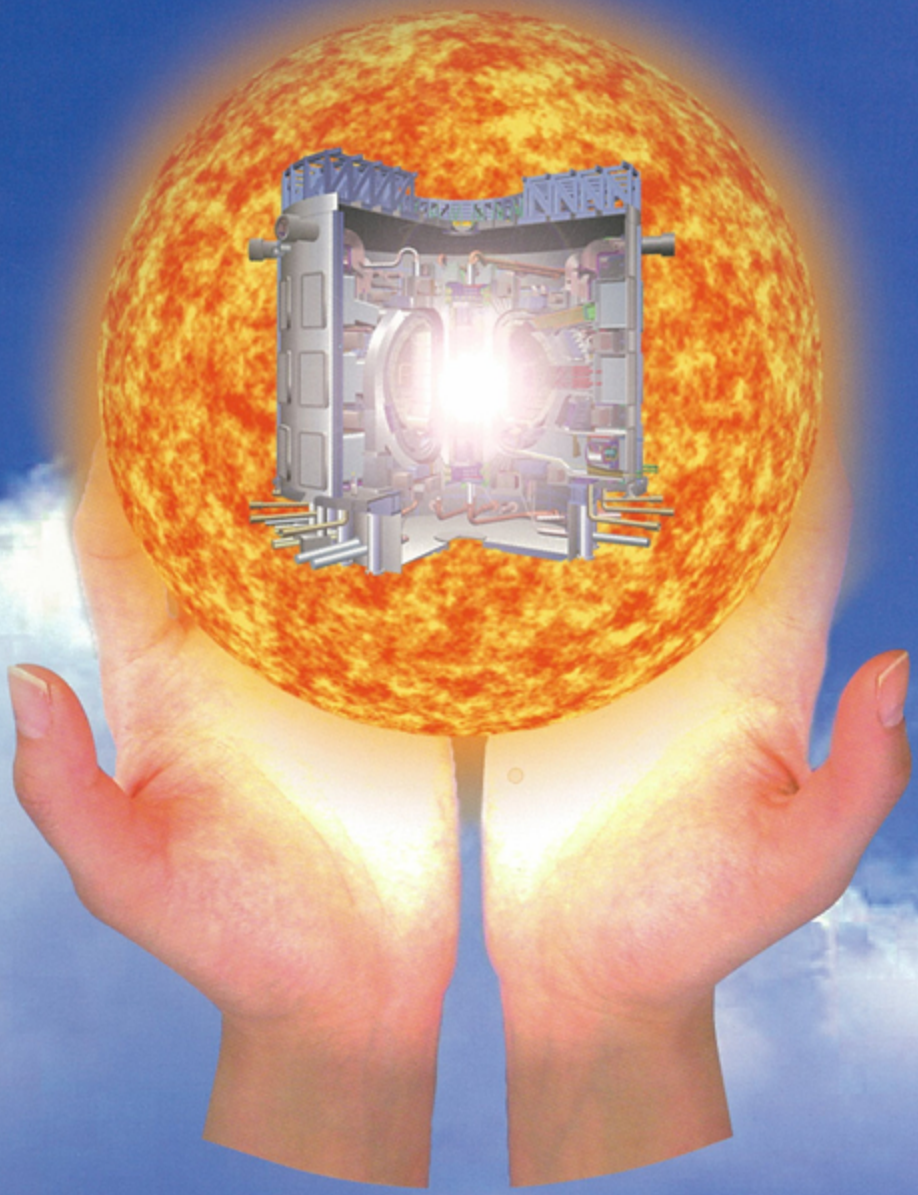
ITER

— Creating a Sun on Earth —



JAEA Japan Atomic Energy Agency

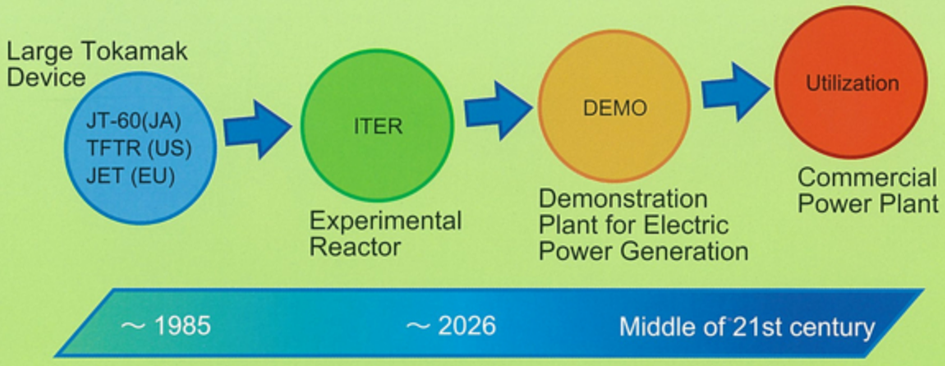
Realization of the Ultimate Energy Source

Fusion energy is the ultimate energy for a sustainable society in the 21st century .
Fusion energy is superior in three respects:

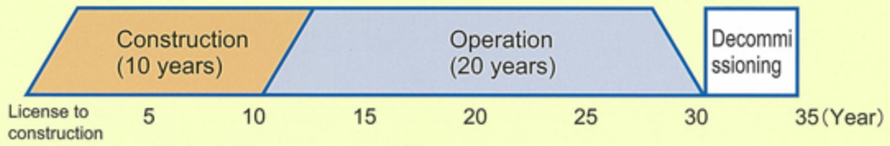
Plentiful fuel resources	Large quantities of Deuterium and Lithium, the Fusion Reactor fuel, are found in sea water.
Enviromentally Friendly	Carbon dioxide, nitric oxide and other gases which cause global environmental pollution are not generated.
Safety, waste	Similar to a gas burner, the reaction can be stopped easily by shutting off the fuel supply. No high-level radioactive waste is generated. Some components will be classified as medium- to low-level waste.

