

111TH CONGRESS
1ST SESSION

S. 1482

To reauthorize the 21st Century Nanotechnology Research and Development Act, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JULY 21, 2009

Mr. KERRY (for himself, Ms. SNOWE, Mr. ROCKEFELLER, Mr. PRYOR, and Mr. WYDEN) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To reauthorize the 21st Century Nanotechnology Research and Development Act, and for other purposes.

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

3 **SECTION 1. SHORT TITLE: TABLE OF CONTENTS; AMEND-**
4 **MENT OF ACT.**

5 This Act may be cited as the “National Nanotechnol-
6 ogy Initiative Amendments Act of 2009”.

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

- Sec. 1. Short title; table of contents.
- Sec. 2. Enhancements to National Nanotechnology Program.
- Sec. 3. Enhancements to National Nanotechnology Program coordination.
- Sec. 4. Enhancement of National Nanotechnology Advisory Panel.
- Sec. 5. Triennial external review of National Nanotechnology Program.
- Sec. 6. Societal dimensions of nanotechnology.

Sec. 7. Transfer of nanotechnology.
 Sec. 8. Research in areas of national importance.
 Sec. 9. Nanomanufacturing research.
 Sec. 10. Nanoscale characterization and metrology.
 Sec. 11. Deliberative public input in decisionmaking processes.
 Sec. 12. Amendments to definitions.

1 (c) AMENDMENT OF 21ST CENTURY NANOTECHNOL-
 2 OGY RESEARCH AND DEVELOPMENT ACT.—Except as
 3 otherwise expressly provided, whenever in this Act an
 4 amendment or repeal is expressed in terms of an amend-
 5 ment to, or repeal of, a section or other provision, the ref-
 6 erence shall be considered to be made to a section or other
 7 provision of the 21st Century Nanotechnology Research
 8 and Development Act (15 U.S.C. 7501 et seq.).

9 **SEC. 2. ENHANCEMENTS TO NATIONAL NANOTECHNOLOGY**
 10 **PROGRAM.**

11 (a) EXPANSION OF PROGRAM SCOPE.—Section 2(a)
 12 (15 U.S.C. 7501(a)) is amended—

13 (1) by striking “and” after the semicolon in
 14 paragraph (2);

15 (2) by striking “Program.” in paragraph (3)
 16 and inserting “Program; and”; and

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

18 “(4) sponsor nanotechnology education and
 19 workforce development programs, including informa-
 20 tion on nanotechnology, to prepare scientists, engi-
 21 neers, and technicians to work in nanotechnology;

1 “(5) fully support the development of standard
2 reference materials and instrumentation, metrology,
3 and computational tools necessary to measure, char-
4 acterize, and predict the properties of nanoscale ma-
5 terials;

6 “(6) participate in national and international
7 organizations developing trade, commercialization,
8 and regulatory guidelines, plans, and standards for
9 the safe use of nanotechnology;

10 “(7) establish and sustain the infrastructure,
11 tools, and instruments to provide cost effective state-
12 of-the-art measurement, characterization, manipula-
13 tion, and simulations capabilities;

14 “(8) utilize the perspectives of the industrial
15 community to promote the rapid commercial devel-
16 opment of nanoscale-enabled devices, systems, and
17 technologies; and

18 “(9) coordinate research to determine key phys-
19 ical and chemical characteristics of nanoparticles
20 and nanomaterials that may pose environmental,
21 health, and safety risks.”.

22 (b) ADDITION OF PROGRAM ACTIVITIES.—

23 (1) IN GENERAL.—Section 2(b) (15 U.S.C.
24 7501(b)) is amended—

1 (A) by redesignating paragraphs (3)
 2 through (11) as paragraphs (4) through (12),
 3 respectively; and

4 (B) by inserting after paragraph (2) the
 5 following:

6 “(3) issuing guidance each year to the agencies
 7 participating in the Program that—

8 “(A) prioritizes the Program’s research ini-
 9 tiatives;

10 “(B) documents the benefit of the research
 11 to the United States;

12 “(C) describes a clear strategy for
 13 transitioning the research into commercial prod-
 14 ucts and technologies; and

15 “(D) describes how the Program will co-
 16 ordinate or conduct research on the environ-
 17 mental, health, and safety issues related to
 18 nanotechnology.”.

19 (2) CONFORMING AMENDMENTS.—

20 (A) Section 2(c) (15 U.S.C. 7501(c)) is
 21 amended—

22 (i) in paragraph (7), by striking “stat-
 23 ed in subsection (b)(7)” and inserting
 24 “stated in subsection (b)(9)”; and

1 (ii) in paragraph (10), by striking
 2 “pursuant to subsection (b)(10)(D)” and
 3 inserting “pursuant to subsection
 4 (b)(12)(D)”.

5 (B) Section 2(d) (15 U.S.C. 7501(d)) is
 6 amended in paragraphs (1) and (2), by striking
 7 “pursuant to subsection (b)(10)” each place it
 8 occurs and inserting “pursuant to subsection
 9 (b)(12)”.

10 (C) Section 7(a)(1) (15 U.S.C. 7506(a)(1))
 11 is amended by striking “under section 2(b)(7)”
 12 and inserting “under section 2(b)(9)”.

13 (c) ENHANCEMENT OF PROGRAM MANAGEMENT.—

14 (1) TRIENNIAL STRATEGIC PLAN.—Section 2(c)
 15 (15 U.S.C. 7501(c)) is amended by striking para-
 16 graph (4) and inserting the following:

17 “(4) develop, not later than 1 year after the
 18 date of enactment of the National Nanotechnology
 19 Initiative Amendments Act of 2009, and update
 20 every 3 years thereafter, a strategic plan to guide
 21 the Program activities described under subsection
 22 (b) that—

23 “(A) specifies—

24 “(i) near-term and long-term objec-
 25 tives for the Program;

1 “(ii) the anticipated time frame for
2 achieving the near-term objectives; and

3 “(iii) the metrics to be used for as-
4 sessing progress toward the objectives; and
5 “(B) describes—

6 “(i) how the Program will move re-
7 sults out of the laboratory and into appli-
8 cations for the benefit of society, including
9 through cooperation and collaboration with
10 nanotechnology research, development, and
11 technology transition initiatives supported
12 by the States;

13 “(ii) how the Program will encourage
14 and support interdisciplinary research and
15 development in nanotechnology; and

16 “(iii) proposed research in areas of
17 national importance in accordance with the
18 requirements of section 12;”.

19 (2) JOINT INTERAGENCY SOLICITATIONS.—Sec-
20 tion 2(e) (15 U.S.C. 7501(e)) is further amended—

21 (A) by striking “and” after the semicolon
22 in paragraph (9);

23 (B) by redesignating paragraph (10) as
24 paragraph (11);

1 (C) by inserting after paragraph (9) the
 2 following:

3 “(10) encourage joint interagency solicitation of
 4 grant applications in high-priority multi-disciplinary
 5 research areas, including—

6 “(A) instrumentation and metrology equip-
 7 ment to detect, measure, and characterize nano-
 8 materials;

9 “(B) chemical, biological, and nuclear sen-
 10 sor technology for defense and homeland secu-
 11 rity applications;

12 “(C) sustainable energy, environment,
 13 water and agriculture;

14 “(D) long-term health and safety aspects,
 15 with a particular focus on the workforce;

16 “(E) simulation and modeling; and

17 “(F) manufacturing of complex systems at
 18 the nanoscale.”; and

19 (D) by striking “through (9)” and insert-
 20 ing “through (10)” in paragraph (11), as redes-
 21 ignated by subparagraph (B).

