duplicate the efforts of, programs and laboratories within the Department and other relevant research agencies. *ARPA-E shall not provide funding for a project unless the prospective grantee demonstrates sufficient attempts to secure private financing or indicates that the project is not independently commercially viable.*

(2) TECHNOLOGY TRANSFER COORDINATOR.—To the extent appropriate, the Director may coordinate technology transfer efforts with the Technology Transfer Coordinator appointed under section 1001 of the Energy Policy Act of 2005 (42 U.S.C. 16391).

(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.

(k) ADVICE.—

(1) ADVISORY COMMITTEES.—The Director may seek advice on any aspect of ARPA-E from—

(A) an existing Department of Energy advisory committee; and

(B) a new advisory committee organized to support the programs of ARPA-E and to provide advice and assistance on—

(i) specific program tasks; or

(ii) overall direction of ARPA-E.

(2) ADDITIONAL SOURCES OF ADVICE.—In carrying out this section, the Director may seek advice and review from—

(A) the President's Committee of Advisors on Science and Technology; and

(B) any professional or scientific organization with expertise in specific processes or technologies under development by ARPA-E.

(l) ARPA-E EVALUATION.—

(1) IN GENERAL.—After ARPA-E has been in operation for 6 years, *and once every 6 years thereafter*, the Secretary shall offer to enter into a contract with the National Academy of Sciences under which the National Academy shall conduct an evaluation of how well ARPA-E is achieving the goals and mission of ARPA-E.

(2) INCLUSIONS.—The evaluation shall include—

(A) the recommendation of the National Academy of Sciences on whether ARPA-E should be continued or terminated; and

(B) a description of lessons learned from operation of ARPA-E, and the manner in which those lessons may apply to the operation of other programs of the Department.

(3) AVAILABILITY.—On completion of the evaluation, the evaluation shall be made available to Congress and the public.

(m) EXISTING AUTHORITIES.—The authorities granted by this section are—

(1) in addition to existing authorities granted to the Secretary; and

(2) are not intended to supersede or modify any existing authorities.

(n) *PROTECTION OF PROPRIETARY INFORMATION.*—

(1) *IN GENERAL.*—*The following categories of information collected by the Advanced Research Projects Agency–Energy from recipients of financial assistance awards shall be considered privileged and confidential and not subject to disclosure pursuant to section 552 of title 5, United States Code:*

(A) *Plans for commercialization of technologies developed under the award, including business plans, technology to market plans, market studies, and cost and performance models.*

(B) *Investments provided to an awardee from third parties, such as venture capital, hedge fund, or private equity firms, including amounts and percentage of ownership of the awardee provided in return for such investments.*

(C) *Additional financial support that the awardee plans to invest or has invested into the technology developed under the award, or that the awardee is seeking from third parties.*

(D) *Revenue from the licensing or sale of new products or services resulting from the research conducted under the award.*

(2) *EFFECT OF SUBSECTION.*—*Nothing in this subsection affects—*

(A) *the authority of the Secretary to use information without publicly disclosing such information; or*

(B) *the responsibility of the Secretary to transmit information to Congress as required by law.*

[(n)] (o) *FUNDING.*—

(1) *FUND.*—*There is established in the Treasury of the United States a fund, to be known as the “Energy Transformation Acceleration Fund”, which shall be administered by the Director for the purposes of carrying out this section.*

(2) *AUTHORIZATION OF APPROPRIATIONS.*—*Subject to paragraphs (4) and (5), 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 2008;*

(B) *such sums as are necessary for each of fiscal years 2009 and 2010;*

(C) *\$300,000,000 for fiscal year 2011;*

(D) *\$306,000,000 for fiscal year 2012; and*

(E) *\$312,000,000 for fiscal year 2013.*

(3) *SEPARATE BUDGET AND APPROPRIATION.*—

(A) *BUDGET REQUEST.*—*The budget request for ARPA-E shall be separate from the rest of the budget of the Department.*

(B) *APPROPRIATIONS.*—*Appropriations to the Fund shall be separate and distinct from the rest of the budget for the Department.*

(4) *ALLOCATION.*—*Of the amounts appropriated for a fiscal year under paragraph (2)—*

(A) *not more than 50 percent of the amount shall be used to carry out subsection (e)(3)(D);*

(B) *at least 5 percent of the amount shall be used for technology transfer and outreach activities, consistent with*

the goal described in subsection (c)(2)(D) and within the responsibilities of program directors described in subsection (g)(2)(B)(vii); and

(C) no funds may be used for construction of new buildings or facilities during the 5-year period beginning on the date of enactment of this Act.

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## DEPARTMENT OF ENERGY SCIENCE EDUCATION ENHANCEMENT ACT

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### DIVISION C—OTHER NATIONAL DEFENSE AUTHORIZATIONS

#### TITLE XXXI—DEPARTMENT OF ENERGY NATIONAL SECURITY PROGRAMS

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#### PART E—DEPARTMENT OF ENERGY SCIENCE EDUCATION PROGRAMS

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### Subpart A—Science Education Enhancement

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#### SEC. 3164. SCIENCE EDUCATION PROGRAMS.

