

[COMMITTEE PRINT-DEPARTMENT OF ENERGY]

MARCH 22, 2010

1 **TITLE I—OFFICE OF SCIENCE**

2 **SEC. 101. SHORT TITLE.**

3 This title may be cited as the “Department of Energy
4 Office of Science Authorization Act of 2010”.

5 **SEC. 102. DEFINITIONS.**

6 Except as otherwise provided, in this title:

7 (1) DEPARTMENT.—The term “Department”
8 means the Department of Energy.

9 (2) DIRECTOR.—The term “Director” means
10 the Director of the Office of Science.

11 (3) OFFICE OF SCIENCE.—The term “Office of
12 Science” means the Department of Energy Office of
13 Science.

14 (4) SECRETARY.—The term “Secretary” means
15 the Secretary of Energy.

16 **SEC. 103. OFFICE OF SCIENCE ACTIVITIES.**

17 (a) IN GENERAL.—The Secretary shall carry out,
18 through the Office of Science, research, development, dem-
19 onstration, and commercial application activities in science
20 supporting the missions of the Department, including pro-
21 grams on basic energy sciences, biological and environ-

1 mental research, advanced scientific computing research,
2 fusion energy sciences, high energy physics, and nuclear
3 physics.

4 (b) SUPPORTING ACTIVITIES.—The activities de-
5 scribed in subsection (a) shall include providing for rel-
6 evant facilities and infrastructure, analysis, coordination,
7 and education and outreach activities.

8 (c) OTHER AUTHORIZED ACTIVITIES.—In addition to
9 the activities authorized under this title, the Office of
10 Science shall carry out such other activities it is author-
11 ized or required to carry out by law.

12 (d) COORDINATION AND JOINT ACTIVITIES.—The
13 Department's Under Secretary for Science shall ensure
14 the coordination of activities under this title with the other
15 activities of the Department, and shall support joint activi-
16 ties among the programs of the Department.

17 **SEC. 104. BASIC ENERGY SCIENCES PROGRAM.**

18 (a) PROGRAM.—As part of the activities authorized
19 under section 103, the Director shall carry out a program
20 in basic energy sciences, including materials sciences and
21 engineering, chemical sciences, biosciences, and geo-
22 sciences, for the purpose of providing the scientific founda-
23 tions for new energy technologies.

24 (b) USER FACILITIES.—

1 (1) IN GENERAL.—The Director shall carry out
2 a program for the construction, operation, and main-
3 tenance of national user facilities to support the pro-
4 gram under this section. As practicable, these facili-
5 ties shall serve the needs of the Department, indus-
6 try, the academic community, and other relevant en-
7 tities to create and examine new materials and
8 chemical processes for the purposes of advancing
9 new energy technologies and improving the competi-
10 tiveness of the United States. These facilities shall
11 include—

12 (A) high-intensity light sources;

13 (B) neutron sources;

14 (C) electron beam characterization centers;

15 and

16 (D) nanoscale science research centers.

17 (2) FACILITY CONSTRUCTION AND UP-
18 GRADES.—Consistent with the Office of Science’s
19 project management practices, the Director shall
20 support construction of—

21 (A) the National Synchrotron Light Source

22 II; and

23 (B) a Second Target Station at the Spall-
24 ation Neutron Source.

25 (c) ENERGY FRONTIER RESEARCH CENTERS.—

1 (1) IN GENERAL.—The Director shall carry out
2 a grant program to provide awards, on a competi-
3 tive, merit-reviewed basis, to multi-institutional col-
4 laborations or other appropriate entities to meet en-
5 ergy research, development, demonstration, and
6 commercial application needs identified in—

7 (A) the Grand Challenges report of the De-
8 partment's Basic Energy Sciences Advisory
9 Committee;

10 (B) energy-related Grand Challenges for
11 Engineering, as described by the National
12 Academy of Engineering; or

13 (C) other relevant reports identified by the
14 Director.

15 (2) COLLABORATIONS.—A collaboration receiv-
16 ing a grant under this subsection may include mul-
17 tiple types of institutions and private sector entities.

18 (3) DURATION.—Grants shall be provided
19 under this subsection to a collaboration or entity for
20 a period of not more than 5 years. Grants may be
21 renewed for an additional 5 years on a competitive,
22 merit-reviewed basis.

23 (4) NO FUNDING FOR CONSTRUCTION.—No
24 funding provided pursuant to this subsection may be

1 used for the construction of new buildings or facili-
2 ties.

3 (d) ACCELERATOR RESEARCH AND DEVELOP-
4 MENT.—The Director shall carry out research and devel-
5 opment on advanced accelerator technologies relevant to
6 the development of Basic Energy Sciences user facilities,
7 in consultation with the Office of Science’s High Energy
8 Physics and Nuclear Physics programs.

9 **SEC. 105. BIOLOGICAL AND ENVIRONMENTAL RESEARCH**
10 **PROGRAM.**

11 (a) IN GENERAL.—As part of the activities author-
12 ized under section 103, the Director shall carry out a pro-
13 gram of research, development, demonstration, and com-
14 mercial application in the areas of biological, climate, and
15 environmental systems science to support the energy and
16 environmental missions of the Department.