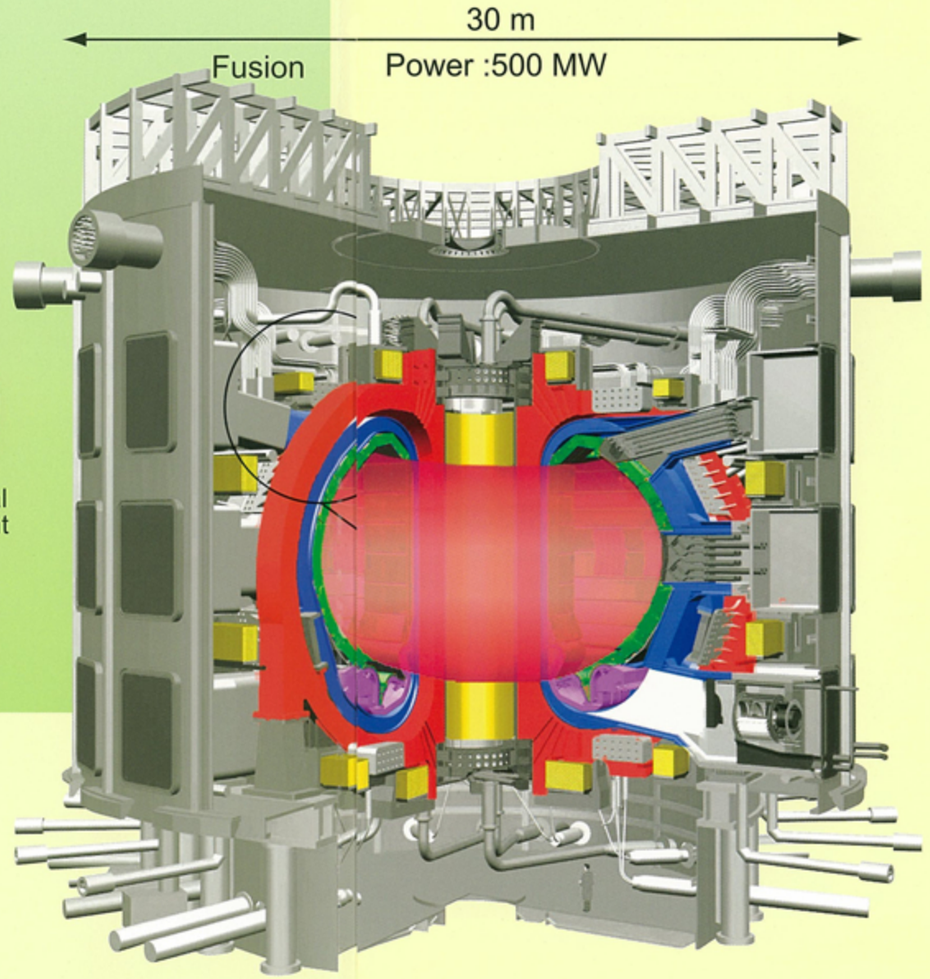
The Way Toward Fusion Energy

Fusion energy as a future energy source is one of the most attractive options for human society. The ITER project is a collaborative research venture using international resources and expertise toward the realization of fusion energy.
ITER is not an end in itself: it is bridge toward demonstrating the feasibility of a large-scale reactor for electrical power production, called DEMO.
DEMO will lead the way to the first commercial fusion power plant.



Schedule of ITER





ITER is the World's Largest Superconducting Tokamak Reactor

ITER is based on the "tokamak" concept, in which the fusion fuel is contained in a doughnut shaped vessel. The fuel — a mixture of deuterium and tritium, two isotopes of hydrogen — is heated in excess of 100 million degrees, forming a hot gas "plasma". The plasma is kept away from the walls by a strong magnetic field produced by superconducting coils surrounding the vessel and an electrical current in the plasma.

※ITER : the "way" in Latin

Main Parameters of ITER	
Plasma Major Radius	6.2 m
Weight of Tokamak Machine	23,000 t
Fusion Power	500 MW

Objectives of ITER

Q ≥10 represents the scientific goal of the ITER project: to deliver ten times the power it consumes.

During its operational lifetime, ITER will test key technologies necessary for the next step: a demonstration fusion power plant that will capture fusion energy for commercial use.

ITER as an International Project

ITER is an international project. Construction, operation and decommisioning are based on an international agreement signed by the ITER Parties (China, the EU, India, Japan, Korea, Russia and the US) on 21st November 2006 in the Elysée Palace, Paris.
Over half of the world's population and more than 80% of GWP is represented in the ITER project.


signing ceremony of the ITER agreement
(21st November 2006 in Paris)