22 (d) EXPANSION OF ANNUAL REPORT OF THE NA-
 23 TIONAL SCIENCE AND TECHNOLOGY COUNCIL.—Section
 24 2(d) (15 U.S.C. 7501(d)) is amended—

1 (1) in paragraph (1), by inserting “and the pre-
2 vious fiscal year” after “current fiscal year”;

3 (2) in paragraph (4), by striking “and”;

4 (3) in paragraph (5), by striking the period at
5 the end and inserting “; and”; and

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

7 “(6) the research plan required by section
8 10(b)(1) and updated under section 10(b)(5); and

9 “(7) a description of research and development
10 areas supported in accordance with section 12, in-
11 cluding—

12 “(A) the budget for such areas for the cur-
13 rent and previous fiscal year; and

14 “(B) the budget for such areas for the
15 next fiscal year.”.

16 (e) SUPPORT OF STANDARDS SETTING ACTIVI-
17 TIES.—Section 2 (15 U.S.C. 7501) is amended by adding
18 at the end the following:

19 “(e) STANDARDS SETTING.—

20 “(1) IN GENERAL.—The agencies participating
21 in the Program shall fully support the activities of
22 the committees of standards setting bodies involved
23 in the development of standards for nanotechnology.

24 “(2) REIMBURSEMENT OF TRAVEL COSTS.—

25 The agencies participating in the Program may re-

1 imburse the travel costs of participants described in
2 paragraph (1).”.

3 **SEC. 3. ENHANCEMENTS TO NATIONAL NANOTECHNOLOGY**
4 **PROGRAM COORDINATION.**

5 (a) MODIFICATIONS TO FUNDING OF NATIONAL
6 NANOTECHNOLOGY COORDINATION OFFICE.—Section
7 3(b) of the Act (15 U.S.C. 7502(b)) is amended to read
8 as follows:

9 “(b) FUNDING.—

10 “(1) IN GENERAL.—The operation of the Na-
11 tional Nanotechnology Coordination Office shall be
12 supported by funds from each agency participating
13 in the Program. The portion of the total budget of
14 the Office provided by each agency for each fiscal
15 year shall be in the same proportion as the agency’s
16 share of the total budget for the Program for the
17 previous fiscal year, as specified in the report re-
18 quired under section 2(c)(1).

19 “(2) STANDARDS RESEARCH.—Of the amounts
20 provided to the Office under paragraph (1),
21 \$500,000 shall be made available to the National In-
22 stitute of Standards and Technology to be used by
23 the Institute, in coordination with the American Na-
24 tional Standards Institute, for the development of
25 nanotechnology standards.

1 “(3) NNCO DATABASE.—There are authorized
 2 to be appropriated to the National Science Founda-
 3 tion for use by the National Nanotechnology Coordi-
 4 nation Office in developing and maintaining the
 5 database required by subsection (d)—

6 “(A) \$1,750,000 for fiscal year 2010;

7 “(B) \$1,000,000 for fiscal year 2011; and

8 “(C) \$750,000 for fiscal year 2012.”.

9 (b) ANNUAL REPORT ON FUNDING OF THE NA-
 10 TIONAL NANOTECHNOLOGY COORDINATION OFFICE.—
 11 Section 3 (15 U.S.C. 7502) is amended by striking sub-
 12 section (c) and inserting the following:

13 “(c) ANNUAL REPORT.—The Council shall submit to
 14 the Committee on Commerce, Science, and Transportation
 15 of the Senate and the Committee on Science and Tech-
 16 nology of the House of Representatives each year, together
 17 with documents submitted to Congress in support of the
 18 budget of the President for the fiscal year beginning in
 19 such year (as submitted pursuant to section 1105 of title
 20 31, United States Code), a report containing the following:

21 “(1) A description of the funding required by
 22 the National Nanotechnology Coordination Office to
 23 perform the functions specified in subsection (a) for
 24 the next fiscal year set forth by category of activity,

1 including the funding required to carry out the re-
2 quirements of—

3 “(A) section 2(b)(12)(D);

4 “(B) subsection (d) of this section; and

5 “(C) section 5.

6 “(2) A description of the funding required by
7 such Office to perform the functions specified in
8 subsection (a) for the current fiscal year set forth by
9 category of activity, including the funding required
10 to carry out the requirements of subsection (d).

11 “(3) The amount of funding provided for such
12 Office for the current fiscal year set forth by each
13 agency participating in the Program.”.

14 (c) PUBLIC INFORMATION.—Section 3 (15 U.S.C.
15 7502) is further amended by adding at the end the fol-
16 lowing:

17 “(d) PUBLIC INFORMATION.—

18 “(1) DATABASE.—

19 “(A) IN GENERAL.—The Director of the
20 National Nanotechnology Coordination Office
21 shall develop and maintain a searchable key-
22 word database of all projects funded by the
23 Nanoscale Science, Engineering, and Tech-
24 nology Subcommittee of the National Science
25 and Technology Council.

1 “(B) DATABASE CONTENTS.—The data-
2 base required by subparagraph (A) shall include
3 the following, with respect to each project in the
4 database:

5 “(i) A description of the project.

6 “(ii) The source of funding of the
7 project, set forth by agency.

8 “(iii) The funding history of the
9 project.

10 “(C) GROUPING OF PROJECTS IN THE EN-
11 VIRONMENTAL, HEALTH, AND SAFETY PROGRAM
12 COMPONENT AREA.—For projects in the Envi-
13 ronmental, Health, and Safety program compo-
14 nent area, or any successor program component
15 area, projects shall be grouped in the database
16 by major objective as specified in the research
17 plan required by section 10(b)(1).

18 “(D) GROUPING OF PROJECTS IN THE
19 EDUCATION AND SOCIETAL DIMENSIONS PRO-
20 GRAM COMPONENT AREA.—For projects in the
21 Education and Societal Dimensions program
22 component area, or any successor program com-
23 ponent area, the projects shall be grouped in
24 the database in the following categories:

25 “(i) Education in formal settings.

1 “(ii) Education in informal settings.

2 “(iii) Public outreach.

3 “(iv) Ethical, legal, and other societal
4 issues.

5 “(E) ACCESSIBILITY.—The Director shall
6 make the database required by subparagraph
7 (A) accessible to the public.

8 “(2) INFORMATION ON NANOTECHNOLOGY FA-
9 CILITIES.—

10 “(A) IN GENERAL.—The Director of the
11 National Nanotechnology Coordination Office—

12 “(i) shall develop, maintain, and pub-
13 licize information on nanotechnology facili-
14 ties supported under the Program that are
15 accessible for use by individuals from aca-
16 demic institutions and industry; and

17 “(ii) may include information on
18 nanotechnology facilities that are—

19 “(I) supported by the States; and

20 “(II) accessible for use by indi-
21 viduals from academic institutions
22 and from industry.