17 (b) BIOLOGICAL SYSTEMS SCIENCE SUBPROGRAM.—

18 (1) SUBPROGRAM.—As part of the activities au-
19 thORIZED under subsection (a), the Director shall
20 carry out a subprogram of research, development,
21 and demonstration on fundamental, structural, com-
22 putational, and systems biology to increase systems-
23 level understanding of complex biological systems,
24 which shall include activities to—

1 (A) increase cost-effective sustainable pro-
2 duction of biomass-based liquid transportation
3 fuels, bioenergy, and biobased products that
4 minimize greenhouse gas emissions;

5 (B) remove carbon dioxide from the atmos-
6 phere, through photosynthesis and other bio-
7 logical processes, for sequestration and storage;
8 and

9 (C) destroy, immobilize, or remove con-
10 taminants from subsurface environments, in-
11 cluding at facilities of the Department.

12 (2) RESEARCH PLAN.—Not later than 1 year
13 after the date of enactment of this Act, and at least
14 once every 2 years thereafter, the Director shall pre-
15 pare and transmit to Congress a research plan de-
16 scribing how the subprogram authorized under this
17 subsection will be undertaken.

18 (3) BIOENERGY RESEARCH CENTERS.—

19 (A) ESTABLISHMENT OF CENTERS.—In
20 carrying out the subprogram under paragraph
21 (1), the Director shall establish or maintain at
22 least 3 bioenergy research centers to accelerate
23 basic biological research, development, dem-
24 onstration, and commercial application of bio-
25 mass-based liquid transportation fuels, bio-

1 energy, and biobased products that reduce
2 greenhouse gas emissions and are produced
3 from a variety of regionally diverse feedstocks.

4 (B) GEOGRAPHIC DISTRIBUTION.—The
5 Secretary shall ensure that the bioenergy re-
6 search centers under this paragraph are estab-
7 lished in geographically diverse locations.

8 (C) SELECTION AND DURATION.—

9 (i) IN GENERAL.—A center under this
10 paragraph shall be selected on a competi-
11 tive basis for a period of 5 years.

12 (ii) REAPPLICATION.—After the end
13 of the period described in clause (i), a
14 grantee may reapply for selection on a
15 competitive, merit-reviewed basis.

16 (4) ENABLING SYNTHETIC BIOLOGY PLAN.—

17 (A) IN GENERAL.—The Secretary, in con-
18 sultation with other relevant Federal agencies,
19 the academic community, research-based non-
20 profit entities, and the private sector, shall de-
21 velop a comprehensive plan for federally sup-
22 ported research and development activities that
23 will support the energy and environmental mis-
24 sions of the Department and accelerate the

1 growth of a competitive synthetic biology indus-
2 try in the United States.

3 (B) PLAN.—The plan developed under sub-
4 paragraph (A) shall assess the need to create a
5 database for synthetic biology information, the
6 need and process for developing standards for
7 biological parts, components and systems, and
8 the need for a federally funded facility that en-
9 ables the discovery, design, development, pro-
10 duction, and systematic use of parts, compo-
11 nents, and systems created through synthetic
12 biology.

13 (C) SUBMISSION TO CONGRESS.—The Sec-
14 retary shall transmit the plan developed under
15 subparagraph (A) to the Congress not later
16 than 9 months after the date of enactment of
17 this Act.

18 (5) COMPUTATIONAL BIOLOGY AND SYSTEMS
19 BIOLOGY KNOWLEDGEBASE.—As part of the subpro-
20 gram described in paragraph (1), the Director shall
21 carry out research in computational biology, acquire
22 or otherwise ensure the availability of hardware for
23 biology-specific computation, and establish and
24 maintain an open virtual database and information
25 management system to centrally integrate systems

1 biology data, analytical software, and computational
2 modeling tools that will allow data sharing and free
3 information exchange in the scientific community.

4 (6) REPEAL.—Section 977 of the Energy Policy
5 Act of 2005 (42 U.S.C. 16317) is repealed.

6 (c) CLIMATE AND ENVIRONMENTAL SCIENCES SUB-
7 PROGRAM.—

8 (1) IN GENERAL.—As part of the activities au-
9 thorized under subsection (a), the Director shall
10 carry out a subprogram of climate and environ-
11 mental science research, which shall include activi-
12 ties to—

13 (A) understand, observe, and model the re-
14 sponse of the Earth’s atmosphere and bio-
15 sphere, including oceans, to increased green-
16 house gas emissions, and any associated
17 changes in climate;

18 (B) sequester, destroy, immobilize, or re-
19 move contaminants and carbon from subsurface
20 environments, including at facilities of the De-
21 partment; and

22 (C) develop potential mitigation and adap-
23 tation options for increased greenhouse gas
24 emissions and any associated changes in cli-
25 mate.

1 (2) SUBSURFACE BIOGEOCHEMISTRY RE-
2 SEARCH.—

3 (A) IN GENERAL.—As part of the subpro-
4 gram described in paragraph (1), the Director
5 shall carry out research to advance a funda-
6 mental understanding of coupled physical,
7 chemical, and biological processes for control-
8 ling the movement of sequestered carbon and
9 subsurface environmental contaminants, includ-
10 ing field observations of subsurface microorga-
11 nisms and field-scale subsurface research.

12 (B) COORDINATION.—

13 (i) DIRECTOR.—The Director shall
14 carry out activities under this paragraph in
15 accordance with priorities established by
16 the Department's Under Secretary for
17 Science to support and accelerate the de-
18 contamination of relevant facilities man-
19 aged by the Department.