(a) PROGRAMS.—The Secretary is authorized to establish programs to enhance the quality of mathematics, science, and engineering education. Any such programs shall be operated at or through the support of Department research and development facilities, shall use the scientific resources of the Department, and shall be consistent with the overall Federal plan for education and human resources in science and technology developed by the Federal Coordinating Council for Science, Engineering, and Technology.

(b) ORGANIZATION OF SCIENCE, ENGINEERING, AND MATHEMATICS EDUCATION PROGRAMS.—

(1) DIRECTOR OF SCIENCE, ENGINEERING, AND MATHEMATICS EDUCATION.—Notwithstanding any other provision of law, the Secretary, acting through the **Under Secretary for Science** *Under Secretary for Science and Energy* (referred to in this subsection as the “Under Secretary”), shall appoint a Director of Science, Engineering, and Mathematics Education (referred to in this subsection as the “Director”) with the principal responsibility for administering science, engineering, and mathematics education programs 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 Under Secretary on all matters pertaining to science, engineering, and mathematics education at the Department.

## (3) DUTIES.—The Director shall—

(A) oversee all science, engineering, and mathematics education programs of the Department;

(B) represent the Department as the principal inter-agency liaison for all science, engineering, and mathematics education programs, unless otherwise represented by the Secretary or the Under Secretary;

(C) prepare the annual budget and advise the Under Secretary on all budgetary issues for science, engineering, and mathematics education programs of the Department;

(D) increase, to the maximum extent practicable, the participation and advancement of women and underrepresented minorities at every level of science, technology, engineering, and mathematics education; and

(E) perform other such matters relating to science, engineering, and mathematics education as are required by the Secretary or the Under Secretary.

(4) STAFF AND OTHER RESOURCES.—The Secretary shall assign to the Director such personnel and other resources as the Secretary considers necessary to permit the Director to carry out the duties of the Director.

## (5) ASSESSMENT.—

(A) IN GENERAL.—The Secretary shall offer to enter into a contract with the National Academy of Sciences under which the National Academy, not later than 5 years after, and not later than 10 years after, the date of enactment of this paragraph, shall assess the performance of the science, engineering, and mathematics education programs of the Department.

(B) CONSIDERATIONS.—An assessment under this paragraph shall be conducted taking into consideration, where applicable, the effect of science, engineering, and mathematics education programs of the Department on student academic achievement in science and mathematics.

(6) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated such sums as are necessary to carry out this subsection.

(c) RELATIONSHIP TO OTHER DEPARTMENT ACTIVITIES.—The programs described in subsection (a) shall supplement and be coordinated with current activities of the Department, but shall not supplant them.

(d) SCIENCE, ENGINEERING, AND MATHEMATICS EDUCATION FUND.—The Secretary shall establish a Science, Engineering, and Mathematics Education Fund, using not less than 0.3 percent of the amount made available to the Department for research, development, demonstration, and commercial application for each fiscal year, to carry out sections 3165, 3166, and 3167.

(e) ANNUAL PLAN FOR ALLOCATION OF EDUCATION FUNDING.—The Secretary shall submit to Congress as part of the annual budget submission for a fiscal year a report describing the manner in which the Department has complied with subsection (d) for the prior fiscal year and the manner in which the Department proposes to comply with subsection (d) during the following fiscal year, including—

(1) the total amount of funding for research, development, demonstration, and commercial application activities for the corresponding fiscal year;

(2) the amounts set aside for the Science, Engineering, and Mathematics Education Fund under subsection (d) from funding for research activities, development activities, demonstration activities, and commercial application activities for the corresponding fiscal year; and

(3) a description of how the funds set aside under subsection (d) were allocated for the prior fiscal year and will be allocated for the following fiscal year.

(f) **PROGRAMS FOR STUDENTS FROM UNDER-REPRESENTED GROUPS.**—In carrying out a program under subsection (a), the Secretary shall give priority to activities that are designed to encourage students from under-represented groups to pursue scientific and technical careers.

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## **UNITED STATES ENERGY STORAGE COMPETITIVENESS ACT OF 2007**

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## **TITLE VI—ACCELERATED RESEARCH AND DEVELOPMENT**

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### **Subtitle D—Energy Storage for Transportation and Electric Power**

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#### **SEC. 641. ENERGY STORAGE COMPETITIVENESS.**

(a) **SHORT TITLE.**—This section may be cited as the “United States Energy Storage Competitiveness Act of 2007”.

(b) **DEFINITIONS.**—In this section:

(1) **COUNCIL.**—The term “Council” means the Energy Storage Advisory Council established under subsection (e).