23 “(B) INFORMATION TO BE PUBLICIZED.—
24 The information developed, maintained, and

publicized under subparagraph (A) shall include
the following:

“(i) The terms and conditions for the
use of each nanotechnology facility sup-
ported under the Program.

“(ii) A description of the capabilities
of the instruments and equipment available
for use at the facility.

“(iii) A description of the technical
support available to assist users of the fa-
cility.”.

**SEC. 4. ENHANCEMENT OF NATIONAL NANOTECHNOLOGY
ADVISORY PANEL.**

(a) ESTABLISHMENT OF SUBPANEL ON SOCIETAL,
ETHICAL, LEGAL, ENVIRONMENTAL, AND WORKFORCE
CONCERNS.—Section 4(a) of the Act (15 U.S.C. 7503(a))
is amended—

(1) by striking “or designate”;

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

(3) by inserting “(1) ESTABLISHMENT OF ADVI-
SORY PANEL.—” before “The President shall” and
indenting paragraph (1) as so designated 2 ems
from the left margin; and

(4) by adding at the end the following:

1 “(2) ESTABLISHMENT OF SUBPANEL ON SOCI-
 2 ETAL, ETHICAL, LEGAL, ENVIRONMENTAL, AND
 3 WORKFORCE CONCERNS.—The Advisory Panel shall
 4 establish a subpanel with membership having spe-
 5 cific qualifications tailored to enable it to carry out
 6 the requirements of subsection (c)(7).”.

7 (b) REPRESENTATION OF MINORITY-SERVING INSTI-
 8 TUTIONS.—Section 4(b) (15 U.S.C. 7503(b)) is amend-
 9 ed—

10 (1) by designating the first, second, and third
 11 sentences as paragraphs (1), (2), and (3), respec-
 12 tively, and indenting such paragraphs, as so des-
 13 ignated, 2 ems to the right;

14 (2) in paragraph (1), as so designated by para-
 15 graph (1) of this subsection—

16 (A) by striking “or designated”; and

17 (B) by inserting “MEMBERSHIP FROM ACA-
 18 DEMIC INSTITUTIONS AND INDUSTRY.—” before
 19 “The Advisory Panel”;

20 (3) in paragraph (2), as so designated by para-
 21 graph (1) of this subsection, by inserting “QUALI-
 22 FIED TO PROVIDE ADVICE.—” before “Members of”;

23 (4) in paragraph (3), as so designated by para-
 24 graph (1) of this subsection—

25 (A) by striking “or designating”; and

1 (B) by inserting “SEEKING RECOMMENDA-
 2 TIONS.—” before “In selecting”; and

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

4 “(4) REPRESENTATION OF MINORITY-SERVING
 5 INSTITUTIONS.—At least one member of the Advi-
 6 sory Panel shall be an individual employed by and
 7 representing a minority-serving institution.”.

8 **SEC. 5. TRIENNIAL EXTERNAL REVIEW OF NATIONAL**
 9 **NANOTECHNOLOGY PROGRAM.**

10 Section 5 of the Act (15 U.S.C. 7504) is amended
 11 to read as follows:

12 **“SEC. 5. EXTERNAL REVIEW OF THE NATIONAL NANOTECH-**
 13 **NOLOGY PROGRAM.**

14 “(a) IN GENERAL.—The Director of the National
 15 Nanotechnology Coordination Office shall, in consultation
 16 with the Nanoscale Science, Engineering, and Technology
 17 Subcommittee, the National Research Council of the Na-
 18 tional Academy of Sciences, and relevant Congressional
 19 staff, identify 3 highly targeted and timely topic areas that
 20 would benefit from review and evaluation. The Director
 21 will enter into an arrangement with the National Research
 22 Council to conduct these reviews.

23 “(b) MATTERS EVALUATED.—The reviews shall in-
 24 clude an evaluation of topics relevant to the following:

1 “(1) The research priorities and technical con-
2 tent of the Program, including whether the alloca-
3 tion of funding among program component areas, as
4 designated according to section 2(c)(2), is appro-
5 priate.

6 “(2) The effectiveness of the Program’s man-
7 agement and coordination across agencies and dis-
8 ciplines, including an assessment of the effectiveness
9 of the National Nanotechnology Coordination Office.

10 “(3) The scientific and technological accom-
11 plishments of the Program and the success of the
12 Program in transferring technology to the private
13 sector.

14 “(4) The adequacy of the activities of the Pro-
15 gram in addressing ethical, legal, environmental,
16 workplace, and other appropriate societal issues, in-
17 cluding human health issues.

18 “(5) The adequacy and effectiveness of the Pro-
19 gram’s public education and outreach efforts.

20 “(6) The worldwide investment in and activities
21 related to nanotechnology and an analysis of the rel-
22 ative position of the United States compared to
23 other countries with respect to nanotechnology re-
24 search and development.

1 “(7) The adequacy of the Program in incor-
 2 porating the results of deliberative public input into
 3 the decisionmaking process.

4 “(c) EXTERNAL REVIEW REPORTS.—

5 “(1) IN GENERAL.—Not later than September
 6 30, 2011, and every 3 years thereafter, the Director
 7 of the National Nanotechnology Coordination Office
 8 shall submit to the Advisory Panel, the Committee
 9 on Commerce, Science, and Transportation of the
 10 Senate, and the Committee on Science and Tech-
 11 nology of the House of Representatives a report pre-
 12 pared by the National Research Council on the most
 13 recent external reviews carried out under subsection
 14 (a).

15 “(2) CONTENTS.—Each report required by
 16 paragraph (1) shall include the following:

17 “(A) The findings of the National Re-
 18 search Council with respect to the matters de-
 19 scribed in subsection (b).

20 “(B) The recommendations of the Director
 21 of the National Nanotechnology Coordination
 22 Office, if any—

23 “(i) on ways to improve the manage-
 24 ment and coordination processes of the
 25 Program; and

1 “(ii) for changes to the objectives,
 2 funding priorities, and technical content of
 3 the Program.

4 “(d) FUNDING.—There are authorized to be appro-
 5 priated to the National Science Foundation for use by the
 6 National Nanotechnology Coordinating Office to carry out
 7 this section \$500,000 for each of fiscal years 2010, 2011,
 8 and 2012.”.

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

10 (a) IN GENERAL.—The Act (15 U.S.C. 7501 et seq.)
 11 is amended—

12 (1) by redesignating section 10 as section 15;

13 (2) by inserting after section 9 the following:

14 **“SEC. 10. SOCIETAL DIMENSIONS OF NANOTECHNOLOGY.**

15 “(a) COORDINATOR FOR SOCIETAL DIMENSIONS OF
 16 NANOTECHNOLOGY.—

17 “(1) DESIGNATION.—The Director of the Office
 18 of Science and Technology Policy shall designate an
 19 associate director of the Office of Science and Tech-
 20 nology Policy as the Coordinator for Societal Dimen-
 21 sions of Nanotechnology.

22 “(2) DUTIES.—The duties of the Coordinator
 23 for Societal Dimensions of Nanotechnology are as
 24 follows:

1 “(A) Providing oversight of the coordina-
2 tion, planning, and budget prioritization of ac-
3 tivities required by section 2(b)(12).