20 (ii) UNDER SECRETARY FOR
21 SCIENCE.—The Department's Under Sec-
22 retary for Science shall ensure the coordi-
23 nation of the activities of the Department,
24 including activities under this paragraph,
25 to support and accelerate the decontamina-

1 tion of relevant facilities managed by the
2 Department.

3 (3) NEXT-GENERATION ECOSYSTEM-CLIMATE
4 EXPERIMENT.—

5 (A) IN GENERAL.—The Director, in col-
6 laboration with other relevant agencies who are
7 participants in the United States Global
8 Change Research Program, shall carry out the
9 selection and development of a next-generation
10 ecosystem-climate change experiment to under-
11 stand the impact and feedbacks of increased
12 temperature and elevated carbon levels on eco-
13 systems.

14 (B) REPORT.—Not later than 1 year after
15 the date of enactment of this Act, the Director
16 shall transmit to the Congress a report con-
17 taining—

18 (i) an identification of the location or
19 locations that have been selected for the
20 experiment described in subparagraph (A);

21 (ii) a description of the need for addi-
22 tional experiments; and

23 (iii) an associated research plan.

24 (4) AMERIFLUX NETWORK COORDINATION AND
25 RESEARCH.—As part of the subprogram described in

1 paragraph (1), the Director shall carry out research
2 and coordinate the AmeriFlux Network to directly
3 observe and understand the exchange of greenhouse
4 gases, water, and energy within terrestrial eco-
5 systems and the response of those systems to climate
6 change and other dynamic terrestrial landscape
7 changes. The Director, in collaboration with other
8 relevant Federal agencies, shall—

9 (A) identify opportunities to incorporate
10 innovative and emerging observation tech-
11 nologies and practices into the existing Net-
12 work;

13 (B) conduct research to determine the
14 need for increased greenhouse gas observation
15 facilities across North America to meet future
16 mitigation and adaptation needs of the United
17 States; and

18 (C) examine how the technologies and
19 practices described in subparagraph (A), and
20 increased coordination among scientific commu-
21 nities through the Network, have the potential
22 to help characterize baseline greenhouse gas
23 emission sources and sinks in the United States
24 and internationally.

1 (5) REGIONAL AND GLOBAL CLIMATE MOD-
2 ELING.—As part of the subprogram described in
3 paragraph (1), the Director, in collaboration with
4 the Office of Advanced Scientific Computing Re-
5 search described in section 106, shall carry out re-
6 search to develop, evaluate, and use high-resolution
7 regional and global climate and Earth models and
8 predictions to determine, and support efforts to re-
9 duce, the impacts of changing climate.

10 (6) INTEGRATED ASSESSMENT RESEARCH.—
11 The Director shall carry out research into options
12 for mitigation of and adaptation to climate change
13 through multiscale models of the entire climate sys-
14 tem. Such modeling shall include human processes
15 and greenhouse gas emissions, land use, and inter-
16 action among human and Earth systems.

17 (7) COORDINATION.—The Director shall coordi-
18 nate activities under this subsection with other Of-
19 fice of Science activities and with the United States
20 Global Change Research Program.

21 (d) USER FACILITIES AND ANCILLARY EQUIP-
22 MENT.—

23 (1) IN GENERAL.—The Director shall carry out
24 a program for the construction, operation, and main-
25 tenance of user facilities to support the program

1 under this section. As practicable, these facilities
2 shall serve the needs of the Department, industry,
3 the academic community, and other relevant entities.

4 (2) INCLUDED FUNCTIONS.—User facilities de-
5 scribed in paragraph (1) shall include facilities which
6 carry out—

7 (A) genome sequencing and analysis of
8 plants, microbes, and microbial communities
9 using high throughput tools, technologies, and
10 comparative analysis;

11 (B) molecular level research in biological
12 interactions, subsurface science, and the inter-
13 faces of natural and engineered materials; and

14 (C) measurement of cloud and aerosol
15 properties used for examining atmospheric proc-
16 esses and evaluating climate model perform-
17 ance, including ground stations at various loca-
18 tions, mobile resources, and aerial vehicles.

19 **SEC. 106. ADVANCED SCIENTIFIC COMPUTING RESEARCH**
20 **PROGRAM.**

21 (a) IN GENERAL.—As part of the activities author-
22 ized under section 103, the Director shall carry out a re-
23 search, development, demonstration, and commercial ap-
24 plication program to advance computational and net-
25 working capabilities to analyze, model, simulate, and pre-

1 dict complex phenomena relevant to the development of
2 new energy technologies and the competitiveness of the
3 United States.

4 (b) COORDINATION.—

5 (1) DIRECTOR.—The Director shall carry out
6 activities under this section in accordance with prior-
7 ities established by the Department’s Under Sec-
8 retary for Science to determine and meet the com-
9 putational and networking research and facility
10 needs of the Office of Science and all other relevant
11 energy technology programs within the Department.

12 (2) UNDER SECRETARY FOR SCIENCE.—The
13 Department’s Under Secretary for Science shall en-
14 sure the coordination of the activities of the Depart-
15 ment, including activities under this section, to de-
16 termine and meet the computational and networking
17 research and facility needs of the Office of Science
18 and all other relevant energy technology programs
19 within the Department.