(2) **COMPRESSED AIR ENERGY STORAGE.**—The term “compressed air energy storage” means, in the case of an electricity grid application, the storage of energy through the compression of air.

(3) **ELECTRIC DRIVE VEHICLE.**—The term “electric drive vehicle” means—

(A) a vehicle that uses an electric motor for all or part of the motive power of the vehicle, including battery electric, hybrid electric, plug-in hybrid electric, fuel cell, and plug-in fuel cell vehicles and rail transportation vehicles; or

(B) mobile equipment that uses an electric motor to replace an internal combustion engine for all or part of the work of the equipment.

(4) ISLANDING.—The term “islanding” means a distributed generator or energy storage device continuing to power a location in the absence of electric power from the primary source.

(5) FLYWHEEL.—The term “flywheel” means, in the case of an electricity grid application, a device used to store rotational kinetic energy.

(6) MICROGRID.—The term “microgrid” means an integrated energy system consisting of interconnected loads and distributed energy resources (including generators and energy storage devices), which as an integrated system can operate in parallel with the utility grid or in an intentional islanding mode.

(7) SELF-HEALING GRID.—The term “self-healing grid” means a grid that is capable of automatically anticipating and responding to power system disturbances (including the isolation of failed sections and components), while optimizing the performance and service of the grid to customers.

(8) SPINNING RESERVE SERVICES.—The term “spinning reserve services” means a quantity of electric generating capacity in excess of the quantity needed to meet peak electric demand.

(9) ULTRACAPACITOR.—The term “ultracapacitor” means an energy storage device that has a power density comparable to a conventional capacitor but is capable of exceeding the energy density of a conventional capacitor by several orders of magnitude.

(c) PROGRAM.—The Secretary shall carry out a research, development, and demonstration program to support the ability of the United States to remain globally competitive in energy storage systems for electric drive vehicles, stationary applications, and electricity transmission and distribution.

(d) COORDINATION.—In carrying out the activities of this section, the Secretary shall coordinate relevant efforts with appropriate Federal agencies, including the Department of Transportation.

(e) ENERGY STORAGE ADVISORY COUNCIL.—

(1) ESTABLISHMENT.—Not later than 90 days after the date of enactment of this Act, the Secretary shall establish an Energy Storage Advisory Council.

(2) COMPOSITION.—

(A) IN GENERAL.—Subject to subparagraph (B), the Council shall consist of not less than 15 individuals appointed by the Secretary, based on recommendations of the National Academy of Sciences.

(B) ENERGY STORAGE INDUSTRY.—The Council shall consist primarily of representatives of the energy storage industry of the United States.

(C) CHAIRPERSON.—The Secretary shall select a Chairperson for the Council from among the members appointed under subparagraph (A).

(3) MEETINGS.—

(A) IN GENERAL.—The Council shall meet not less than once a year.

(B) FEDERAL ADVISORY COMMITTEE ACT.—The Federal Advisory Committee Act (5 U.S.C. App.) shall apply to a meeting of the Council.

(4) PLANS.—No later than 1 year after the date of enactment of this Act and every 5 years thereafter, the Council, in con-

junction with the Secretary, shall develop a 5-year plan for integrating basic and applied research so that the United States retains a globally competitive domestic energy storage industry for electric drive vehicles, stationary applications, and electricity transmission and distribution.

(5) REVIEW.—The Council shall—

(A) assess, every 2 years, the performance of the Department in meeting the goals of the plans developed under paragraph (4); and

(B) make specific recommendations to the Secretary on programs or activities that should be established or terminated to meet those goals.

(f) BASIC RESEARCH PROGRAM.—

(1) BASIC RESEARCH.—The Secretary shall conduct a basic research program on energy storage systems to support electric drive vehicles, stationary applications, and electricity transmission and distribution, including—

(A) materials design;

(B) materials synthesis and characterization;

(C) electrode-active materials, including electrolytes and bioelectrolytes;

(D) surface and interface dynamics;

(E) modeling and simulation; and

(F) thermal behavior and life degradation mechanisms.

(2) NANOSCIENCE CENTERS.—The Secretary, in cooperation with the Council, shall coordinate the activities of the nanoscience centers of the Department to help the energy storage research centers of the Department maintain a globally competitive posture in energy storage systems for electric drive vehicles, stationary applications, and electricity transmission and distribution.

(3) FUNDING.—For activities carried out under this subsection, in addition to funding activities at National Laboratories, the Secretary shall award funds to, and coordinate activities with, a range of stakeholders including the public, private, and academic sectors.

(g) APPLIED RESEARCH PROGRAM.—

(1) IN GENERAL.—The Secretary shall conduct an applied research program on energy storage systems to support electric drive vehicles, stationary applications, and electricity transmission and distribution technologies, including—

(A) ultracapacitors;

(B) flywheels;

(C) batteries and battery systems (including flow batteries);

(D) compressed air energy systems;

(E) power conditioning electronics;

(F) manufacturing technologies for energy storage systems;

(G) thermal management systems; and

(H) hydrogen as an energy storage medium.

