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[Report No. 109-____]

Science Section Only

IN THE SENATE OF THE UNITED STATES

JUNE ____ (legislative day, _____), 2005

Mr. DOMENICI, from the Committee on Energy and Natural Resources, reported the following original bill; which was read twice and placed on the calendar

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A BILL

To enhance the energy security of the United States, and for other purposes.

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

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Energy Policy Act of 2005".

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

(3) minimizing the efficiency losses associated with carbon capture and sequestration.

(b) CARBON SEQUESTRATION.—In conjunction with the program under subsection (a), the Secretary shall continue pursuit of a carbon sequestration program involving public-private partnerships.

SEC. 957. COMPLEX WELL TECHNOLOGY TESTING FACILITY.

The Secretary, in coordination with industry leaders in extended research drilling technology, shall establish a Complex Well Technology Testing Facility at the Rocky Mountain Oilfield Testing Center to increase the range of extended drilling technologies.

Subtitle F—Science

SEC. 961. SCIENCE.

(a) IN GENERAL.—There are authorized to be appropriated to the Secretary to carry out research, development, demonstration, and commercial application activities of the Office of Science, including activities authorized under this subtitle (including the amounts authorized under the amendment made by section 967(b) and including basic energy sciences, advanced scientific and computing research, biological and environmental research, fusion energy sciences, high energy physics, nuclear physics, research analysis, and infrastructure support)—

(1) $4,153,000,000 for fiscal year 2006;

(2) $4,586,000,000 for fiscal year 2007; and

(3) $5,000,000,000 for fiscal year 2008.

(b) ALLOCATIONS.—From amounts authorized under subsection (a), the following sums are authorized:

(1) For activities under the Fusion Energy Sciences program (including activities under section 962)—

(A) $349,000,000 for fiscal year 2006;

(B) $362,000,000 for fiscal year 2007; and

(C) $377,000,000 for fiscal year 2008.

(2) For activities under the catalysis research program established under section 964—

(A) $35,000,000 for fiscal year 2006;

(B) $36,500,000 for fiscal year 2007; and

(C) $38,200,000 for fiscal year 2008.

(3) For activities under the Genomes to Life Program established under section 968—

(A) $170,000,000 for fiscal year 2006;

(B) $325,000,000 for fiscal year 2007; and

(C) $415,000,000 for fiscal year 2008.

(4) For construction and ancillary equipment for user facilities under section 968(d) for the Genomes to Life Program, of the amounts authorized under paragraph (3)—

(A) $70,000,000 for fiscal year 2006;

(B) $175,000,000 for fiscal year 2007; and

(C) $215,000,000 for fiscal year 2008.

(5) For activities under the Energy-Water Supply Technologies Program established under section 970, $30,000,000 for each of fiscal years 2006 through 2008.

(c) FUSION ENERGY SCIENCES PROGRAM.—In addition to the funds authorized under subsection (b)(1), there are authorized to be appropriated for construction costs associated with the Fusion Energy Sciences Program under section 962—

(1) $55,000,000 for fiscal year 2006;

(2) $95,000,000 for fiscal year 2007; and

(3) $115,000,000 for fiscal year 2008.

SEC. 962. FUSION ENERGY SCIENCES PROGRAM.

(a) DECLARATION OF POLICY.—It shall be the policy of the United States to conduct research, development, demonstration, and commercial applications to provide for the scientific, engineering, and commercial infrastructure necessary to ensure that the United States is competitive with other countries in providing fusion energy for its own needs and the needs of other countries, including by demonstrating electric power or hydrogen production for the

United States energy grid using fusion energy at the earliest date.

(b) PLANNING.—

(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary shall submit to Congress a plan (with proposed cost estimates, budgets, and lists of potential international partners) for the implementation of the policy described in subsection (a) in a manner that ensures that—

(A) existing fusion research facilities are more fully used;

(B) fusion science, technology, theory, advanced computation, modeling, and simulation are strengthened;

(C) new magnetic and inertial fusion research and development facilities are selected based on scientific innovation and cost effectiveness, and the potential of the facilities to advance the goal of practical fusion energy at the earliest date practicable;

(D) facilities that are selected are funded at a cost-effective rate;

(E) communication of scientific results and methods between the fusion energy science com-

munity and the broader scientific and technology communities is improved;

(F) inertial confinement fusion facilities are used to the extent practicable for the purpose of inertial fusion energy research and development;

(G) attractive alternative inertial and magnetic fusion energy approaches are more fully explored; and

(H) to the extent practicable, the recommendations of the Fusion Energy Sciences Advisory Committee in the report on workforce planning, dated March 2004, are carried out, including periodic reassessment of program needs.