20 (c) REPORTS.—

21 (1) ADVANCED COMPUTING FOR ENERGY APPLI-
22 CATIONS.—Not later than one year after the date of
23 enactment of this Act, the Secretary shall transmit
24 to the Congress a plan to integrate and leverage the
25 expertise and capabilities of the program described

1 in subsection (a), as well as other relevant computa-
2 tional and networking research programs and re-
3 sources supported by the Federal Government, to
4 advance the missions of the Department's applied
5 energy and energy efficiency programs.

6 (2) EXASCALE COMPUTING.—At least 18
7 months prior to the initiation of construction or in-
8 stallation of any exascale-class computing facility,
9 the Secretary shall transmit a plan to the Congress
10 detailing the proposed facility's cost projections and
11 capabilities to significantly accelerate the develop-
12 ment of new energy technologies.

13 (d) APPLIED MATHEMATICS AND SOFTWARE DEVEL-
14 OPMENT FOR HIGH-END COMPUTING SYSTEMS.—The Di-
15 rector shall carry out activities to develop, test, maintain,
16 and support mathematics, models, and algorithms for
17 complex systems, as well as programming environments,
18 tools, languages, and operating systems for high-end com-
19 puting systems (as defined in section 2 of the Department
20 of Energy High-End Computing Revitalization Act of
21 2004 (15 U.S.C. 5541)).

22 (e) HIGH-END COMPUTING FACILITIES.—The Direc-
23 tor shall—

24 (1) provide for sustained access by the research
25 community in the United States to high-end com-

1 puting systems and to Leadership Systems (as de-
2 fined in section 2 of the Department of Energy
3 High-End Computing Revitalization Act of 2004 (15
4 U.S.C. 5541)), including provision of technical sup-
5 port for users of such systems; and

6 (2) conduct research and development on next-
7 generation computing architectures and platforms to
8 support the missions of the Department.

9 **SEC. 107. FUSION ENERGY RESEARCH PROGRAM.**

10 (a) PROGRAM.—As part of the activities authorized
11 under section 103, the Director shall carry out a fusion
12 energy sciences research and development program to ef-
13 fectively address the scientific and engineering challenges
14 to building a cost-competitive fusion power plant and a
15 competitive fusion power industry in the United States.

16 (b) ITER.—The Director shall coordinate and carry
17 out the responsibilities of the United States with respect
18 to the ITER international fusion project pursuant to the
19 Agreement on the Establishment of the ITER Inter-
20 national Fusion Energy Organization for the Joint Imple-
21 mentation of the ITER Project.

22 (c) IDENTIFICATION OF PRIORITIES.—Not later than
23 180 days after the date of enactment of this Act, the Sec-
24 retary shall transmit to the Congress a report on the De-
25 partment's proposed research and development activities

1 in magnetic fusion over the 10 years following the date
2 of enactment of this Act under four realistic budget sce-
3 narios. The report shall—

4 (1) identify priorities for initiation of facility
5 construction and facility decommissioning under
6 each of those scenarios;

7 (2) provide an assessment of the need for a fa-
8 cility or facilities that can examine and test potential
9 fusion materials; and

10 (3) provide an assessment of whether a single
11 new facility that substantially addresses magnetic
12 fusion, inertial fusion, and next generation fission
13 materials research needs is feasible, in conjunction
14 with the expected capabilities of facilities operational
15 as of the date of enactment of this Act.

16 (d) FUSION MATERIALS RESEARCH AND DEVELOP-
17 MENT.—The Director, in coordination with the Assistant
18 Secretary for Nuclear Energy of the Department, shall
19 carry out research and development activities to identify,
20 characterize, and create materials that can endure the
21 neutron, plasma, and heat fluxes expected in a commercial
22 fusion power plant.

23 (e) FUSION SIMULATION PROJECT.—In collaboration
24 with the Office of Science’s Advanced Scientific Com-
25 puting Research program described in section 106, the Di-

1 rector shall carry out a computational project to advance
2 the capability of fusion researchers to accurately simulate
3 an entire fusion energy system.

4 (f) INERTIAL FUSION ENERGY RESEARCH AND
5 TECHNOLOGY DEVELOPMENT PROGRAM.—The Secretary
6 shall carry out a program of research and technology de-
7 velopment in inertial fusion for energy applications, in-
8 cluding ion beam and laser fusion.

9 **SEC. 108. HIGH ENERGY PHYSICS PROGRAM.**

10 (a) PROGRAM.—As part of the activities authorized
11 under section 103, the Director shall carry out a research
12 program on the elementary constituents of matter and en-
13 ergy and the nature of space and time.

14 (b) NEUTRINO RESEARCH.—As part of the program
15 described in subsection (a), the Director shall carry out
16 research activities on the nature of the neutrino, which
17 may—

18 (1) include collaborations with the National
19 Science Foundation on relevant projects; and

20 (2) utilize components of existing accelerator
21 facilities to produce neutrino beams of sufficient in-
22 tensity to explore research priorities identified by the
23 High Energy Physics Advisory Panel or the National
24 Academy of Sciences.

1 (c) DARK ENERGY AND DARK MATTER RE-
2 SEARCH.—As part of the program described in subsection
3 (a), the Director shall carry out research activities on the
4 nature of dark energy and dark matter. These activities
5 shall be consistent with research priorities identified by
6 the High Energy Physics Advisory Panel or the National
7 Academy of Sciences, and may include—

8 (1) the development of space-based and land-
9 based facilities and experiments; and

10 (2) collaborations with the National Aeronautics
11 and Space Administration, the National Science
12 Foundation, or international collaborations on rel-
13 evant research projects.

