

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY**

Fusion: The World's Most Complex Energy Project

CHARTER

Friday, July 11, 2014
9:00 a.m. – 11:00 a.m.
2318 Rayburn House Office Building

Purpose

The Energy Subcommittee will hold a hearing titled *Fusion Energy: The World's Most Complex Energy Project* starting at 9:00 a.m. on Friday, July 11th in room 2318 of the Rayburn House Office Building. This hearing will examine the Fusion Energy Science (FES) program within the Department of Energy's (DOE's) Office of Science, focusing on the United States' involvement in the International Thermonuclear Experimental Reactor (ITER) project located in Cadarache, France, as well as its current operating status.

Witnesses

- **Dr. Frank Rusco**, Director, Natural Resources and Environment, GAO
- **Dr. Patricia Dehmer**, Deputy Director for Science Programs, DOE
- **Dr. Robert Iotti**, ITER Council Chair
- **Dr. Ned Sauthoff**, Director, U.S. ITER Project, Oak Ridge National Laboratory

Background

The mission of DOE's Fusion Energy Sciences program is to expand the fundamental understanding of matter at very high temperatures and densities and to build the scientific foundation needed to develop a fusion energy source.¹ The pursuit of fusion energy is an attempt to replicate the energy-producing power of a star on earth. The potential benefits from a workable fusion energy source are incalculable, but it is also one of the most challenging programs of scientific research and development that has ever been undertaken. Such an energy system would utilize seawater as the primary fuel, produce modest radioactive bi-products, and

¹ U.S. Department of Energy, Office of Science, Fusion Energy Sciences Mission, Available at: <http://science.energy.gov/fes/about/>

emit zero carbon emissions. FES also supports discovery science related to understanding the behavior of plasmas – the primary constituent matter of most stars.²

The International Thermonuclear Experimental Reactor (ITER) project is a collaboration to design, build, and operate a first-of-a-kind research facility to achieve and maintain a burning plasma with a peak output of 500 MW thermal power driven by 50 MW input power.³

In 2003, President George W. Bush announced the United States' intention to join ITER describing it as “an ambitious international research project to harness the promise of fusion energy.”⁴ Congress then authorized U.S. participation in the project through the Energy Policy Act of 2005 (EPAct05). In 2006, the United States signed the ITER agreement. DOE fulfills this obligation by: (1) supplying personnel; (2) providing cash contributions to the ITER Organization; and (3) delivering 12 assigned hardware components.⁵

The seven member countries of ITER are China, India, Japan, the European Union, the Russian Federation, the United States, and South Korea. The European Union is obligated to contribute 45.46 percent of the construction cost of the ITER project, while the other countries, including the United States, are each to provide 9.09 percent. The United States is also obligated to provide 13 percent of the costs for operating, deactivating, and decommissioning the facility. The ITER organization is led by a Director-General and governed by the ITER Council, composed of government officials from each of the ITER members. The ITER Council has authority to appoint senior staff, amend regulations, decide on budgeting issues, and allow additional states or organizations to participate in ITER.⁶ In 2010, the ITER Council appointed Professor Osamu Motojimi as Director-General of the ITER project.⁷

At the time of the 2006 agreement, DOE estimated that construction would cost approximately \$5 billion (in 2002 US Dollars, no adjustments for inflation). These figures are not comparable to a DOE construction project cost estimate, but were meant to establish contribution expectations for ITER members. Last month, U.S. Government Accountability Office (GAO) concluded that since the 2006 agreement the DOE's estimated cost of the United States' commitment to the ITER project has grown by almost \$3 billion and the schedule for completion has been delayed up to 20 years. The report also points out that DOE's current cost and schedule estimates for the project cannot be used to set a performance baseline because they are linked to factors that DOE can only partially influence. The GAO also found that DOE has taken several actions to reduce the ITER project's costs by approximately \$388 million (as of February 2014), but that DOE has not yet adequately planned for the potential impact of those costs on FES. Through March of 2014, DOE has spent approximately \$692 million on ITER.

²U.S. Department of Energy, Office of Science, Fusion Energy Sciences, Available at: <http://science.energy.gov/fes/>

³ International Thermonuclear Experimental Reactor, Available at: <http://www.iter.org/>

⁴ White House Archives, Available at: <http://georgewbush-whitehouse.archives.gov/news/releases/2003/01/20030130-18.html>

⁵ United States International Thermonuclear Experimental Reactor Project, Available at: <https://www.usiter.org/>

⁶ International Thermonuclear Experimental Reactor, the ITER Council, Available at: <https://www.iter.org/org/council>

⁷ International Thermonuclear Experimental Reactor, Director General, Available at: <https://www.iter.org/org/io/dg>

The Consolidated Appropriations Act of 2014 (P.L. 113-76) provided \$199.5 million for ITER with a stipulation that “not more than \$22,790,000 may be available for U.S. cash contributions to the International Thermonuclear Experimental Reactor project until its governing Council adopts the recommendations of the Third Biennial International Organization Management Assessment Report.” The Act also provided the Secretary with an opportunity to waive this requirement upon a determination that the Council is making satisfactory progress towards adoption of such recommendations.

Additional Reading

- United States Government Accountability Office, *Fusion Energy: Actions Needed to Finalize Cost and Schedule Estimates for U.S. Contributions to an International Experimental Reactor*, June 2014, available at: <http://www.gao.gov/products/GAO-14-499>
- Madia & Associates LLC, *2013 ITER Management Assessment*, October 18, 2013.