4 “(B) With the assistance of appropriate
5 senior officials of the agencies funding activities
6 within the Environmental, Health, and Safety
7 program component area and the Education
8 and Societal Dimensions program component
9 area, or any successor program component
10 areas, ensuring that the requirements of section
11 2(b)(12) are satisfied.

12 “(C) Ensuring that the research plan re-
13 quired under subsection (b)(1) is—

14 “(i) developed, updated, and imple-
15 mented as required thereunder; and

16 “(ii) responsive to the recommenda-
17 tions of the subpanel established under
18 section 4(a)(2).

19 “(D) Encouraging and monitoring the ef-
20 forts of the agencies participating in the Pro-
21 gram to allocate the level of resources and man-
22 agement attention necessary to ensure that the
23 ethical, legal, environmental, and other appro-
24 priate societal concerns related to nanotechnol-
25 ogy, including human health and workplace

1 safety concerns, are addressed under the Pro-
 2 gram, including the implementation of the re-
 3 search plan required under subsection (b)(1).

4 “(E) Encouraging the agencies required to
 5 develop the research plan under subsection (b)
 6 to identify, assess, and implement suitable
 7 mechanisms for the establishment of public-pri-
 8 vate partnerships for support of environmental,
 9 health, and safety research.

10 “(b) RESEARCH PLAN.—

11 “(1) IN GENERAL.—

12 “(A) PANEL CONVENED AND PLAN RE-
 13 QUIRED.—Not later than 60 days after the date
 14 of enactment of the National Nanotechnology
 15 Initiative Amendments Act of 2009, the Coordi-
 16 nator for Societal Dimensions of Nanotechnol-
 17 ogy designated under subsection (a)(1) shall
 18 convene and chair a panel to develop, periodi-
 19 cally update, and coordinate the implementation
 20 of a research plan for the Environmental,
 21 Health, and Safety program component area, or
 22 any successor program component area.

23 “(B) MEMBERSHIP.—The panel convened
 24 under subparagraph (A) shall be comprised of
 25 representatives from—

1 “(i) the agencies funding research ac-
2 tivities under the program component area
3 described in such subparagraph; and

4 “(ii) such other agencies as the Coor-
5 dinator considers necessary.

6 “(C) SOLICITATION OF ADVICE.—In devel-
7 oping and updating the plan required by sub-
8 paragraph (A), the panel convened under such
9 subparagraph shall solicit and be responsive to
10 recommendations and advice from—

11 “(i) the subpanel established under
12 section 4(a)(2); and

13 “(ii) the agencies responsible for envi-
14 ronmental, health, and safety regulations
15 associated with the production, use, and
16 disposal of nanoscale materials and prod-
17 ucts.

18 “(2) DEVELOPMENT OF STANDARDS.—The plan
19 required by paragraph (1) shall include a description
20 of how the Program will help to ensure the develop-
21 ment of the following:

22 “(A) Standards related to nomenclature
23 associated with engineered nanoscale materials.

1 “(B) Engineered nanoscale standard ref-
 2 erence materials for environmental, health, and
 3 safety testing.

4 “(C) Instruments required to fill major
 5 gaps in metrology capabilities.

6 “(D) Standards related to methods and
 7 procedures for detecting, measuring, moni-
 8 toring, sampling, and testing engineered
 9 nanoscale materials for environmental, health,
 10 and safety impacts.

11 “(3) COMPONENTS OF PLAN.—The plan re-
 12 quired under paragraph (1) shall—

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

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

18 “(C) with respect to subparagraphs (A)
 19 and (B), describe the role of each agency car-
 20 rying out or sponsoring research in order to
 21 meet the objectives specified under subpara-
 22 graph (A) and to achieve the milestones speci-
 23 fied under subparagraph (B);

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

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

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

7 “(4) INCORPORATION OF RECOMMENDATIONS
8 OF ADVISORY PANEL.—The Coordinator designated
9 under subsection (a)(1) and the panel convened
10 under paragraph (1)(A) of this subsection shall in-
11 corporate any recommendations of the Advisory
12 panel under subsection (g)(2) into the planning ac-
13 tivity required under this subsection and provide the
14 Committee on Commerce, Science, and Transpor-
15 tation of the Senate and the Committee on Science
16 and Technology of the House of Representatives jus-
17 tification should the funding in the research plan not
18 meet such recommendations.

19 “(5) SUBMITTAL OF INITIAL PLAN TO CON-
20 GRESS.—Not later than 180 days after the date of
21 enactment of the National Nanotechnology Initiative
22 Amendments Act of 2009, the Coordinator des-
23 ignated under subsection (a)(1) shall submit to the
24 Committee on Commerce, Science, and Transpor-
25 tation of the Senate and the Committee on Science

1 and Technology of the House of Representatives the
 2 initial plan required by paragraph (1).

3 “(6) ANNUAL UPDATE OF PLAN.—Each year,
 4 the panel convened under paragraph (1) shall update
 5 the plan required under such paragraph and submit
 6 the plan to the Council for inclusion in the annual
 7 report of the Council required by section 2(d).

8 “(c) REPORT REQUIREMENTS.—

9 “(1) IN GENERAL.—The Coordinator des-
 10 ignated under subsection (a)(1) shall enter into an
 11 arrangement with the National Science Board of the
 12 National Academy of Sciences to create a report
 13 that identifies the broad goals and needs for envi-
 14 ronmental, health, and safety researchers.

15 “(2) MATTERS EVALUATED.—The report shall
 16 identify—

17 “(A) broad strategic goals of overall re-
 18 search;

19 “(B) critical needs of researchers; and

20 “(C) gaps in current research.

21 “(3) SUPPORT NOT SUPPLANT.—The report
 22 shall compliment and support the research plan re-
 23 quired by subsection (b) but not supplant it.

1 “(4) SOLICITATION OF ADVICE.—In developing
2 the report, the National Academy of Sciences shall
3 solicit and be responsive to advice from—

4 “(A) the Advisory Panel under subsection
5 (h)(2);

6 “(B) industry representatives; and

7 “(C) academia.

8 “(d) UNDERGRADUATE EDUCATION PROGRAMS.—

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

18 “(A) The development of courses of in-
19 struction or modules to existing courses.

20 “(B) Faculty professional development.

21 “(C) The acquisition of equipment and in-
22 strumentation suitable for undergraduate edu-
23 cation and research in nanotechnology.

24 “(2) AUTHORIZATION OF APPROPRIATIONS.—

25 There are authorized to be appropriated to the Di-

1 rector of the National Science Foundation to carry
2 out activities described in paragraph (1), amounts as
3 follows:

4 “(A) COURSE, CURRICULUM, AND LABORA-
5 TORY IMPROVEMENT PROGRAM.—Through the
6 Course, Curriculum, and Laboratory Improve-
7 ment program of the National Science Founda-
8 tion—

9 “(i) from amounts authorized under
10 section 7002(b)(2)(B) of the America
11 COMPETES Act (Public Law 110–69),
12 \$5,000,000 for fiscal year 2009; and

13 “(ii) from amounts authorized under
14 section 7002(c)(2)(B) of such Act,
15 \$5,000,000 for fiscal year 2010.