14 (d) ACCELERATOR RESEARCH AND DEVELOP-
15 MENT.—The Director shall carry out research and devel-
16 opment in advanced accelerator concepts and technologies
17 to reduce the necessary scope and cost for the next genera-
18 tion of particle accelerators.

19 (e) INTERNATIONAL COLLABORATION.—The Direc-
20 tor, as practicable and in coordination with other appro-
21 priate Federal agencies as necessary, shall maximize the
22 access of United States researchers to the most advanced
23 facilities and research capabilities in the world, including
24 the Large Hadron Collider.

1 **SEC. 109. NUCLEAR PHYSICS PROGRAM.**

2 (a) PROGRAM.—As part of the activities authorized
3 under section 103, the Director shall carry out a research
4 program, and support relevant facilities, to discover and
5 understand various forms of nuclear matter.

6 (b) FACILITY CONSTRUCTION AND UPGRADES.—
7 Consistent with the Office of Science’s project manage-
8 ment practices, the Director shall carry out—

9 (1) an upgrade of the Continuous Electron
10 Beam Accelerator Facility to a 12 gigaelectronvolt
11 beam of electrons; and

12 (2) construction of the Facility for Rare Isotope
13 Beams.

14 (c) ISOTOPE DEVELOPMENT AND PRODUCTION FOR
15 RESEARCH APPLICATIONS.—The Director shall carry out
16 a program for the production of isotopes, including the
17 development of techniques to produce isotopes, that the
18 Secretary determines are needed for research or other pur-
19 poses. In making this determination, the Secretary shall
20 consider any relevant recommendations made by Federal
21 advisory committees, the National Academies, and inter-
22 agency working groups in which the Department partici-
23 pates.

1 **SEC. 110. SCIENCE LABORATORIES INFRASTRUCTURE PRO-**
2 **GRAM.**

3 (a) PROGRAM.—The Director shall carry out a pro-
4 gram to improve the safety, efficiency, and mission readi-
5 ness of infrastructure at Office of Science laboratories.

6 The program shall include projects to—

7 (1) renovate or replace space that does not
8 meet research needs;

9 (2) replace facilities that are no longer cost ef-
10 fective to renovate or operate;

11 (3) modernize utility systems to prevent failures
12 and ensure efficiency;

13 (4) remove excess facilities to allow safe and ef-
14 ficient operations; and

15 (5) construct modern facilities to conduct ad-
16 vanced research in controlled environmental condi-
17 tions.

18 (b) MINOR CONSTRUCTION PROJECTS.—

19 (1) AUTHORITY.—Using operation and mainte-
20 nance funds or facilities and infrastructure funds
21 authorized by law, the Secretary may carry out
22 minor construction projects with respect to labora-
23 tories administered by the Office of Science.

24 (2) ANNUAL REPORT.—The Secretary shall
25 submit to Congress on an annual basis a report on
26 each exercise of the authority under subsection (a)

1 during the preceding fiscal year. Each report shall
2 provide a brief description of each minor construc-
3 tion project covered by the report.

4 (3) COST VARIATION REPORTS.—If, at any time
5 during the construction of any minor construction
6 project, the estimated cost of the project is revised
7 and the revised cost of the project exceeds the minor
8 construction threshold, the Secretary shall imme-
9 diately submit to Congress a report explaining the
10 reasons for the cost variation.

11 (4) DEFINITIONS.—In this section—

12 (A) the term “minor construction project”
13 means any plant project not specifically author-
14 ized by law for which the approved total esti-
15 mated cost does not exceed the minor construc-
16 tion threshold; and

17 (B) the term “minor construction thresh-
18 old” means \$10,000,000, with such amount to
19 be adjusted by the Secretary in accordance with
20 the Engineering News-Record Construction
21 Cost Index, or an appropriate alternative index
22 as determined by the Secretary, once every five
23 years after the date of enactment of this Act.

24 (5) NONAPPLICABILITY.—Sections 4703 and
25 4704 of the Atomic Energy Defense Act (50 U.S.C.

1 2743 and 2744) shall not apply to laboratories ad-
2 ministered by the Office of Science.

3 **SEC. 111. AUTHORIZATION OF APPROPRIATIONS.**

4 There are authorized to be appropriated to the Sec-
5 retary for the activities of the Office of Science—

6 (1) \$6,221,000,000 for fiscal year 2011, of
7 which—

8 (A) \$2,020,000 shall be for Basic Energy
9 Sciences activities under section 104;

10 (B) \$700,000 shall be for Biological and
11 Environmental Research activities under section
12 105; and

13 (C) \$469,000 shall be for Advanced Sci-
14 entific Computing Research activities under sec-
15 tion 106;

16 (2) \$6,656,000,000 for fiscal year 2012, of
17 which—

18 (A) \$2,220,000 shall be for Basic Energy
19 Sciences activities under section 104;

20 (B) \$791,000 shall be for Biological and
21 Environmental Research activities under section
22 105; and

23 (C) \$515,000 shall be for Advanced Sci-
24 entific Computing Research activities under sec-
25 tion 106;

1 (3) \$7,122,000,000 for fiscal year 2013, of
2 which—

3 (A) \$2,440,000 shall be for Basic Energy
4 Sciences activities under section 104;

5 (B) \$894,000 shall be for Biological and
6 Environmental Research activities under section
7 105; and