(2) FUNDING.—For activities carried out under this subsection, in addition to funding activities at National Laboratories, the Secretary shall provide funds to, and coordinate ac-

tivities with, a range of stakeholders, including the public, private, and academic sectors.

(h) ENERGY STORAGE RESEARCH CENTERS.—

(1) IN GENERAL.—The Secretary shall establish, through competitive bids, not more than 4 energy storage research centers to translate basic research into applied technologies to advance the capability of the United States to maintain a globally competitive posture in energy storage systems for electric drive vehicles, stationary applications, and electricity transmission and distribution.

(2) PROGRAM MANAGEMENT.—The centers shall be managed by the [Under Secretary for Science] *Under Secretary for Science and Energy* of the Department.

(3) PARTICIPATION AGREEMENTS.—As a condition of participating in a center, a participant shall enter into a participation agreement with the center that requires that activities conducted by the participant for the center promote the goal of enabling the United States to compete successfully in global energy storage markets.

(4) PLANS.—A center shall conduct activities that promote the achievement of the goals of the plans of the Council under subsection (e)(4).

(5) NATIONAL LABORATORIES.—A national laboratory (as defined in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801)) may participate in a center established under this subsection, including a cooperative research and development agreement (as defined in section 12(d) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a(d))).

(6) DISCLOSURE.—Section 623 of the Energy Policy Act of 1992 (42 U.S.C. 13293) may apply to any project carried out through a grant, contract, or cooperative agreement under this subsection.

(7) INTELLECTUAL PROPERTY.—In accordance with section 202(a)(ii) of title 35, United States Code, section 152 of the Atomic Energy Act of 1954 (42 U.S.C. 2182), and section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908), the Secretary may require, for any new invention developed under this subsection, that—

(A) if an industrial participant is active in a energy storage research center established under this subsection relating to the advancement of energy storage technologies carried out, in whole or in part, with Federal funding, the industrial participant be granted the first option to negotiate with the invention owner, at least in the field of energy storage technologies, nonexclusive licenses, and royalties on terms that are reasonable, as determined by the Secretary;

(B) if 1 or more industry participants are active in a center, during a 2-year period beginning on the date on which an invention is made—

(i) the patent holder shall not negotiate any license or royalty agreement with any entity that is not an industrial participant under this subsection; and



(ii) the patent holder shall negotiate nonexclusive licenses and royalties in good faith with any interested industrial participant under this subsection; and

(C) the new invention be developed under such other terms as the Secretary determines to be necessary to promote the accelerated commercialization of inventions made under this subsection to advance the capability of the United States to successfully compete in global energy storage markets.

(i) ENERGY STORAGE SYSTEMS DEMONSTRATIONS.—

(1) IN GENERAL.—The Secretary shall carry out a program of new demonstrations of advanced energy storage systems.

(2) SCOPE.—The demonstrations shall—

(A) be regionally diversified; and

(B) expand on the existing technology demonstration program of the Department.

(3) STAKEHOLDERS.—In carrying out the demonstrations, the Secretary shall, to the maximum extent practicable, include the participation of a range of stakeholders, including—

(A) rural electric cooperatives;

(B) investor owned utilities;

(C) municipally owned electric utilities;

(D) energy storage systems manufacturers;

(E) electric drive vehicle manufacturers;

(F) the renewable energy production industry;

(G) State or local energy offices;

(H) the fuel cell industry; and

(I) institutions of higher education.

(4) OBJECTIVES.—Each of the demonstrations shall include 1 or more of the following:

(A) Energy storage to improve the feasibility of microgrids or islanding, or transmission and distribution capability, to improve reliability in rural areas.

(B) Integration of an energy storage system with a self-healing grid.

(C) Use of energy storage to improve security to emergency response infrastructure and ensure availability of emergency backup power for consumers.

(D) Integration with a renewable energy production source, at the source or away from the source.

(E) Use of energy storage to provide ancillary services, such as spinning reserve services, for grid management.

(F) Advancement of power conversion systems to make the systems smarter, more efficient, able to communicate with other inverters, and able to control voltage.

(G) Use of energy storage to optimize transmission and distribution operation and power quality, which could address overloaded lines and maintenance of transformers and substations.

(H) Use of advanced energy storage for peak load management of homes, businesses, and the grid.

(I) Use of energy storage devices to store energy during nonpeak generation periods to make better use of existing grid assets.

(j) VEHICLE ENERGY STORAGE DEMONSTRATION.—

(1) IN GENERAL.—The Secretary shall carry out a program of electric drive vehicle energy storage technology demonstrations.

