

Office of Science Section on Fusion Energy Sciences

the Department should apply the same principles to climate and atmospheric research.

The Committee continues to support the goals of the Bioenergy Research Centers (BRCs), which conduct science research aiming to develop the next generation of economic fuels made from domestic plant sources that do not compete with the nations' food supply. Successful breakthroughs at the BRCs could result in technologies that could leapfrog current incarnations of cellulosic biofuels and provide a path to substantially reducing the nation's oil imports. However, these centers were never envisioned as permanent research institutions dependent on federal funding, but instead as temporary and targeted initiatives with five-year terms. In order to receive funding beyond fiscal year 2012, the fifth full year of funding, the Department will need to fully justify to the Committee each center's performance. The Committee therefore directs the Department to provide to the Committee, not later than February 6, 2012, a full evaluation of each Bioenergy Research Center, a comparison of each center's achievements with the Department's original targets, and the Department's subsequent recommendation for extension or conclusion of each center.

While the Department has increased collaboration between the Bioenergy Research Centers and its applied research and development programs, the Committee encourages greater integration and cooperation among these activities in order to more effectively advance biofuels solutions from the laboratories to commercial production.

FUSION ENERGY SCIENCES

Fusion Energy Sciences conducts basic science research and experimentation seeking to harness nuclear fusion for energy production purposes. The Committee recommends \$406,000,000 for fusion energy sciences, \$30,537,000 above fiscal year 2011 and \$6,300,000 above the request.

While the National Nuclear Security Administration performs inertial confinement fusion research for nuclear stockpile stewardship, the Office of Science has historically focused on magnetic confinement fusion and other related research. The Committee continues to strongly support magnetic confinement fusion research both as a source of American scientific leadership and expertise, and as a long-term effort to develop a clean energy alternative powered by domestic resources. As a result of the program's sole focus on magnetic fusion energy, however, the Office of Science's program does not have a broad framework for pursuing research avenues related to inertial fusion energy. In anticipation of achieving ignition at the National Ignition Facility—a critical milestone in the demonstration of inertial confinement fusion's feasibility for energy production—the Department has commissioned a National Academies study assessing the prospects for power generation with inertial fusion energy and identifying obstacles and challenges that will assist in developing a research and development roadmap. The Committee supports this study and encourages the Department to move quickly upon completion of the report to determine a proposed path forward for inertial fusion energy in the event ignition is achieved.

Further, the Committee remains concerned that research expertise may be lost while the Department awaits completion of the Na-

tional Academies study, which is not due until July of 2012. The Committee urges the Department to fully evaluate existing research capabilities that do not fit easily within the existing weapons-focused inertial and energy-focused magnetic confinement fusion programs, such as krypton fluoride lasers and magneto-inertial fusion, but that may play important roles if an inertial fusion energy program moves forward in future years. The Department should take action to avoid irreversible losses in expertise in these areas before completion of the National Academies study.

The budget request proposes \$105,000,000 for ITER, the first full-scale test reactor for fusion energy. The Committee supports this project as an important step in the development of fusion energy and takes seriously the Department's commitments to international collaborations. However, the Department of Energy's required contribution to ITER is expected to increase substantially in the next several years, and the Committee is concerned that, while funding for ITER will yield important advances to domestic superconductor and other manufacturing capabilities, it may leave little budgetary room to continue supporting critical American fusion science expertise. Further, the Department has not preemptively indicated how it is planning for this impending budgetary challenge, nor has it created a clear prioritization of activities within Fusion Energy Sciences to guide tradeoffs when budgets are tight. The Department is therefore directed to submit a 10-year plan, not later than 12 months after enactment of this Act, on the Department's proposed research and development activities in magnetic fusion under four realistic budget scenarios. The report shall (1) identify specific areas of fusion energy research and enabling technology development in which the United States can and should establish or solidify a lead in the global fusion energy development effort, and (2) identify priorities for facility construction and facility decommissioning under each of the four budget scenarios. The Department is encouraged to use a similar approach adopted by the Particle Physics Project Prioritization Panel that developed a 10-year strategic plan for the Department's high energy physics program.

HIGH ENERGY PHYSICS

The Committee recommends \$797,200,000 for High Energy Physics, \$1,780,000 above fiscal year 2011 and the same as the budget request.

The United States led the world in high-energy particle physics for much of the twentieth century, most recently as the host of Fermilab's Tevatron accelerator, which staged the world's highest-energy particle collisions for several decades. As the Large Hadron Collider (LHC) at CERN ramps up operation as the world's leading experimental site for high-energy collider physics, the Committee supports the Department of Energy's significant ongoing contributions to this international collaboration probing the edges of scientific discovery on the nature of the universe. The Committee also supports the Department's careful prioritization within this program and decision to invest in the so-called "intensity frontier" of high-energy physics—an area of science in which the United States can become a global leader. In a time marked by the need for fiscal

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entific advisory group on the ability to certify the Reliable Replacement Warhead. That program has been cancelled and the Administration has stated it does not intend to produce a new nuclear weapon. Therefore, it is unclear why such large increases are being requested and the recommendation provides funding consistent with the pre-NPR level. The NNSA should clarify the goals of the Advanced Certification subprogram and how they are related to current stockpile requirements.

Engineering Campaign.—For the Engineering Campaign, the Committee recommends \$143,078,000, \$2,146,000 above fiscal year 2011 and the same as the request.

Inertial Confinement Fusion and High Yield Campaign.—The Committee recommendation provides \$471,174,000 for the Inertial Confinement Fusion and High Yield Campaign, \$6,427,000 below fiscal year 2011 and \$5,100,000 below the budget request. Within these funds, \$62,500,000 shall be for the Laboratory for Laser Energetics as requested. The recommendation includes \$4,000,000 for the Joint Program in High Energy Density Laboratory Plasmas, the same as fiscal year 2011 and \$5,100,000 below the budget request.

The Committee continues to support the National Ignition Facility (NIF) and urges the NNSA to maintain its schedule towards achieving fusion ignition. The Committee recommendation includes the full request to pursue ignition at NIF and to perform supporting weapons-related experiments on its pulsed power facilities. The Committee notes that NIF is already contributing to stockpile stewardship through experiments which ensure the aging nuclear weapons stockpile continues to be safe, secure and effective without nuclear testing.

Advanced Simulation and Computing Campaign.—The Committee recommends \$616,000,000 for the Advanced Simulation and Computing (ASC) Campaign, \$5,005,000 above fiscal year 2011 and \$12,945,000 below the budget request. High performance computing underpins our nation's nuclear stewards' ability to scientifically resolve outstanding weapons performance issues, address material aging and compatibility challenges, and conduct warhead life extension program activities. The budget request includes a new initiative to pursue a jump to exascale computing speeds, a thousand-fold improvement over today's modeling and simulation capability. The Committee recognizes that the request is part of a crosscutting endeavor with the Office of Science to maintain U.S. leadership in high performance computing. The Committee commends the Department's effort for its collaborative approach to develop exascale computing, which will serve to complement the strengths of both offices and limit duplication. The Committee supports initiation of this endeavor within ASC, consistent with other national security requirements of the Campaign. However, undertaking such a major initiative will require considerable funding, and the NNSA has yet to tie the need for this level of computing to any specific requirements of the stockpile in its 20-year plan.

Readiness Campaign.—The Committee recommends \$63,591,000 for the Readiness Campaign, \$35,001,000 below fiscal year 2011 and \$78,900,000 below the budget request. The Committee recommends no funding for the B61 within Nonnuclear Readiness and has provided the funding requested for these activities within the