8 (C) \$567,000 shall be for Advanced Sci-
9 entific Computing Research activities under sec-
10 tion 106;

11 (4) \$7,621,000,000 for fiscal year 2014, of
12 which—

13 (A) \$2,690,000 shall be for Basic Energy
14 Sciences activities under section 104;

15 (B) \$957,000 shall be for Biological and
16 Environmental Research activities under section
17 105; and

18 (C) \$624,000 shall be for Advanced Sci-
19 entific Computing Research activities under sec-
20 tion 106; and

21 (5) \$8,154,000,000 for fiscal year 2015, of
22 which—

23 (A) \$2,960,000 shall be for Basic Energy
24 Sciences activities under section 104;

1 (B) \$1,060,000 shall be for Biological and
2 Environmental Research activities under section
3 105; and

4 (C) \$686,000 shall be for Advanced Sci-
5 entific Computing Research activities under sec-
6 tion 106.

7 **TITLE II—ADVANCED RESEARCH** 8 **PROJECTS AGENCY-ENERGY**

9 **SEC. 201. SHORT TITLE.**

10 This title may be cited as the “ARPA-E Reauthoriza-
11 tion Act of 2010”.

12 **SEC. 202. ARPA-E AMENDMENTS.**

13 Section 5012 of the America COMPETES Act (42
14 U.S.C. 16538) is amended—

15 (1) in subsection (c)(2)—

16 (A) in subparagraph (A), by inserting
17 “and applied” after “advances in fundamental”;

18 (B) by striking “and” at the end of sub-
19 paragraph (B);

20 (C) by striking the period at the end of
21 subparagraph (C) and inserting “; and”; and

22 (D) by adding at the end the following new
23 subparagraph:

24 “(D) promoting the commercial application
25 of advanced energy technologies.”;

1 (2) in subsection (e)(3), by amending subpara-
2 graph (C) to read as follows:

3 “(C) research and development of ad-
4 vanced manufacturing process and technologies
5 for the domestic manufacturing of novel energy
6 technologies; and”;

7 (3) by redesignating subsections (f) through
8 (m) as subsections (g), (h), (i), (j), (l), (m), (n), and
9 (o), respectively;

10 (4) by inserting after subsection (e) the fol-
11 lowing new subsection:

12 “(f) AWARDS.—In carrying out this section, the Di-
13 rector shall initiate and execute awards in the form of
14 grants, contracts, cooperative agreements, cash prizes,
15 and other transactions.”;

16 (5) in subsection (g), as so redesignated by
17 paragraph (3) of this section—

18 (A) by redesignating paragraphs (1) and
19 (2) as paragraphs (2) and (3), respectively;

20 (B) by inserting before paragraph (2), as
21 so redesignated by subparagraph (A) of this
22 paragraph, the following new paragraph:

23 “(1) IN GENERAL.—The Director shall establish
24 and maintain within ARPA-E a staff, including legal
25 counsel, contracting personnel, and program direc-

1 tors, with sufficient qualifications and expertise to
2 enable ARPA-E to carry out its responsibilities
3 under this section separate and distinct from the op-
4 erations of the rest of the Department.”;

5 (C) in paragraph (2)(A), as so redesign-
6 nated by subparagraph (A) of this paragraph,
7 by striking “each of”;

8 (D) in paragraph (2)(B), as so redesign-
9 nated by subparagraph (A) of this paragraph—

10 (i) in clause (iv), by striking “, with
11 advice under subsection (j) as appro-
12 priate,”;

13 (ii) by redesignating clauses (v) and
14 (vi) as clauses (vi) and (viii), respectively;

15 (iii) by inserting after clause (iv) the
16 following new clause:

17 “(v) identifying innovative cost-shar-
18 ing arrangements for ARPA-E projects, in-
19 cluding through use of the authority under
20 section 988(b)(3) of the Energy Policy Act
21 of 2005 (42 U.S.C. 16352(b)(3));”;

22 (iv) in clause (vi), as so redesignated
23 by clause (ii) of this subparagraph, by
24 striking “; and” and inserting a semicolon;
25 and

1 (v) by inserting after clause (vi), as so
2 redesignated by clause (ii) of this subpara-
3 graph, the following new clause:

4 “(vii) identifying mechanisms for com-
5 mercial application of successful energy
6 technology development projects, including
7 through establishment of partnerships be-
8 tween awardees and commercial entities;
9 and”;

10 (E) in paragraph (2)(C), as so redesign-
11 ated by subparagraph (A) of this paragraph,
12 by inserting “up to” after “shall be”;

13 (F) in paragraph (3), as so redesignated
14 by subparagraph (A) of this paragraph, by
15 striking subparagraph (B) and redesignating
16 subparagraphs (C) and (D) as subparagraphs
17 (B) and (C), respectively;

18 (G) by striking “program managers” each
19 place it appears and inserting “program direc-
20 tors”;

21 (H) by striking “program manager” each
22 place it appears and inserting “program direc-
23 tor”; and

24 (I) by adding at the end the following new
25 paragraph:

1 “(4) FELLOWSHIPS.—The Director is author-
2 ized to select exceptional early-career and senior sci-
3 entific, legal, business, and technical personnel to
4 serve as fellows to work at ARPA-E for terms not
5 to exceed two years. Responsibilities of fellows may
6 include—

7 “(A) supporting program managers in pro-
8 gram creation, design, implementation, and
9 management;