(2) CONSORTIA.—The technology demonstrations shall be conducted through consortia, which may include—

- (A) energy storage systems manufacturers and suppliers of the manufacturers;
- (B) electric drive vehicle manufacturers;
- (C) rural electric cooperatives;
- (D) investor owned utilities;
- (E) municipal and rural electric utilities;
- (F) State and local governments;
- (G) metropolitan transportation authorities; and
- (H) institutions of higher education.

(3) OBJECTIVES.—The program shall demonstrate 1 or more of the following:

(A) Novel, high capacity, high efficiency energy storage, charging, and control systems, along with the collection of data on performance characteristics, such as battery life, energy storage capacity, and power delivery capacity.

(B) Advanced onboard energy management systems and highly efficient battery cooling systems.

(C) Integration of those systems on a prototype vehicular platform, including with drivetrain systems for passenger, commercial, and nonroad electric drive vehicles.

(D) New technologies and processes that reduce manufacturing costs.

(E) Integration of advanced vehicle technologies with electricity distribution system and smart metering technology.

(F) Control systems that minimize emissions profiles in cases in which clean diesel engines are part of a plug-in hybrid drive system.

(k) SECONDARY APPLICATIONS AND DISPOSAL OF ELECTRIC DRIVE VEHICLE BATTERIES.—The Secretary shall carry out a program of research, development, and demonstration of—

- (1) secondary applications of energy storage devices following service in electric drive vehicles; and
- (2) technologies and processes for final recycling and disposal of the devices.

(l) COST SHARING.—The Secretary shall carry out the programs established under this section in accordance with section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352).

(m) MERIT REVIEW OF PROPOSALS.—The Secretary shall carry out the programs established under subsections (i), (j), and (k) in accordance with section 989 of the Energy Policy Act of 2005 (42 U.S.C. 16353).

(n) COORDINATION AND NONDUPLICATION.—To the maximum extent practicable, the Secretary shall coordinate activities under this section with other programs and laboratories of the Department and other Federal research programs.

(o) REVIEW BY NATIONAL ACADEMY OF SCIENCES.—On the business day that is 5 years after the date of enactment of this Act, the Secretary shall offer to enter into an arrangement with the Na-

tional Academy of Sciences to assess the performance of the Department in carrying out this section.

(p) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out—

(1) the basic research program under subsection (f) \$50,000,000 for each of fiscal years 2009 through 2018;

(2) the applied research program under subsection (g) \$80,000,000 for each of fiscal years 2009 through 2018; and;

(3) the energy storage research center program under subsection (h) \$100,000,000 for each of fiscal years 2009 through 2018;

(4) the energy storage systems demonstration program under subsection (i) \$30,000,000 for each of fiscal years 2009 through 2018;

(5) the vehicle energy storage demonstration program under subsection (j) \$30,000,000 for each of fiscal years 2009 through 2018; and

(6) the secondary applications and disposal of electric drive vehicle batteries program under subsection (k) \$5,000,000 for each of fiscal years 2009 through 2018.

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## MINORITY VIEWS

The Competes Act of 2007 was landmark bipartisan legislation that was based on the recommendations of the esteemed National Academies and was vetted with dozens of stakeholder organizations through a multi-month, transparent process. The Competes Reauthorization Act of 2010 went through a similar, transparent, bipartisan process. In contrast, H.R. 1806 was kept behind closed doors until less than a week before the full committee markup. There were no legislative hearings or subcommittee markups. Neither the agencies that are being authorized nor the stakeholder community at large had any opportunity to see it or to provide feedback. Bipartisan negotiations were limited to a few pages in the science, technology, engineering, and math (STEM) title.

H.R. 1806 violates every one of the basic principles that underlay the original Competes Act. The Competes Acts of 2007 and 2010 sought to ensure America's continued scientific preeminence and to grow our innovation economy. In contrast, H.R. 1806 is preoccupied with questioning the motives of the National Science Foundation and the integrity of the scientists it funds. In addition, it would put up multiple roadblocks to progress in clean energy research and development (R&D), under the guise of preventing "picking winners and losers", even as H.R. 1806 picks its own winners and losers.

The Competes Acts of 2007 and 2010 focused on reinforcing America's commitment to the sciences across the board. In contrast, H.R. 1806 seeks to pit different scientific disciplines against one another and to prevent research in fields to which the Majority is ideologically opposed.

The Competes Acts of 2007 and 2010 sought to provide sustainable increases for R and D. In contrast, H.R. 1806 would flat fund R&D overall and impose severe cuts in certain fields. The Competes Acts of 2007 and 2010 sought to attract a new generation of STEM researchers across all fields. In contrast, H.R. 1806 would impose funding cuts and policies that will discourage an entire generation of American students and researchers.

The Competes Acts of 2007 and 2010 received hundreds of endorsements from scientific organizations, universities, companies, and industry organizations. This time, even though they had only a few days to respond, a large number of significant organizations wrote to the Committee expressing concern or outright opposition to H.R. 1806. By the date of the markup we had already received 32 such letters representing well over 300 scientific organizations, universities, private companies, and retired military leaders.

