



STEADY STATE ELECTRICAL NETWORK

The U.S.-procured 400 kV high-voltage transformers were installed at the ITER site in 2015. Photo: ITER Organization

U.S. CONTRIBUTION

The United States contributed 75% of the equipment required for ITER's steady state electrical network, excluding cables and emergency power. The European Union contributed the remaining equipment and was responsible for the design and installation of the system.

OVERVIEW

The steady state electrical network is an alternating current (AC) power substation and distribution system that supplies electrical power to all ITER conventional systems and facilities. A separate system delivers power to the pulsed systems, including the magnet and heating power supplies.

The network is rated at 120 megawatts (MW) and is similar to the auxiliary power distribution system in a nuclear fission power plant, except that it is about twice the size. The equipment contributed by US ITER is typical of a large AC power distribution system, consisting of transformers and switchgear at a high voltage of 400 kilovolts (kV) and a medium voltage of 200 kV.

STATUS

US ITER completed delivery of all components in 2017.



Aerial view of the completed steady state electrical system at the ITER site. Photo: ITER Organization



U.S. DEPARTMENT
of ENERGY

OAK RIDGE
National Laboratory





High-voltage switchgear during factory acceptance testing. Photo: US ITER



Earthing resistors during factory acceptance testing. Photo: US ITER



Installation of bushings for high-voltage transformers. Photo: ITER Organization

TECHNICAL DESCRIPTION

Standards: International Electrotechnical Commission standards for 50 Hz operation

POWER FEEDS

2 feeds: 400 kV substation transformer, 22 kV distribution to load centers, 6.6 kV distribution

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EQUIPMENT

High-voltage (HV) disconnect switches

HV circuit breakers

HV current transformers

HV potential transformers

HV surge arresters

HV substation transformers

HV substation hardware

HV control & protection

Earthing resistors

22 kV switchgear

6.6 kV switchgear

Reactive power compensators

Power transformers

Uninterruptible power supply

Low voltage distribution & subdistribution panels

Direct current distribution

CONTRIBUTORS INCLUDE

ABB (Raleigh, NC)

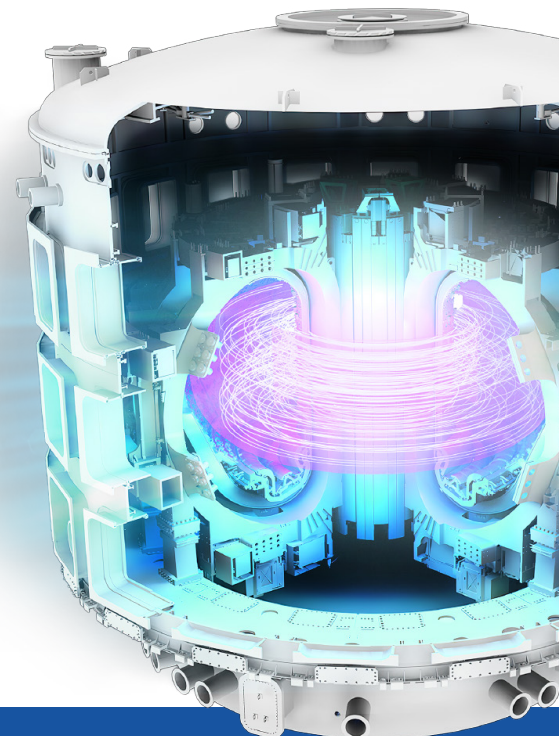
Eaton (Cleveland, OH)

Hyundai (Houston, TX)

Schneider (Palatine, IL)

Siemens (Raleigh, NC)

Alstom (Saint-Ouen, France)



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US ITER 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.