10 “(B) exploring technical fields for future
11 ARPA-E program areas;

12 “(C) assisting the Director in the creation
13 of the strategic vision for ARPA-E referred to
14 in subsection (h)(2);

15 “(D) preparing energy technology and eco-
16 nomic analyses; and

17 “(E) any other appropriate responsibilities
18 identified by the Director.”;

19 (6) in subsection (h)(2), as so redesignated by
20 paragraph (3) of this section—

21 (A) by striking “2008” and inserting
22 “2010”; and

23 (B) by striking “2011” and inserting
24 “2013”;

1 (7) by amending subsection (j), as so redesign-
2 nated by paragraph (3) of this section, to read as
3 follows:

4 “(j) FEDERAL DEMONSTRATION OF TECH-
5 NOLOGIES.—The Director shall seek opportunities to part-
6 ner with purchasing and procurement programs of Federal
7 agencies to demonstrate energy technologies resulting
8 from activities funded through ARPA-E.”;

9 (8) by inserting after such subsection (j) the
10 following new subsection:

11 “(k) EVENTS.—The Director is authorized to con-
12 vene, organize, and sponsor events that further the objec-
13 tives of ARPA-E, including events that assemble award-
14 ees, the most promising applicants for ARPA-E funding,
15 and a broad range of ARPA-E stakeholders (which may
16 include members of relevant scientific research and aca-
17 demic communities, government officials, financial institu-
18 tions, private investors, entrepreneurs, and other private
19 entities), for the purposes of—

20 “(1) demonstrating projects of ARPA-E award-
21 ees;

22 “(2) demonstrating projects of finalists for
23 ARPA-E awards and other energy technology
24 projects;

1 “(3) facilitating discussion of the commercial
2 application of energy technologies developed under
3 ARPA-E and other government-sponsored research
4 and development programs; or

5 “(4) such other purposes as the Director con-
6 siders appropriate.”;

7 (9) in subsection (m)(1), as so redesignated by
8 paragraph (3) of this section, by striking “4 years”
9 and inserting “6 years”;

10 (10) in section (m)(2)(B), as so redesignated by
11 paragraph (3) of this section, by inserting “, and
12 how those lessons may apply to the operation of
13 other programs within the Department of Energy”
14 after “ARPA-E”;

15 (11) by amending subsection (o)(2), as so re-
16 designating by paragraph (3) of this section, to read
17 as follows:

18 “(2) AUTHORIZATION OF APPROPRIATIONS.—
19 Subject to paragraph (4), there are authorized to be
20 appropriated to the Director for deposit in the
21 Fund, without fiscal year limitation—

22 “(A) \$300,000,000 for fiscal year 2011;

23 “(B) \$500,000,000 for fiscal year 2012;

24 “(C) \$700,000,000 for fiscal year 2013;

25 “(D) \$900,000,000 for fiscal year 2014;

1 “(E) \$1,000,000,000 for fiscal year 2015;
2 and
3 “(F) such sums as are necessary for each
4 of fiscal years 2016 through 2020.”; and
5 (12) in subsection (o), as so redesignated by
6 paragraph (3) of this section, by—
7 (A) striking paragraph (4); and
8 (B) redesignated paragraph (5) as para-
9 graph (4).

10 **TITLE III—ENERGY INNOVATION** 11 **HUBS**

12 **SEC. 301. SHORT TITLE.**

13 This title may be cited as the “Energy Innovation
14 Hubs Authorization Act of 2010”.

15 **SEC. 302. ENERGY INNOVATION HUBS.**

16 (a) ESTABLISHMENT OF PROGRAM.—

17 (1) IN GENERAL.—The Secretary of Energy
18 shall carry out a program to enhance the Nation’s
19 economic, environmental, and energy security by
20 making grants to consortia for establishing and op-
21 erating Energy Innovation Hubs to conduct and
22 support, whenever practicable at one centralized lo-
23 cation, multidisciplinary, collaborative research, de-
24 velopment, demonstration, and commercial applica-

1 tion of advanced energy technologies in areas not
2 being served by the private sector.

3 (2) TECHNOLOGY DEVELOPMENT FOCUS.—The
4 Secretary shall designate for each Hub a unique ad-
5 vanced energy technology development focus.

6 (3) COORDINATION.—The Secretary shall en-
7 sure the coordination of, and avoid unnecessary du-
8 plication of, the activities of Hubs with those of
9 other Department of Energy research entities, in-
10 cluding the National Laboratories, the Advanced Re-
11 search Projects Agency—Energy, and Energy Fron-
12 tier Research Centers, and within industry. Such co-
13 ordination shall include convening and consulting
14 with representatives of staff of the Department of
15 Energy, representatives from Hubs and the quali-
16 fying entities that are members of the consortia op-
17 erating the Hubs, and representatives of such other
18 entities as the Secretary considers appropriate, to
19 share research results, program plans, and opportu-
20 nities for collaboration.

21 (4) ADMINISTRATION.—The Secretary shall ad-
22 minister this section with respect to each Hub
23 through the Department program office appropriate
24 to administer the subject matter of the technology

1 development focus assigned under paragraph (2) for
2 the Hub.