Among those organizations expressing serious concern are the American Physical Society, the Computing Research Association, the American Institute of Biological Sciences, the American Association of Petroleum Geologists, the American Association for the Advancement of Science, and the Energy Sciences Coalition. It is

notable that the very scientists and engineers for whom H.R. 1806 was supposedly written want nothing to do with it.

We even received a letter from the widely respected Secretary of Energy. This may well be the first time in the history of this Committee that a sitting Cabinet member has provided formal opposition to a piece of legislation that we are considering, certainly at this stage of the legislative process. That should be a strong indication of just how bad this bill really is.

There are a few positive and bipartisan provisions in H.R. 1806. We disagree with the funding levels provided to NIST in Title IV; however, the policy language in that title was arrived at through bipartisan negotiations in the 113th Congress. The provisions of Title II, the STEM Education Title, likewise reflect bipartisan discussions prior to the introduction of that title. The DOE Technology Transfer Title and supercomputing research provisions incorporate bipartisan bills that moved through the Committee earlier in the year. Finally, a few Democratic amendments improving the bill were accepted during the April 22 markup. However, even with these improvements, the Democratic Members of the Committee voted unanimously in opposition to the legislation as reported.

The Democratic Members of the Committee introduced an alternative bill, H.R. 1898, and offered it as an amendment at the April 22 markup. Every Democratic Committee Member is an original cosponsor of that bill. H.R. 1898 continues the spirit and intent of the original Competes Act. While the amendment was voted down along partisan lines, the Democratic Members continue to hope that a bipartisan compromise may be possible. The Competes Act is too important to be subject to the worst of partisan politics.

### **National Science Foundation**

H.R. 1806 arbitrarily provides increases to the natural sciences and engineering at the expense of the social, behavioral, and economic sciences (SBE), geosciences, prestigious fellowships for American graduate students, EPSCoR, international collaboration, and STEM education. The bill slashes funding for the SBE research by 55 percent from the FY 2015 level, even though NSF is the primary source of federal support for SBE sciences. Understanding human factors is essential to our economic and national security, public health, and the wellbeing of our society as we know it, and this severe cut will do lasting harm. H.R. 1806 cuts funding for the geosciences directorate (GEO) by 8 percent. GEO, in addition to funding work directly on climate sciences, has a broad portfolio that includes ocean sciences, natural hazards research, space weather, and the polar programs, every one of which is essential to this nation's national and economic security and wellbeing. The bill cuts EPSCoR and NSF graduate research fellowships by 11 percent. We do not agree with any of these cuts.

H.R. 1806 flat funds the Education and Human Resources directorate (EHR), despite the repeated rhetoric on the importance of STEM education and the significantly increased administrative burden placed on EHR as a result of several other provisions in the bill. That administrative burden compounds the loss of purchasing power inherent in flat funding.

Therefore, flat funding in this bill represents a cut, not just due to the impact of inflation. EHR funds rigorous research that improves STEM education and opportunities for all Americans. It must be fully funded. Finally, with respect to funding, H.R. 1806 flat funds the agency's operations account, putting into severe jeopardy the cost and schedule of NSF's new headquarters being built in Alexandria, Virginia.

A couple of the significant policy concerns in the NSF title were positively addressed during the markup; however concerns remain. Overall, "heavy-handed oversight" is a more fitting term than "authorization" to describe the NSF title, which does not follow the spirit of Competes. There is room for improvement throughout the NSF title, but a few provisions stand out as being the most flawed. Specifically, Sec. 106 represents a misguided and potentially dangerous attempt to impose a level of political review on NSF's gold-standard merit-review system, thus encouraging researchers, peer-reviewers, and NSF program officers alike to play it safe, discouraging high-risk research and out-of-the-box thinking that is essential to the progress of science.

In another provision that is a solution in search of a problem, Sec. 116 would require public shaming of all NSF-funded investigators who are found to be guilty of research misconduct, independent of the nature or severity of the offense. This same provision also suggests that NSF should police misconduct in scientific publications, something that is impossible for them to do. Similarly, in another poorly conceived provision on research reproducibility, Sec. 117 largely ignores the expert advice of NSF officials on the actual nature of the reproducibility challenges (including how much these challenges vary across fields), the proactive steps NSF is already taking with input from their expert advisory committees, and how the Academies might best be helpful on this topic.