(2) COSTS AND SCHEDULES.—The plan shall also address the status of and, to the extent practicable, costs and schedules for—

(A) the design and implementation of international or national facilities for the testing of fusion materials; and

(B) the design and implementation of international or national facilities for the testing and development of key fusion technologies.

(c) UNITED STATES PARTICIPATION IN ITER.—

(1) DEFINITIONS.—In this subsection:

(A) CONSTRUCTION.—

(i) IN GENERAL.—The term "construction" means—

(I) the physical construction of the ITER facility; and

(II) the physical construction, purchase, or manufacture of equipment or components that are specifically designed for the ITER facility.

(ii) EXCLUSIONS.—The term "construction" does not include the design of the facility, equipment, or components.

(B) ITER.—The term "ITER" means the international burning plasma fusion research project in which the President announced United States participation on January 30, 2003, or any similar international project.

(2) PARTICIPATION.—The United States may participate in the ITER only in accordance with this subsection.

(3) AGREEMENT.—

(A) IN GENERAL.—The Secretary may negotiate an agreement for United States participation in the ITER.

(B) CONTENTS.—Any agreement for United States participation in the ITER shall, at a minimum—

(i) clearly define the United States financial contribution to construction and operating costs, as well as any other costs associated with a project;

(ii) ensure that the share of high-technology components of the ITER manufactured in the United States is at least proportionate to the United States financial contribution to the ITER;

(iii) ensure that the United States will not be financially responsible for cost overruns in components manufactured in other ITER participating countries;

(iv) guarantee the United States full access to all data generated by the ITER;

(v) enable United States researchers to propose and carry out an equitable share of the experiments at the ITER;

(vi) provide the United States with a role in all collective decisionmaking related to the ITER; and

(vii) describe the process for discontinuing or decommissioning the ITER and any United States role in that process.

(4) PLAN.—

(A) DEVELOPMENT.—The Secretary, in consultation with the Fusion Energy Sciences Advisory Committee, shall develop a plan for the participation of United States scientists in the ITER that shall include—

(i) the United States research agenda for the ITER;

(ii) methods to evaluate whether the ITER is promoting progress toward making fusion a reliable and affordable source of power; and

(iii) a description of how work at the ITER will relate to other elements of the United States fusion program.

(B) REVIEW.—The Secretary shall request a review of the plan by the National Academy of Sciences.

(5) LIMITATION.—No Federal funds shall be expended for the construction of the ITER until the Secretary has submitted to Congress—

(A) the agreement negotiated in accordance with paragraph (3) and 120 days have elapsed since that submission;

(B) a report describing the management structure of the ITER and providing a fixed dollar estimate of the cost of United States participation in the construction of the ITER, and 120 days have elapsed since that submission;

(C) a report describing how United States participation in the ITER will be funded without reducing funding for other programs in the Office of Science (including other fusion programs), and 60 days have elapsed since that submission; and

(D) the plan required by paragraph (4) (but not the National Academy of Sciences review of that plan), and 60 days have elapsed since that submission.

(6) ALTERNATIVE TO ITER.—

(A) IN GENERAL.—If at any time during the negotiations on the ITER, the Secretary determines that construction and operation of the ITER is unlikely or infeasible, the Secretary shall submit to Congress, along with the budget request of the President submitted to Congress

for the following fiscal year, a plan for implementing a domestic burning plasma experiment such as the Fusion Ignition Research Experiment, including costs and schedules for the plan.

(B) ADMINISTRATION.—The Secretary shall—

(i) refine the plan in full consultation with the Fusion Energy Sciences Advisory Committee; and

(ii) transmit the plan to the National Academy of Sciences for review.

SEC. 963. SUPPORT FOR SCIENCE AND ENERGY FACILITIES AND INFRASTRUCTURE.

(a) FACILITY AND INFRASTRUCTURE POLICY.—

(1) IN GENERAL.—The Secretary shall develop and implement a strategy for facilities and infrastructure supported primarily from the Office of Science, the Office of Energy Efficiency and Renewable Energy, the Office of Fossil Energy, or the Office of Nuclear Energy, Science and Technology Programs at all National Laboratories and single-purpose research facilities.

(2) STRATEGY.—The strategy shall provide cost-effective means for—

(A) maintaining existing facilities and infrastructure;

(B) closing unneeded facilities;

(C) making facility modifications; and

(D) building new facilities.

(b) REPORT.—

(1) IN GENERAL.—The Secretary shall prepare and submit, along with the budget request of the President submitted to Congress for fiscal year 2007, a report describing the strategy developed under subsection (a).

