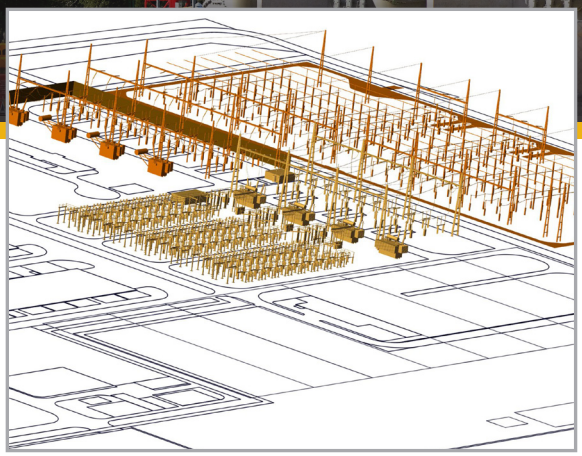
Steady State Electrical Network

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



Switchyard design. Image: US ITER

US Contribution

US ITER contributes 75% of the equipment required for the steady state electrical network (SSEN), excluding cables and emergency power. The European Union contributes the remaining equipment and is also responsible for the design and installation of the system.

Overview

The steady state electrical network is an 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 SSEN is rated at 120 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 to be contributed by US ITER is typical of a large AC power distribution system, consisting of transformers and switchgear at the high-voltage (400 kV) and medium-voltage (22 kV) levels.

A wide view of the installed HV transformers and the electrical gantry train. Photo: ITER Organization

Status

US ITER completed delivery of all components in 2017.

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

Earthing resistors during factory acceptance testing. Photo: US ITER

Installation of bushings for HV 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

LV Distribution & Subdistribution Panels

DC Distribution

Contributors include

ABB (Raleigh, NC)

Eaton (Cleveland, OH)

Hyundai (Houston, TX)

Schneider (Palatine, IL)

Siemens (Raleigh, NC)

Alstom (Saint-Ouen, France)