### **Office of Science and Technology Policy (OSTP)**

H.R. 1806 cuts OSTP's budget by \$1 million—nearly 20 percent—seemingly as retaliation for OSTP being uncooperative, in the Majority's view, in the Majority's 2-year campaign to undercover supposed evidence of OSTP's culpability in the early troubles with the Healthcare.gov website and the more recent news of potential issues with privacy protections on Healthcare.gov. The Majority keeps looking for the smoking gun that doesn't exist, and OSTP is apparently being punished as a result. For the same reasons, Sec. 306 requires that the White House Chief Technology Officer, currently an advisor to the President, be a Senate-confirmed position within OSTP. The bill lays out a very prescriptive description of duties, many of which overlap with duties of the Chief Information Officer, codified in the E-Government Act of 2002. In fact, it was this very provision that triggered a referral to the Oversight and Government Reform Committee, which was apparently not consulted in the drafting on this section. There may be good reasons to codify the CTO position, but we cannot support the approach in Sec. 306, nor the 20 percent cut to OSTP's budget at a time when Congress and the Administration alike are asking OSTP to take on more and more responsibilities, including a number that are mandated in this bill.

### **National Institute of Standards and Technology (NIST)**

Our major concern with the NIST title has to do with funding. H.R. 1806 cuts funding for the very successfully Manufacturing Extension Partnership (MEP) Program and does not fund the new manufacturing institutes requested by the Administration under the recently enacted National Networking for Manufacturing Innovation. We would like to see both of these important manufacturing programs fully funded.

### **Department of Energy (DOE)**

H.R. 1806 makes significant cuts to critical Department of Energy R&D programs. First, the legislation would cut Energy Efficiency and Renewable Energy (EERE) R&D by 29 percent, or \$496 million, below FY15 appropriated levels, and 50 percent below the President's FY 2016 request level. It would cut ARPA-E by 50 percent, or \$140 million, below FY 2015 levels, and 57 percent below the FY 2016 request level. In addition, H.R. 1806 would cut the Office of Science's Biological and Environmental Research Program (BER) by 7.1 percent, or \$62.4 million, below FY 2015 levels, and 10.2 percent below the FY 2016 request level. We support full funding for all of these offices.

In addition to these harmful cuts, there are a number of equally harmful policy directives in the current bill text. The bill would:

- Bar the results of any DOE-supported fossil R&D activity from being “used for regulatory assessments or determinations by Federal regulatory authorities.” This could essentially ban the EPA or FERC from using the most up-to-date research results when they set rules to protect our air, land, and water and prevent health hazards associated with fossil fuel use. See Section 661, which adds a Section 961(b)(3) into the Energy Policy Act of 2005.
- Eliminate existing authorization for integrated biorefinery demonstration projects and R&D in offshore wind, next generation lighting, hybrid and electric propulsion systems, plug-in hybrid systems, advanced combustion engines, and secondary EV battery use. Most of these changes are made through cut-and-replace (or in the case of lighting and secondary batteries, just cut) amendments to the Energy Policy Act of 2005 throughout Title II, Subtitle C.
- Remove “reductions of energy-related emissions, including greenhouse gases” from goals of ARPA-E, and also could limit its ability to work with universities and national laboratories to carry out early-stage, high-risk research due to an assumption that every awardee must seek private financing first. See Section 671, which amends Section 5012(c)(1) and (0)(1) of the America COMPETES Act.
- Repeal the statute establishing a program to support renewable energy demonstration projects in State and local government buildings. See Section 650.
- Prohibit DOE from continuing to support a joint initiative with the Department of Defense and the Department of Agriculture to establish a cost-competitive drop-in biofuels production capability for military and commercial applications. See Section 648, which adds a Section 932(d) into the Energy Policy Act of 2005.
- Strike existing authorization for DOE to provide grants or technical assistance to support the development of standards for

high performance buildings, and for Advanced Energy Technology Transfer Centers to develop and distribute informational materials on how to use energy more efficiently. See Sections 643 and 646.

- Prevent BER from carrying out climate science-related initiatives that are identified by GAO as “overlapping or duplicative” with initiatives of other Federal agencies. While these efforts should be, and are, coordinated across the government, this language ignores the value of independent replication of research results. Further, GAO has noted in a recent report that its own use of the term “duplicative” did not mean that a particular federal effort wasn’t valuable. See Section 505(d).

- BER would also be required to “prioritize fundamental research on biological systems and genomics science” over climate and environmental research, even when an independent merit review process determines that research opportunities in the latter areas may warrant more funding than the former in any given year. It is also unclear how cutting-edge biological research for environmental applications, such as cleaning up weapons-related waste sites like Hanford, WA, would be affected. See Section 505(b).

### **What’s Missing**

Finally, while there are many Democratic priorities not addressed in H.R. 1806, there are a few omissions that we find most troubling. First, H.R. 1806 fails to do anything substantive and meaningful on broadening participation in STEM to women and underrepresented minorities. Increasing the participation of women and minorities in STEM is an economic imperative for our nation. Ranking Member Johnson offered H.R. 467, the STEM Opportunities Act, as an amendment during markup, and it was voted down along party lines without any substantive response as to why it was being rejected. Rep. Edwards offered a narrowly targeted amendment that would help ensure that Minority Serving Institutes are equal partners in NSF-funded research partnerships with major research universities. Chairman Smith refused to accept the amendment but did pledge to work with Ms. Edwards on a compromise. Even if Ms. Edwards’ amendment were to be incorporated in some meaningful way, H.R. 1806 would still fail to address in any significant way the issue of broadening participation in STEM.