16 “(B) ADVANCED TECHNOLOGY EDU-
17 CATION.—Through the Advanced Technology
18 Education program of the National Science
19 Foundation—

20 “(i) from amounts authorized under
21 section 7002(b)(2)(B) of the America
22 COMPETES Act (Public Law 110–69),
23 \$5,000,000 for fiscal year 2009; and

1 “(ii) from amounts authorized under
2 section 7002(c)(2)(B) of such Act,
3 \$5,000,000 for fiscal year 2010.

4 “(e) INTERAGENCY WORKING GROUP.—The Council
5 shall establish an Education Working Group under the
6 Nanoscale Science, Engineering, and Technology Sub-
7 committee of the Council to coordinate, prioritize, and
8 plan both formal and informal educational activities sup-
9 ported under the Program, including activities to help par-
10 ticipants understand environmental, health, and safety im-
11 plications of nanotechnology.

12 “(f) SOCIETAL DIMENSIONS IN NANOTECHNOLOGY
13 EDUCATION ACTIVITIES.—Activities supported under the
14 Education and Societal Dimensions program component
15 area, or any successor program component area, that in-
16 volve informal, precollege, or undergraduate nanotechnol-
17 ogy education shall include education regarding the envi-
18 ronmental, health and safety, and other societal aspects
19 of nanotechnology.

20 “(g) REMOTE ACCESS TO NANOTECHNOLOGY FA-
21 CILITIES.—

22 “(1) IN GENERAL.—Agencies supporting nano-
23 technology research facilities as part of the Program
24 shall require the entities that operate such facilities
25 to allow access via the Internet by secondary school

1 students and teachers to instruments and equipment
 2 within such facilities for educational purposes and to
 3 informal science educators for science enrichment
 4 opportunities and public education purposes.

5 “(2) SUPPORT.—The agencies described in
 6 paragraph (1) shall support the costs associated
 7 with the provision of such access to facilities de-
 8 scribed in such paragraph.

9 “(3) WAIVER.—The agencies described in para-
 10 graph (1) may waive the requirement of paragraph
 11 (1) in cases when—

12 “(A) use of particular facilities would be
 13 inappropriate for educational purposes; or

14 “(B) the costs for providing the access to
 15 facilities as described in paragraph (1) would be
 16 prohibitive.

17 “(4) ESTABLISHMENT AND PUBLICATION OF
 18 PROCEDURES, GUIDELINES, AND CONDITIONS FOR
 19 USE OF FACILITIES.—The agencies identified in
 20 paragraph (1) shall require the entities that operate
 21 nanotechnology research facilities that are supported
 22 by such agencies as part of the Program to establish
 23 and publish procedures, guidelines, and conditions
 24 for the submission and approval of applications for

1 the use of such facilities for the purpose identified
2 in paragraph (1).

3 “(5) TECHNICAL SUPPORT.—The agencies iden-
4 tified in paragraph (1) shall authorize personnel who
5 operate the facilities described in such paragraph to
6 provide necessary technical support to students and
7 teachers who use such facilities.

8 “(h) ADVISORY PANEL REVIEW OF ENVIRON-
9 MENTAL, HEALTH, AND SAFETY PROGRAM COMPONENT
10 AREA.—

11 “(1) IN GENERAL.—The Advisory Panel shall
12 periodically review the funding level of the Environ-
13 mental, Health, and Safety program component
14 area, or any successor program component area, rel-
15 ative to the overall budget of the Program to deter-
16 mine whether the amount dedicated to this area is
17 sufficient to address the research funding needs as
18 estimated in the research plan required by sub-
19 section (b).

20 “(2) RECOMMENDATIONS.—If the Advisory
21 Panel determines under paragraph (1) that the
22 amount described in such paragraph is insufficient
23 or excessive, the Advisory Panel shall submit to the
24 Coordinator for Societal Dimensions of Nanotechnol-
25 ogy a recommendation for an appropriate level of

1 funding for the Environmental, Health, and Safety
 2 program component area, or any successor program
 3 component area.”; and

4 (3) in section 4(d), by adding at the end the
 5 following: “Such report shall include the findings of
 6 the Advisory Panel with respect to the most recent
 7 review required by section 10(h)(1) and any rec-
 8 ommendations of the Advisory Panel under section
 9 10(h)(2).”.

10 (b) NANOTECHNOLOGY EDUCATION PARTNER-
 11 SHIPS.—Section 9 of the National Science Foundation Au-
 12 thorization Act of 2002 (42 U.S.C. 1862n) is amended
 13 by adding at the end the following:

14 “(e) NANOTECHNOLOGY EDUCATION PARTNER-
 15 SHIPS.—

16 “(1) ESTABLISHMENT.—

17 “(A) IN GENERAL.—As part of the pro-
 18 gram authorized by subsection (a), the Director
 19 shall provide 1 or more grants under such sub-
 20 section to establish partnerships described in
 21 paragraph (2) of such subsection, except that
 22 each such partnership shall include 1 or more
 23 businesses engaged in the production of
 24 nanoscale materials, products, or devices.

1 “(B) DESIGNATION.—A partnership estab-
 2 lished in accordance with subparagraph (A)
 3 shall be designated as a ‘Nanotechnology Edu-
 4 cation Partnership’.

5 “(2) PURPOSE.—The purpose of a Nanotech-
 6 nology Education Partnership is to recruit and help
 7 prepare secondary school students to pursue postsec-
 8 ondary level courses of instruction in nanotechnology
 9 and assist secondary institution and informal learn-
 10 ing centers with outreach programs directed at sec-
 11 ondary students.

12 “(3) USE OF GRANT FUNDS.—Notwithstanding
 13 subsection (a)(3), each entity receiving a grant
 14 under this subsection shall use the grant for the
 15 purposes described in paragraph (2), including uses
 16 in support of the following:

17 “(A) Professional development activities in
 18 formal and informal settings to enable sec-
 19 ondary school teachers to use curricular mate-
 20 rials incorporating nanotechnology and to in-
 21 form teachers about career possibilities for stu-
 22 dents in nanotechnology.

23 “(B) Enrichment programs for students,
 24 including access to nanotechnology facilities and
 25 equipment at partner institutions in formal and

informal settings, to increase their understanding of nanoscale science and technology and to inform them about career possibilities in nanotechnology as scientists, engineers, and technicians.

“(C) Identification of appropriate formal and informal nanotechnology educational materials and incorporation of nanotechnology into the curriculum for secondary school students at one or more organizations participating in a Nanotechnology Education Partnership.

“(4) SELECTION OF GRANT RECIPIENTS.—Grants under this subsection shall be awarded in accordance with subsection (b), except that paragraph (3)(B) of such subsection shall not apply to grants awarded under this subsection.

“(5) NANOTECHNOLOGY DEFINED.—In this subsection, the term ‘nanotechnology’ has the meaning given the term in section 15 of the Act.”.

SEC. 7. TRANSFER OF NANOTECHNOLOGY.

(a) IN GENERAL.—The Act (15 U.S.C. 7501 et seq.) is amended by inserting after section 10, as added by section 6(a)(2) of this Act, the following:

“SEC. 11. TECHNOLOGY TRANSFER.