(2) CONTENTS.—For each National Laboratory and single-purpose research facility that is primarily used for science and energy research, the report shall contain—

(A) the current priority list of proposed facilities and infrastructure projects, including cost and schedule requirements;

(B) a current 10-year plan that demonstrates the reconfiguration of its facilities and infrastructure to meet its missions and to address its long-term operational costs and return on investment;

(C) the total current budget for all facilities and infrastructure funding; and

(D) the current status of each facility and infrastructure project compared to the original baseline cost, schedule, and scope.

SEC. 964. CATALYSIS RESEARCH PROGRAM.

(a) ESTABLISHMENT.—The Secretary, acting through the Office of Science, shall support a program of research and development in catalysis science consistent with the statutory authorities of the Department related to research and development.

(b) COMPONENTS.—The program shall include efforts to—

(1) enable catalyst design using combinations of experimental and mechanistic methodologies coupled with computational modeling of catalytic reactions at the molecular level;

(2) develop techniques for high throughput synthesis, assay, and characterization at nanometer and subnanometer scales in situ under actual operating conditions;

(3) synthesize catalysts with specific site architectures;

(4) conduct research on the use of precious metals for catalysis; and

(5) translate molecular understanding to the design of catalytic compounds.

(c) DUTIES OF THE OFFICE OF SCIENCE.—In carrying out the program, the Director of the Office of Science shall—

(1) support both individual investigators and multidisciplinary teams of investigators to pioneer new approaches in catalytic design;

(2) develop, plan, construct, acquire, share, or operate special equipment or facilities for the use of investigators in collaboration with national user facilities, such as nanoscience and engineering centers;

(3) support technology transfer activities to benefit industry and other users of catalysis science and engineering; and

(4) coordinate research and development activities with industry and other Federal agencies.

(d) TRIENNIAL ASSESSMENT.—Not later than 3 years after the date of enactment of this Act and every 3 years thereafter, the National Academy of Sciences shall—

(1) review the catalysis program to measure—

(A) gains made in the fundamental science of catalysis; and

(B) progress towards developing new fuels for energy production and material fabrication processes; and

(2) submit to Congress a report describing the results of the review.

SEC. 965. HYDROGEN.

(a) IN GENERAL.—The Secretary shall conduct a program of fundamental research and development in support of programs authorized under title VIII.

(b) METHODS.—The program shall include support for methods of generating hydrogen without the use of natural gas.

SEC. 966. SOLID STATE LIGHTING.

The Secretary shall conduct a program of fundamental research on advance solid state lighting in support of the Next Generation Lighting Initiative carried out under section 912.

SEC. 967. ADVANCED SCIENTIFIC COMPUTING FOR ENERGY MISSIONS.

(a) PROGRAM.—

(1) IN GENERAL.—The Secretary shall conduct an advanced scientific computing research and development program that includes activities related to applied mathematics and activities authorized by the Department of Energy High-End Computing Revitalization Act of 2004 (15 U.S.C. 5541 et seq.).

(2) GOAL.—The Secretary shall carry out the program with the goal of supporting departmental

missions, and providing the high-performance computational, networking, advanced visualization technologies, and workforce resources, that are required for world leadership in science.

(b) HIGH-PERFORMANCE COMPUTING.—Section 203 of the High-Performance Computing Act of 1991 (15 U.S.C. 5523) is amended to read as follows:

"SEC. 203. DEPARTMENT OF ENERGY ACTIVITIES.

"(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Secretary of Energy shall—

"(1) conduct and support basic and applied research in high-performance computing and networking to support fundamental research in science and engineering disciplines related to energy applications; and

"(2) provide computing and networking infrastructure support, including—

"(A) the provision of high-performance computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems; and

"(B) support for advanced software and applications development for science and engi-

neering disciplines related to energy applications.

"(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary of Energy such sums as are necessary to carry out this section.".

SEC. 968. GENOMES TO LIFE PROGRAM.

(a) ESTABLISHMENT.—The Secretary shall carry out a program of research, development, demonstration, and commercial application, to be known as the "Genomes to Life Program", in microbial and plant systems biology, protein science, and computational biology consistent with the statutory authorities of the Department.

(b) PLANNING.—

(1) IN GENERAL.—The Secretary shall prepare a program plan that describes how knowledge and capabilities would be developed by the program and applied to missions of the Department relating to energy security, environmental cleanup, and national security.

(2) CONSULTATION.—The Secretary shall prepare the program plan in consultation with the heads of other Federal agencies that carry out relevant technology programs.