Second, H.R. 1806 also lacks an Innovation title that builds and strengthens programs and activities at the Department of Commerce that would help build innovation capacity and increase competitiveness and job creation in regions across our nation, including by supporting collaborations among state and local governments, the private sector, and research institutions. Such a title is included in the Democratic alternative, H.R. 1898. Similarly, H.R. 1806 falls short in authorizing innovative models to accelerate the development of new energy technologies, such as Energy Innovation Hubs, which bring together leading researchers from universities, the private sector, and national laboratories to tackle significant energy science and technology issues.



### **Groups Concerned about H.R. 1806**

Below is a list of organizations or groups that have written letters or released statements expressing concern or opposition to H.R. 1806:

- Alliance to Save Energy
- American Academy of Political and Social Science
- American Anthropological Association
- American Association for the Advancement of Science
- American Association of Petroleum Geologists
- American Association of Physics Teachers
- American Educational Research Association
- American Geophysical Union
- American Geosciences Institute
- American Institute of Biological Sciences
- American Institute of Physics
- American Physical Society
- American Political Science Association
- American Psychological Association
- American Society for Microbiology
- Association for the Sciences of Limnology and Oceanography
- Association of American Universities
- Association of Public and Land-grant Universities
- AVS: Science & Technology of Materials, Interfaces, and Processing
- Clay Minerals Society
- Coalition for National Science Funding
- Computing Research Association
- Consortium for Ocean Leadership
- Consortium of Social Science Associations
- Council for Sustainable Energy
- Council of Undergraduate Research
- Department of Energy Secretary Ernest Moniz
- Ecological Society of America
- Energy Sciences Coalition
- Environment America
- Environmental Defense Fund
- Federation of Associations in Behavioral and Brain Sciences
- Geological Society of America
- IEEE
- Iris Consortium
- League of Conservation Voters
- Learning and Education Academic Research Network
- National Association of Geoscience Teachers
- National Association of Marine Laboratories
- National Cave and Karst Research Institute
- National Ground Water Association
- Natural Resources Defense Council
- Paleontological Research Institution
- Princeton University
- Research!America
- Seismological Society of America
- Sierra Club
- Society for Mining, Metallurgy, and Exploration, Inc.

- Society of Independent Professional Earth Scientists
- Soil Science Society Of America
- STEM Education Coalition
- Taskforce on American Innovation
- The Optical Society
- Truman National Security Project—Operation Free
- Union of Concerned Scientists
- United States Permafrost Association
- University Corporation for Atmospheric Research

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## ADDITIONAL VIEWS

The America COMPETES Act has been a key public policy initiative promoting U.S. innovation and competitiveness since its passage in 2007 and its renewal is vital to ensuring that our country's leadership in a global marketplace is maintained.

An innovative workforce needs people who create, problem-solve, and think outside the box. Sharpening our focus on innovation requires updating our approach to educating our nation's students. We need to find new ways to engage more students in Science, Technology, Engineering, and Mathematics (STEM) so that innovative companies like Intel and NIKE—both major employers in my district—have the skilled applicants they need to fill high-skilled, high-paying jobs.

Not only must we engage more students in STEM, but we must also make sure those pursuing a career in the STEM fields have the ability to think creatively and be truly innovative. That comes from educating and using both halves of the brain. Research shows that integrating arts and design, broadly defined, into STEM education, can achieve both these goals. STEAM, as this approach has come to be known, can engage more students *and* lead to a more innovative workforce.

Look at patents, for example, which are indicative of innovation and leadership. The U.S. Patent and Trademark office has said it is “interested in making sure that we are encouraging more innovation and more invention in this country . . . we’ve spent a long time thinking about how science and art intersect because that is the lifeblood of the agency . . . STEAM is critical to the U.S. Patent and Trademark office.”

The Director of Worldwide Education for Adobe said, “by embracing STEAM, we can help bridge the creativity gap within the global economy and help ensure the success of the next generation.”

During Committee consideration of the bill, I offered an amendment that represents an important step toward updating the federal approach to STEM by laying the groundwork for the increased adoption of arts and design into federal STEM education programs. My amendment would have added a Sense of Congress expressing the potential of this approach to improve the federal approach to STEM education, and would have directed the National Science Foundation and the National Research Council to work together to evaluate the potential benefits of integrating arts and design with STEM education.

Maintaining our position as the most innovative country on Earth, and making sure we have a cutting-edge, next generation workforce is something we should all agree on. Although the amendment was not included in the final bill, as Congress moves

forward with legislation that seeks to further American innovation and competitiveness, STEAM should be a part of those efforts.

SUZANNE BONAMICI.