“(a) PROTOTYPING.—

1 “(1) ACCESS TO FACILITIES.—In accordance
2 with section 2(b)(9), the agencies supporting nano-
3 technology research facilities as part of the Program
4 shall provide access to such facilities to representa-
5 tives from industry and other stakeholders for the
6 purpose of transferring research results or assisting
7 in the development of prototypes of nanoscale prod-
8 ucts, devices, or processes (or products, devices, or
9 processes enabled by nanotechnology) for deter-
10 mining proof of concept.

11 “(2) PUBLICATION OF AVAILABILITY.—The
12 agencies described in paragraph (1) shall publicize
13 the availability of the facilities described in such
14 paragraph and encourage their use by companies as
15 provided for in this section.

16 “(3) PROCEDURES.—The agencies described in
17 paragraph (1)—

18 “(A) shall establish and publish proce-
19 dures, guidelines, and conditions for the sub-
20 mission and approval of applications for use of
21 nanotechnology facilities;

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

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

5 “(4) SELECTION AND CRITERIA.—In cases
6 when less than full cost recovery is required pursu-
7 ant to paragraph (3)(C), projects provided access to
8 nanotechnology facilities in accordance with this sub-
9 section shall be selected through a competitive,
10 merit-based process, and the criteria for the selec-
11 tion of such projects shall include the following:

12 “(A) The readiness of the project for tech-
13 nology demonstration.

14 “(B) Evidence of a commitment by the ap-
15 plicant for further development of the project to
16 full commercialization if the proof of concept is
17 established by the prototype.

18 “(C) Evidence of the potential for further
19 funding from private sector sources following
20 the successful demonstration of proof of con-
21 cept.

22 “(5) SPECIAL CONSIDERATION FOR PROJECTS
23 RELEVANT TO IMPORTANT NATIONAL NEEDS.—In
24 selecting projects under paragraph (4), the agencies
25 described in paragraph (1) may give special consid-

1 eration to applications that are relevant to important
 2 national needs or requirements.

3 “(b) USE OF EXISTING TECHNOLOGY TRANSFER
 4 PROGRAMS.—Each agency participating in the Program
 5 shall—

6 “(1) if the agency administers a Small Business
 7 Innovation Research Program or a Small Business
 8 Technology Transfer Program, encourage the sub-
 9 mission of applications for support of nanotechnol-
 10 ogy related projects to such programs; and

11 “(2) through the National Nanotechnology Co-
 12 ordination Office established under section 3(a) and
 13 not later than 180 days after the date of enactment
 14 of the National Nanotechnology Initiative Amend-
 15 ments Act of 2009, submit to the Committee on
 16 Commerce, Science, and Transportation of the Sen-
 17 ate and the Committee on Science and Technology
 18 of the House of Representatives—

19 “(A) the plan described in section 2(c)(7);
 20 and

21 “(B) a report specifying, if the agency ad-
 22 ministers a Small Business Innovation Research
 23 Program and a Small Business Technology
 24 Transfer Program—

1 “(i) the number of proposals received
2 for nanotechnology related projects during
3 the current fiscal year and the previous 2
4 fiscal years;

5 “(ii) the number of such proposals
6 funded in each year;

7 “(iii) the total number of nanotechnol-
8 ogy related projects funded and the
9 amount of funding provided for fiscal year
10 2003 through fiscal year 2007; and

11 “(iv) a description of the projects
12 identified in accordance with clause (iii)
13 which received private sector funding be-
14 yond the period of phase II support of the
15 Small Business Innovation Research Pro-
16 gram and the Small Business Technology
17 Transfer Program.

18 “(c) INDUSTRY LIAISON GROUPS.—An objective of
19 the Program shall be to establish industry liaison groups
20 for all industry sectors that would benefit from applica-
21 tions of nanotechnology. The Nanomanufacturing, Indus-
22 try Liaison, and Innovation Working Group of the Na-
23 tional Science and Technology Council shall actively pur-
24 sue establishing such liaison groups.”.

1 (b) TECHNOLOGY INNOVATION PROGRAM SUPPORT
 2 FOR NANOTECHNOLOGY.—Section 28 of the National In-
 3 stitute of Standards and Technology Act (15 U.S.C. 278n)
 4 is amended—

5 (1) in subsection (d)—

6 (A) by striking “The Director” and insert-
 7 ing the following:

8 “(1) IN GENERAL.—The Director”; and

9 (B) by adding at the end the following:

10 “(2) SOLICITATION OF NANOTECHNOLOGY PRO-
 11 POSALS.—The Director shall encourage the submis-
 12 sion of proposals under paragraph (1) for support of
 13 nanotechnology related projects.”;

14 (2) in subsection (g)—

15 (A) by striking “The Director” and insert-
 16 ing the following:

17 “(1) IN GENERAL.—The Director”; and

18 (B) by adding at the end the following:

19 “(2) NANOTECHNOLOGY REPORT REQUIRE-
 20 MENTS.—The report required by paragraph (1) shall
 21 include a description of—

22 “(A) how the requirement of subsection
 23 (d)(2) is being met;

24 “(B) the number of proposals for nano-
 25 technology related projects received;

1 “(C) the number of such proposals funded;

2 “(D) the total number of such projects
3 funded since the beginning of the Technology
4 Innovation Program; and

5 “(E) the outcomes of such funded projects
6 in terms of the metrics described in paragraph
7 (1).”;
8 (3) in subsection (k)(3)—

9 (A) in subparagraph (C), by striking
10 “and”; and

11 (B) by adding at the end the following:

12 “(E) advice on how to accomplish the re-
13 quirement of subsection (d)(2); and

14 “(F) an assessment of the adequacy of the
15 allocation of resources for nanotechnology re-
16 lated projects supported under the Technology
17 Innovation Program.”; and
18 (4) in subsection (l)—

19 (A) in paragraph (4)(B), by striking the
20 “and” at the end;

21 (B) in paragraph (5), by striking the pe-
22 riod at the end and inserting “; and”; and

23 (C) by adding at the end the following:

24 “(6) the term ‘nanotechnology’ has the meaning
25 given the term in section 15 of the 21st Century

1 Nanotechnology Research and Development Act (15
2 U.S.C. 7501(a)).”.

3 (c) COORDINATION WITH STATE INITIATIVES.—Sec-
4 tion 2(b)(7) of the Act, as redesignated by section
5 2(b)(1)(A) of this Act, is amended to read as follows:

6 “(7) ensuring United States global leadership in
7 the development and application of nanotechnology,
8 including through coordination and leveraging Fed-
9 eral investments with nanotechnology research, de-
10 velopment, and technology transition initiatives sup-
11 ported by the States;”.

12 **SEC. 8. RESEARCH IN AREAS OF NATIONAL IMPORTANCE.**

13 The Act (15 U.S.C. 7501 et seq.) is amended by in-
14 serting after section 11, as added by section 7(a) of this
15 Act, the following:

16 **“SEC. 12. RESEARCH IN AREAS OF NATIONAL IMPORTANCE.**

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

25 “(1) Nano-electronics.

