

**ENERGY AND WATER DEVELOPMENT APPROPRIATIONS BILL, FY 2011**  
**Senate Bill 3635, Report 111-228**  
**(excerpts)**

The Senate bill provides funding for the **DOE Office of Science** at \$5.012 billion, an increase of \$108.3 million over the FY10 enacted level, but \$109.4 million below the president's budget request.

*Fusion Energy Sciences (FES)* would be funded at \$384.0 million, a decrease of \$42.0 million below the FY10 enacted level and \$4.0 million above the budget request.

### **FUSION ENERGY SCIENCES**

The Committee recommends \$384,000,000 for Fusion Energy Sciences. The Committee is concerned by cost increases and schedule delays related to the ITER project. In the last year, the projected start date for ITER has slipped another 10 months to November 2019, or 3 years later than first projected. These schedule changes put U.S. cost estimates at risk as costs escalate for the total project. The Committee encourages the Office of Science to keep the Committee informed about significant decisions and developments related to the ITER project.

The Committee is encouraged that the Office of Science tasked the National Academy of Sciences with reviewing options to advance inertial fusion energy. The Committee understands that an independent National Academy of Sciences committee will (1) assess the prospects of generating power using inertial confinement fusion, (2) identify scientific and engineering challenges, the costs for manufacturing targets, and research and development objectives to develop an inertial fusion energy demonstration plant, and (3) advise DOE on a roadmap for developing a demonstration plant.

The Committee believes that this is a practical way of identifying the steps that are needed to develop an inertial fusion energy program and plans to work with DOE to assess the budget needs for this alternative approach to fusion energy. Within available funds, the Committee provides \$4,000,000 to advance inertial fusion energy, which may include experiments using solid state or krypton fluoride lasers, ion beams, or pulsed power, and to help laboratories and universities participate in the National Academy of Sciences review.

The Committee is encouraged by DOE's progress in advancing fusion energy sciences. However, the Committee is concerned by the Fusion Advisory Committee finding that the United States risks losing leadership and competitiveness in material science. To successfully harness fusion energy, scientists and engineers must design and build reactor components that can withstand extreme radiation environments and temperature. Since these extreme environments and material needs are common to both magnetic and inertial fusion energy, the Committee encourages DOE to reassess its materials science program and establish a program that would explore science, engineering, and materials issues for both magnetic and inertial fusion energy and build U.S. expertise.

## NNSA

### **Inertial Confinement Fusion Ignition and High-yield Campaign-**

The Committee recommends \$481,548,000 as requested. Within these funds, at least \$62,477,000 and \$48,000,000 shall be used for inertial confinement fusion activities at the University of Rochester's Omega facility and Sandia National Laboratory's Z facility, respectively.

The Committee is concerned that NNSA has been slow to solicit help and ideas from outside experts with knowledge in inertial confinement fusion to make the first ignition experiments a success. The Committee questions Lawrence Livermore National Laboratory's decision, as the laboratory with lead responsibility for managing ignition experiments, to wait 4 years--and only months before the first ignition experiment is expected to take place--to implement the JASON study group's 2005 recommendation to form a standing external review committee of experts that could provide expert advice on the scientific and technical challenges. Even with the creation of this external review committee, a Government Accountability Office [GAO] study found that the committee currently in place falls short of meeting the intent of the JASON study group recommendation. For example, GAO found that the committee may not be able to give fully objective, candid advice because the committee will take direction from, and report to, Livermore's Director, rather than to NNSA. The Committee strongly supports the creation of an independent advisory board that can evaluate experiments planned at the National Ignition Facility, identify potential weaknesses with the experimental plan, and recommend, if necessary, alternative approaches to address scientific and technical challenges. The Committee also strongly supports the advisory committee's role in setting a strategic direction for inertial confinement fusion and high-energy density physics research and determining how best to use current facilities to advance this scientific field.

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