US iter
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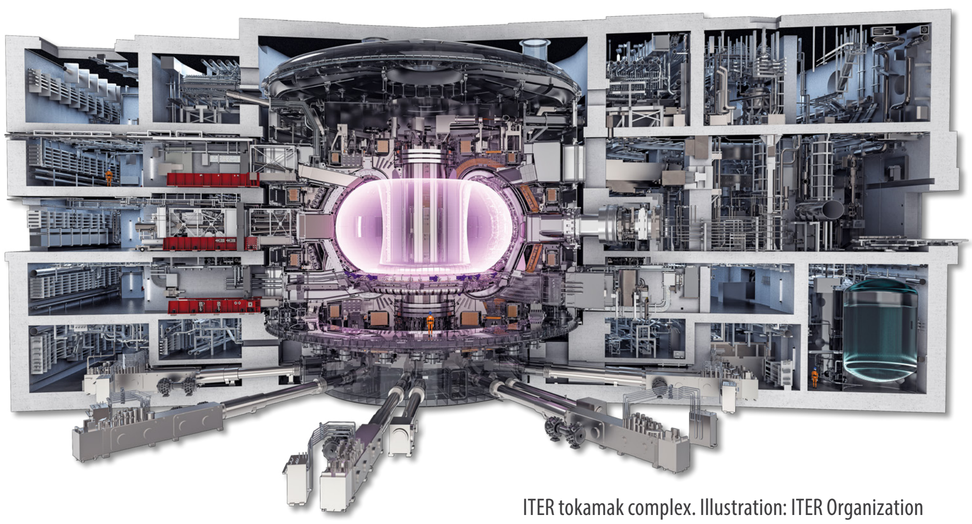
US ITER
PROJECT

Numerous activities are underway in the ITER Assembly Hall, including vacuum vessel sector (left) and central solenoid assembly (right). Photo: ITER Organization

ITER Mission

ITER will demonstrate the production and control of a sustained fusion power source for hundreds of seconds, at power-plant relevant scale. Public and private fusion sectors agree that this is an essential step to establish the scientific basis for practical fusion energy and the development of first-of-a-kind fusion technologies. The ITER project crosscuts the nation's fusion goals for research, technology development, and a path to practical fusion energy.

> **"ITER is an essential step to establish the scientific basis for practical fusion energy."**


ITER tokamak complex. Illustration: ITER Organization

Scientific Foundations for Fusion

Fusion reactions power the sun and the stars. To achieve practical fusion power on earth, a power plant will require a power source where plasma energy is maintained primarily by self-heating from internal fusion reactions. ITER will deliver the necessary physics understanding of a "burning plasma" self-sustained fusion power source. As a research facility, ITER will allow scientists to study reactor-scale burning plasmas and explore technical challenges related to the development of a power-producing fusion reactor. Recent national studies and fusion community reports have affirmed the scientific value of ITER and its contributions to a path to commercial fusion energy, including the Fusion Energy Sciences Advisory Committee (FESAC) *Facilities Construction Projects Subcommittee Report* (2024), the FESAC *International Benchmarking Subcommittee Report on International Collaboration Opportunities, Modes, and Workforce Impacts for Advancement of US Fusion Energy* (2023), the National Academies of Sciences, Engineering, and Medicine report *Bringing Fusion to the U.S. Grid* (2021) and the FESAC report *Powering the Future: Fusion and Plasmas* (2021).

U.S. Project Status

The U.S. project has already completed contributions for two systems, the toroidal field conductor and the steady state electrical network. Four superconducting magnet modules for the “heart of ITER,” the central solenoid, are stacked for assembly at the ITER site. With U.S. contributions approximately 50 percent complete, U.S. industry continues to support design, manufacture, and delivery of US ITER hardware.

In 2023, the project received approval for a new performance baseline for all remaining aspects of the project (hardware and construction cash contributions). From an international perspective, it is significant to note that the global partners continue to allocate substantial annual budgets to support ITER progress.

The ITER tokamak complex in October 2024. Photo: ITER Organization

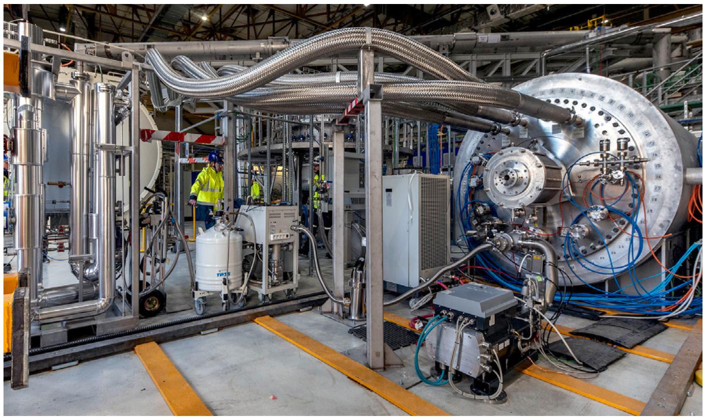
Contact

US ITER Project Office

1055 Commerce Park

Oak Ridge, Tennessee 37830-6483

usiter.ornl.gov



The ITER cryoplant includes a test bench for pumps to confirm their readiness to perform at 4 degrees Kelvin. Photo: ITER Organization

U.S. participation in ITER was authorized by the Energy Policy Act of 2005. In 2006, the United States signed the Agreement on the Establishment of the ITER Fusion Energy Organization for the Joint Implementation of the ITER Project, a Congressional-executive international agreement, along with partners the European Union (project host), the Republic of India, Japan, the People’s Republic of China, the Republic of Korea, and the Russian Federation.

U.S. project execution is managed by Oak Ridge National Laboratory in Tennessee, with partner labs Princeton Plasma Physics Laboratory in New Jersey and Savannah River National Laboratory in South Carolina.

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U.S. DEPARTMENT OF ENERGY | Office of Science | Oak Ridge National Laboratory | PPPL Princeton Plasma Physics Laboratory | Savannah River National Laboratory