1 “(2) Energy production, transmission, storage,
2 use, and efficiency, including renewable energy.

3 “(3) Health care.

4 “(4) Water remediation and purification.

5 “(5) Instrumentation for nanoscale character-
6 ization and metrology.

7 “(6) Rapid production nanomanufacturing for
8 information and intelligence, including cost-effective,
9 green, and safe nanomaterial manufacturing meth-
10 ods.

11 “(7) Precision agriculture.

12 “(8) Sensors and sensor networks for defense
13 and homeland security.

14 “(b) ADDITIONAL RESEARCH.—In addition, the pro-
15 gram will support research that addresses the following:

16 “(1) The environment, health, and safety risks
17 of nanoparticles.

18 “(2) Ethical, legal, and societal issues relating
19 to nanotechnology.

20 “(c) RECOMMENDATIONS.—The Advisory Panel shall
21 make recommendations to the Program for candidate re-
22 search and development areas for support under this sec-
23 tion.

24 “(d) CHARACTERISTICS.—

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

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

6 “(B) involve collaborations among re-
7 searchers in academic institutions and industry,
8 and may involve nonprofit research or edu-
9 cational institutions and Federal and National
10 laboratories, as appropriate;

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

14 “(D) include a plan for fostering the trans-
15 fer of research discoveries and the results of
16 technology demonstration activities to industry
17 for commercial development.

18 “(2) PROCEDURES.—

19 “(A) IN GENERAL.—Determination of the
20 requirements for applications under this sub-
21 section, review and selection of applications for
22 support, and subsequent funding of projects
23 shall be carried out by a collaboration of no
24 fewer than 2 agencies participating in the Pro-
25 gram.

1 “(B) SPECIAL CONSIDERATION.—In select-
 2 ing applications for support, the agencies shall
 3 give special consideration to projects that in-
 4 clude cost sharing from non-Federal sources.

5 “(3) INTERDISCIPLINARY RESEARCH CEN-
 6 TERS.—Research and development activities under
 7 this section may be supported through interdiscipli-
 8 nary nanotechnology research centers, as authorized
 9 by section 2(b)(6), that are organized to investigate
 10 basic research questions and carry out technology
 11 demonstration activities in areas such as those iden-
 12 tified under subsection (b).”.

13 **SEC. 9. NANOMANUFACTURING RESEARCH.**

14 (a) IN GENERAL.—The Act (15 U.S.C. 7501 et seq.)
 15 is amended by inserting after section 12, as added by sec-
 16 tion 8 of this Act, the following:

17 **“SEC. 13. NANOMANUFACTURING RESEARCH.**

18 “(a) RESEARCH AREAS.—The Nanomanufacturing
 19 component area of the Program, or any successor compo-
 20 nent area, shall include research on the following:

21 “(1) Development of instrumentation and tools
 22 required for the rapid characterization of nanoscale
 23 materials and for monitoring of nanoscale manufac-
 24 turing processes.

1 “(2) Approaches and techniques for scaling the
2 synthesis of new nanoscale materials to achieve in-
3 dustrial-level production rates.

4 “(3) Improvements in atomically precise meas-
5 urement, monitoring, manipulating, and manufac-
6 turing.

7 “(4) Development of nanotechnology production
8 methods and tools for aerospace information and in-
9 telligence applications.

10 “(b) GREEN NANOTECHNOLOGY.—Interdisciplinary
11 research centers supported under the Program in accord-
12 ance with section 2(b)(6) that are focused on nanomanu-
13 facturing research and centers established under the au-
14 thority of section 12(c)(3) shall include, as part of the ac-
15 tivities of such centers, the following:

16 “(1) Research on methods and approaches to
17 develop environmentally benign nanoscale products
18 and nanoscale manufacturing processes, taking into
19 consideration relevant findings and results of re-
20 search supported under the Environmental, Health,
21 and Safety program component area, particularly as
22 to full life-cycle assessments, or any successor pro-
23 gram component area.

24 “(2) Fostering the transfer of the results of
25 such research to industry, including through indus-

try-led collaborative translational research, with priority consideration given to proposals that provide non-Federal funds in an amount not less than 25 percent of the total amount of any funding to be awarded under the Program.

“(3) Providing for the education of scientists and engineers through interdisciplinary studies in the principles and techniques for the design and development of environmentally benign nanoscale products and processes and in the full life-cycle assessment of the nanomaterials and nanotechnologies involved.”.

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

(1) DEFINITIONS.—In this subsection, the terms “nanotechnology”, “nanoscale”, “program component area”, “Program”, and “Advisory Panel” have the meaning given such terms in section 15 of the Act, as redesignated by section 6(a)(1) and amended by section 13 of this Act.

(2) PUBLIC MEETING.—

(A) IN GENERAL.—Not later than 6 months after the date of enactment of this Act, the Director of the National Nanotechnology Coordination Office established under section

1 3(a) of such Act (15 U.S.C. 7502(a)) shall
2 sponsor a public meeting, including representa-
3 tion from a wide range of industries engaged in
4 nanoscale manufacturing—

5 (i) to obtain the views of participants
6 at the meeting on—

7 (I) the relevance and value of the
8 research being carried out under the
9 Nanomanufacturing program compo-
10 nent area, or any successor program
11 component area to industry, labor,
12 and the larger public interest; and

13 (II) whether the capabilities of
14 nanotechnology research facilities sup-
15 ported under the Program are ade-
16 quate—

17 (aa) to meet current and
18 near-term requirements for the
19 fabrication and characterization
20 of nanoscale devices and systems;
21 and

22 (bb) to provide access to and
23 use of instrumentation and
24 equipment at the facilities, by
25 means of networking technology,

1 to individuals who are at loca-
2 tions remote from the facilities;
3 and

4 (ii) to receive any recommendations
5 on ways to strengthen the research port-
6 folio supported under the Nanomanufac-
7 turing program component area, or any
8 successor program component area, and on
9 improving the capabilities of nanotechnol-
10 ogy research facilities supported under the
11 Program.

12 (B) INVITATIONS TO PUBLIC MEETING.—
13 The Director of the National Nanotechnology
14 Coordination Office shall invite companies and
15 labor organizations that are participating in in-
16 dustry liaison groups to participate in the meet-
17 ing required by subparagraph (A).

18 (C) REPORT ON PUBLIC MEETING.—Not
19 later than 1 year after the meeting sponsored
20 by the Office, the Director shall prepare and
21 submit to the Advisory Panel a report docu-
22 menting the findings and recommendations of
23 the Director with respect to the meeting re-
24 quired by subparagraph (A).

25 (3) ADVISORY PANEL REVIEW.—

1 (A) IN GENERAL.—The Advisory Panel
2 shall review the Nanomanufacturing program
3 component area, or any successor program com-
4 ponent area, and the capabilities of nanotech-
5 nology research facilities supported under the
6 Program to assess the following:

7 (i) Whether the funding for the Nano-
8 manufacturing program component area,
9 or any successor program component area,
10 is adequate and receiving appropriate pri-
11 ority within the overall resources available
12 for the Program.

13 (ii) The relevance of the research
14 being supported to the identified needs and
15 requirements of industry, labor, and long-
16 term public interest.