3 (b) CONSORTIA.—

4 (1) ELIGIBILITY.—To be eligible to receive a
5 grant under this section for the establishment and
6 operation of a Hub, a consortium shall—

7 (A) be composed of no fewer than 2 quali-
8 fying entities;

9 (B) operate subject to a binding agreement
10 entered into by its members that documents—

11 (i) the proposed partnership agree-
12 ment, including the governance and man-
13 agement structure of the Hub;

14 (ii) measures to enable cost-effective
15 implementation of the program under this
16 section;

17 (iii) a proposed budget, including fi-
18 nancial contributions from non-Federal
19 sources;

20 (iv) conflict of interest procedures
21 consistent with subsection (d)(3), all
22 known material conflicts of interest, and
23 corresponding mitigation plans;

24 (v) an accounting structure that en-
25 ables the Secretary to ensure that the con-

1 consortium has complied with the require-
2 ments of this section; and

3 (vi) an external advisory committee
4 consistent with subsection (d)(2); and
5 (C) operate as a nonprofit organization.

6 (2) APPLICATION.—A consortium seeking to es-
7 tablish and operate a Hub under this section, acting
8 through a prime applicant, shall transmit to the Sec-
9 retary an application at such time, in such form,
10 and accompanied by such information as the Sec-
11 retary shall require, including a detailed description
12 of the elements of the consortium agreement re-
13 quired under paragraph (1)(B).

14 (c) SELECTION AND SCHEDULE.—The Secretary
15 shall select consortia for grants for the establishment and
16 operation of Hubs through competitive selection processes.
17 Grants made to a Hub shall be for a period not to exceed
18 5 years, after which the grant may be renewed, subject
19 to a competitive selection process.

20 (d) HUB OPERATIONS.—

21 (1) IN GENERAL.—Hubs shall conduct or pro-
22 vide for multidisciplinary, collaborative research, de-
23 velopment, demonstration, and commercial applica-
24 tion of advanced energy technologies within the tech-
25 nology development focus designated for the Hub by

1 the Secretary under subsection (a)(2). Each Hub
2 shall—

3 (A) encourage collaboration and commu-
4 nication among the member qualifying entities
5 of the consortium and awardees by conducting
6 activities whenever practicable at one central-
7 ized location;

8 (B) develop and publish on the Depart-
9 ment of Energy's website proposed plans and
10 programs;

11 (C) submit an annual report to the Sec-
12 retary summarizing the Hub's activities, includ-
13 ing detailing organizational expenditures, listing
14 external advisory committee members, and de-
15 scribing each project undertaken by the Hub;
16 and

17 (D) monitor project implementation and
18 coordination.

19 (2) EXTERNAL ADVISORY COMMITTEE.—Each
20 Hub shall establish an external advisory committee,
21 the membership of which shall have sufficient exper-
22 tise to advise and provide guidance on scientific,
23 technical, industry, financial, and research manage-
24 ment matters.

25 (3) CONFLICTS OF INTEREST.—

1 (A) PROCEDURES.—Hubs shall establish
2 conflict of interest procedures, consistent with
3 those of the Department of Energy, to ensure
4 that employees and consortia designees for Hub
5 activities who are in decisionmaking capacities
6 disclose all material conflicts of interest, includ-
7 ing financial, organizational, and personal con-
8 flicts of interest.

9 (B) DISQUALIFICATION AND REVOCA-
10 TION.—The Secretary may disqualify an appli-
11 cation or revoke funds distributed to a Hub if
12 the Secretary discovers a failure to comply with
13 conflict of interest procedures established under
14 subparagraph (A).

15 (e) PROHIBITION ON CONSTRUCTION.—No funds
16 provided pursuant to this section may be used for con-
17 struction of new buildings or facilities for Hubs. Construc-
18 tion of new buildings or facilities shall not be considered
19 as part of the non-Federal share of a Hub cost-sharing
20 agreement.

21 (f) OVERSIGHT BOARD.—The Secretary shall estab-
22 lish and maintain within the Department an Oversight
23 Board to oversee the progress of Hubs.

24 (g) DEFINITIONS.—For purposes of this section:

1 (1) ADVANCED ENERGY TECHNOLOGY.—The
2 term “advanced energy technology” means an inno-
3 vative technology—

4 (A) that produces energy from solar, wind,
5 geothermal, biomass, tidal, wave, ocean, or
6 other renewable energy resources;

7 (B) that produces nuclear energy;

8 (C) for carbon capture and sequestration;

9 or

10 (D) that generates, transmits, distributes,
11 utilizes, or stores energy more efficiently than
12 conventional technologies.

13 (2) HUB.—The term “Hub” means an Energy
14 Innovation Hub established in accordance with this
15 section.

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

20 (4) QUALIFYING ENTITY.—The term “quali-
21 fying entity” means—

22 (A) an institution of higher education;

23 (B) an appropriate State or Federal entity;

24 (C) a nongovernmental organization with
25 expertise in advanced energy technology re-

1 search, development, demonstration, or com-
2 mercial application; or

3 (D) any other relevant entity the Secretary
4 considers appropriate.

5 (5) SECRETARY.—The term “Secretary” means
6 the Secretary of Energy.

7 (h) AUTHORIZATION OF APPROPRIATIONS.—There
8 are authorized to be appropriated to the Secretary to carry
9 out this section—

10 (1) \$110,000,000 for fiscal year 2011;

11 (2) \$135,000,000 for fiscal year 2012;

12 (3) \$195,000,000 for fiscal year 2013;

13 (4) \$210,000,000 for fiscal year 2014; and

14 (5) \$210,000,000 for fiscal year 2015.