

## Why GAO Did This Study

ITER is an international research facility being built in France to demonstrate the feasibility of fusion energy. Fusion occurs when the nuclei of two light atoms collide and fuse together at high temperatures, which results in the release of large amounts of energy. The United States has committed to providing about 9 percent of ITER's construction costs through contributions of hardware, personnel, and cash, and DOE is responsible for managing those contributions, as well as the overall U.S. fusion program. In fiscal year 2014, the U.S. ITER Project received \$199.5 million, or about 40 percent of the overall U.S. fusion program budget.

GAO was asked to review DOE's cost and schedule estimates for the U.S. ITER Project. This report examines (1) how and why the estimated costs and schedule of the U.S. ITER Project have changed since 2006, (2) the reliability of DOE's current cost and schedule estimates, and (3) actions DOE has taken to reduce U.S. ITER Project costs and plan for their impact on the overall U.S. fusion program. GAO reviewed documents; assessed DOE's current estimates against best practices; and obtained the perspectives of 10 experts in fusion energy and project management.

## What GAO Recommends

GAO recommends, among other things, that DOE formally propose the actions needed to set a reliable international project schedule and set a date to complete the U.S. fusion program's strategic plan. DOE agreed with GAO's recommendations.

View [GAO-14-499](#). For more information, contact Frank Rusco at (202) 512-3841 or [ruscof@gao.gov](mailto:ruscof@gao.gov).

## FUSION ENERGY

### Actions Needed to Finalize Cost and Schedule Estimates for U.S. Contributions to an International Experimental Reactor

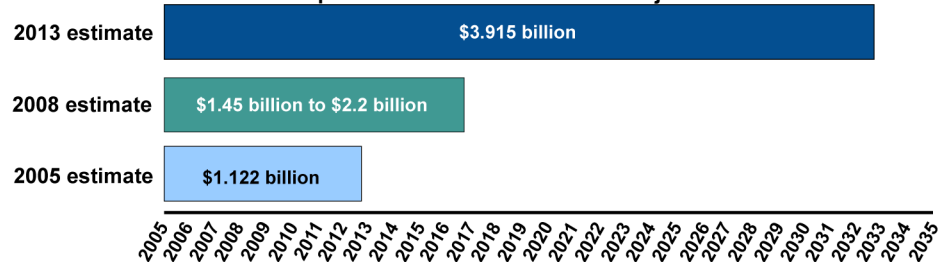
#### What GAO Found

Since the International Thermonuclear Experimental Reactor (ITER) Agreement was signed in 2006, the Department of Energy's (DOE) estimated cost for the U.S. portion of ITER has grown by almost \$3 billion, and its estimated completion date has slipped by 20 years (see fig.). DOE has identified several reasons for the changes, such as increases in hardware cost estimates as designs and requirements have been more fully developed over time.

DOE's current cost and schedule estimates for the U.S. ITER Project reflect most characteristics of reliable estimates, but the estimates cannot be used to set a performance baseline because they are linked to factors that DOE can only partially influence. A performance baseline would commit DOE to delivering the U.S. ITER Project at a specific cost and date and provide a way to measure the project's progress. According to DOE documents and officials, the agency has been unable to finalize its cost and schedule estimates in part because the international project schedule the estimates are linked to is not reliable. DOE has taken some steps to help push for a more reliable international project schedule, such as providing position papers and suggested actions to the ITER Organization. However, DOE has not taken additional actions such as preparing formal proposals that could help resolve these issues. Unless such formal actions are taken to resolve the reliability concerns of the international project schedule, DOE will remain hampered in its efforts to create and set a performance baseline for the U.S. ITER Project.

DOE has taken several actions that have reduced U.S. ITER Project costs by about \$388 million as of February 2014, but DOE has not adequately planned for the potential impact of those costs on the overall U.S. fusion program. The House and Senate Appropriations Committees have directed DOE to complete a strategic plan for the U.S. fusion program. GAO has previously reported that strategic planning is a leading practice that can help clarify priorities, and DOE has begun work on such a plan but has not committed to a specific completion date. Without a strategic plan for the U.S. fusion program, DOE does not have information to create an understanding among stakeholders about its plans for balancing the competing demands the program faces with the limited available resources or to help improve Congress' ability to weigh the trade-offs of different funding decisions for the U.S. ITER Project and overall U.S. fusion program.

Total Estimated Cost and Completion Date for the U.S. ITER Project



Source: GAO analysis of DOE data. | GAO-14-499