17 (iii) Whether the capabilities of nano-
18 technology research facilities supported
19 under the Program are adequate—

20 (I) to meet current and near-
21 term requirements for the fabrication
22 and characterization of nanoscale de-
23 vices and systems; and

24 (II) to provide access to and use
25 of instrumentation and equipment at

1 the facilities, by means of networking
 2 technology, to individuals who are at
 3 locations remote from the facilities.

4 (iv) The level of funding that would
 5 be needed to support—

6 (I) the acquisition of instrumen-
 7 tation, equipment, and networking
 8 technology sufficient to provide the
 9 capabilities at nanotechnology re-
 10 search facilities described in subpara-
 11 graph (C); and

12 (II) the operation and mainte-
 13 nance of such facilities.

14 (B) INCORPORATION OF FINDINGS FROM
 15 PUBLIC MEETING.—In carrying out the review
 16 required by subparagraph (A), the Advisory
 17 Panel shall take into consideration the findings
 18 and recommendations in the report submitted
 19 by the Director of the National Nanotechnology
 20 Coordination Office under paragraph (2)(C).

21 (C) REPORT ON ADVISORY PANEL RE-
 22 VIEW.—Not later than 24 months after the
 23 date of enactment of this Act, the Advisory
 24 Panel shall submit to the Committee on Com-
 25 merce, Science, and Transportation of the Sen-

ate and the Committee on Science and Technology of the House of Representatives a report on the review required by subparagraph (A), including the following:

(i) The recommendations, if any, of the Advisory Panel with respect to the Nanomanufacturing program component area.

(ii) The report required by paragraph (2)(C).

SEC. 10. NANOSCALE CHARACTERIZATION AND METROLOGY.

The Act (15 U.S.C. 7501 et seq.) is amended by inserting after section 13, as added by section 9(a) of this Act, the following:

“SEC. 14. NANOSCALE CHARACTERIZATION AND METROLOGY.

“(a) RESEARCH AREAS.—The Instrument Research, Metrology, and Standards program component area, or any successor program component area, shall include research on translational development of instrumentation, tools, approaches, and techniques required for the characterization of nanoscale materials and for nanoscale metrology, including improvements in speed, accuracy, and scalability.

1 “(b) ENVIRONMENTAL, HEALTH, AND SAFETY EF-
 2 FECTS.—Interdisciplinary research centers supported
 3 under the Program in accordance with section 2(b)(6) that
 4 are focused on nanoscale characterization and metrology
 5 in accordance with section 12(c)(3) shall include as part
 6 of the activities of such centers—

7 “(1) research on methods and approaches to de-
 8 velop characterization and metrology capabilities rel-
 9 evant to the Environmental, Health, and Safety pro-
 10 gram component area, or any successor program
 11 component area; and

12 “(2) fostering the transfer of the results of such
 13 research to industry, including through industry-led
 14 collaborative translational research.”.

15 **SEC. 11. DELIBERATIVE PUBLIC INPUT IN DECISION-**
 16 **MAKING PROCESSES.**

17 (a) BEGINNING A NATIONAL DISCUSSION.—Not later
 18 than 6 months after the date of enactment of this Act,
 19 the Director of the National Nanotechnology Coordination
 20 Office, established under section 3(a) of the 21st Century
 21 Nanotechnology Research and Development Act (15
 22 U.S.C. 7502(a)), shall convene the first in a series of na-
 23 tional discussions to engage the people of the United
 24 States, increase their awareness of nanotechnology, and

1 give them a continuing voice in the evolution of nanotech-
2 nology.

3 (b) FORM.—The Director shall convene the national
4 discussions required by subsection (a) through not fewer
5 than 2 deliberative forums in the first 18 months, includ-
6 ing one large-scale forum and one small-scale forum, and,
7 in each subsequent year, at least one deliberative forum
8 that includes each of the stakeholder groups described in
9 subsection (d).

10 (c) PARTICIPATION.—The Director shall ensure that
11 the population of participants in the forums is diverse in—

- 12 (1) age;
- 13 (2) geography;
- 14 (3) income;
- 15 (4) ethnicity; and
- 16 (5) education.

17 (d) BROAD PARTICIPATION AND INCORPORATION OF
18 STAKEHOLDER VIEWS.—The Director shall incorporate
19 the views, positions, and the participation of key stake-
20 holder groups in the forums, including representatives
21 of—

- 22 (1) academia;
- 23 (2) industry;
- 24 (3) labor;
- 25 (4) environmental organizations;

1 (5) consumer advocacy organizations;

2 (6) other public-interest, non-governmental or-
3 ganizations; and

4 (7) citizens from the general public.

5 (e) IDENTIFICATION OF PRIORITIES AND CON-
6 CERNS.—The Director shall identify the collective prior-
7 ities and concerns of the general public and other stake-
8 holder groups that relate to—

9 (1) nanotechnology products;

10 (2) research and development;

11 (3) regulatory policy;

12 (4) other concerns as identified by the group;

13 and

14 (5) the means by which citizens can learn about
15 and participate in policies affecting the design and
16 use of nanotechnology on an ongoing basis.

17 (f) REPORT.—Not later than 1 year after the comple-
18 tion of each of the forums, the Director shall submit a
19 report to the Committee on Commerce, Science, and
20 Transportation of the Senate and the Committee on
21 Science and Technology of the House of Representatives
22 summarizing the results of the forums and a report issued
23 and approved by the participants of the small-scale forum.

24 (g) AUTHORIZATION OF APPROPRIATIONS.—

1 (1) IN GENERAL.—There are authorized to be
 2 appropriated to the Director of National Nanotech-
 3 nology Coordination Office \$2,000,000 to carry out
 4 this section.

5 (2) SUPPLEMENT NOT SUPPLANT.—The
 6 amount authorized to be appropriated by paragraph
 7 (1) for the purpose described in that paragraph is
 8 in addition to amounts provided in support of the
 9 operation of the National Nanotechnology Coordina-
 10 tion Office under section 3(b) of the 21st Century
 11 Nanotechnology Research and Development Act (15
 12 U.S.C. 7502(b)), as amended by section 2(b)(1) of
 13 this Act.

14 **SEC. 12. AMENDMENTS TO DEFINITIONS.**

15 Section 15 of the Act, as redesignated by section
 16 6(a)(1) of this Act, is amended—

17 (1) in paragraph (2)—

18 (A) by striking “atomic, molecular, and
 19 supramolecular levels” and inserting
 20 “nanoscale”; and

21 (B) by striking “molecular organization,
 22 properties, and” and inserting “properties or”;
 23 and

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

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

4 “(8) FORMAL LEARNING.—The term ‘formal
5 learning’ means learning that takes place in a class-
6 room setting with traditional academic activities and
7 learning outcomes and emphasizes conceptual knowl-
8 edge.

9 “(9) INFORMAL LEARNING.—The term ‘infor-
10 mal learning’ means learning that can take place in
11 museums, nature centers, and through everyday ac-
12 tivities like gardening, hiking, and participation in
13 clubs. Informal learning is self-motivated, guided by
14 learner interests, voluntary, personal, ongoing, con-
15 textually relevant, collaborative, non-linear, and
16 open-ended.

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