"Building a sun on earth has the potential to lead to a global paradigm shift for abundant clean energy."

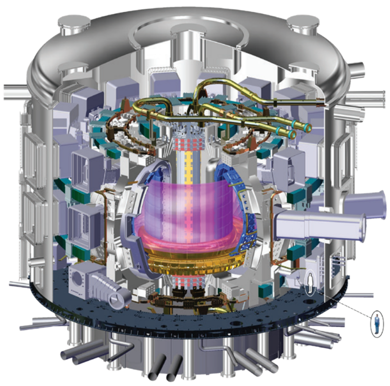
Ned Sauthoff,
US ITER Project Director

ITER: Unprecedented Global Collaboration for Fusion Energy

Fusion reactions power the sun and the stars, and fusion has the potential to produce clean, safe, abundant energy on Earth. By fusing light hydrogen atoms such as deuterium and tritium, fusion reactions can produce energy gains about a million times greater than chemical reactions with fossil fuels. Fusion is not vulnerable to runaway reactions and does not produce long-term high-level radioactive waste.

The ITER project seeks to demonstrate the scientific and technological feasibility of fusion energy by building the world's largest and most advanced tokamak magnetic confinement fusion experiment. The ITER tokamak will be the first fusion device to demonstrate a sustained "burning plasma," an essential step for fusion energy development.

The United States signed the ITER Agreement in 2006, along with China, the European Union, India, Japan, Korea, and the Russian Federation. The ITER members—representing 35 countries, more than 80% of annual global GDP, and half the world's population—are now actively fabricating and shipping components to the ITER site in France for assembly of the first "star on Earth."



The ITER Tokamak

Fusion thermal power has already been demonstrated in tokamaks; however, a sustained burning plasma has yet to be created. The ITER tokamak is designed to achieve an industrial-scale burning plasma producing 500 megawatts of fusion thermal power. ITER's plasma volume is more than eight times greater than that of the largest existing tokamak.

When complete, the ITER tokamak will weigh more than 25,000 tons and over a million components will be integrated into this complex machine. The building that contains it will be the largest on the ITER site, extending approximately 200 feet aboveground and 40 feet below ground.

35
Nations that are collaborating to build ITER

9%
Amount of ITER construction costs funded by the United States

80%
Portion of US funding invested domestically for design and fabrication of components

100%
Access to the research facility and scientific findings

US Innovation

US contributions to ITER are overseen by the US Department of Energy, with the US ITER project office managed by Oak Ridge National Laboratory. Princeton Plasma Physics Laboratory and Savannah River National Laboratory serve as partner labs. US ITER R&D, design, and fabrication rely on industries, universities, and national laboratories in 44 states plus the District of Columbia. US hardware contributions to ITER require exceptional scale, power, and precision, challenging US industry to produce

- Miles of superconductors for magnet systems.
- A 1,000–metric ton, 13-tesla central solenoid electromagnet (the "heart" of ITER).
- High-powered microwave and radio-frequency transmission lines.
- Cryogenic pellet plasma fueling with demanding repetition rates.
- High-throughput tritium processing systems.
- Instrumentation for nuclear environments.

Construction of the ITER facility in Cadarache, France, began in 2010. The United States began deliveries to ITER in 2014. Hundreds of deliveries to ITER have been completed, and fabrication of multiple systems is under way.

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