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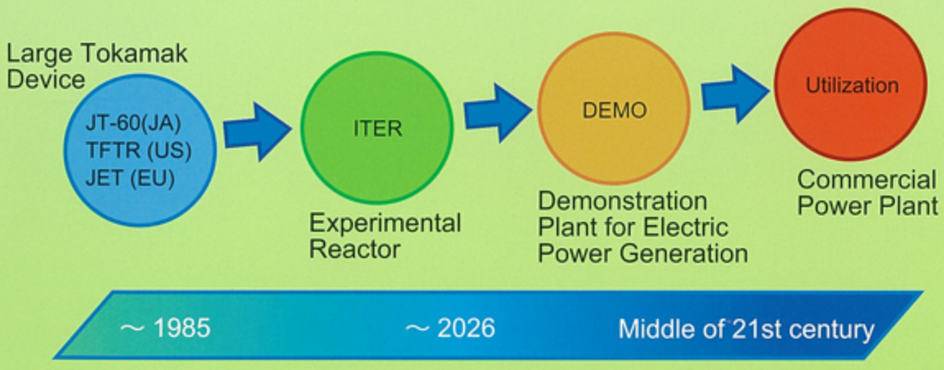
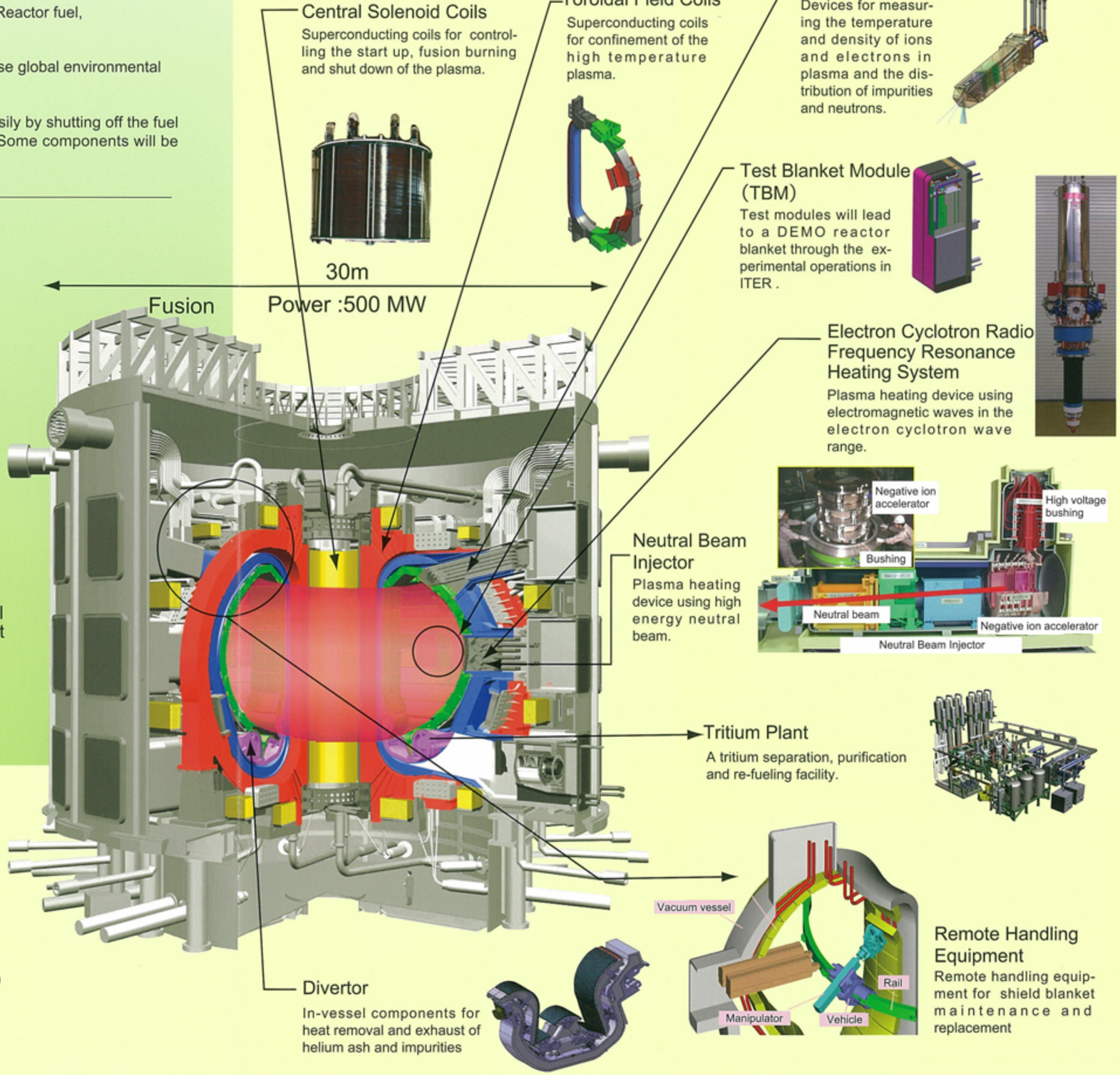


Schedule of ITER

In-kind Procurement for Japan

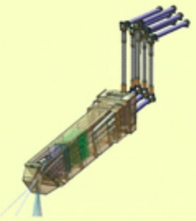
Japan contributes to the construction of ITER by producing major components in collaboration with the ITER Organization and Participating Parties.



Central Solenoid Coils
Superconducting coils for controlling the start up, fusion burning and shut down of the plasma.

Toroidal Field Coils
Superconducting coils for confinement of the high temperature plasma.

Diagnostics
Devices for measuring the temperature and density of ions and electrons in plasma and the distribution of impurities and neutrons.



Test Blanket Module (TBM)
Test modules will lead to a DEMO reactor blanket through the experimental operations in ITER .

Electron Cyclotron Radio Frequency Resonance Heating System
Plasma heating device using electromagnetic waves in the electron cyclotron wave range.

Neutral Beam Injector
Plasma heating device using high energy neutral beam.

Tritium Plant
A tritium separation, purification and re-fueling facility.

Divertor
In-vessel components for heat removal and exhaust of helium ash and impurities

Remote Handling Equipment
Remote handling equipment for shield blanket maintenance and replacement

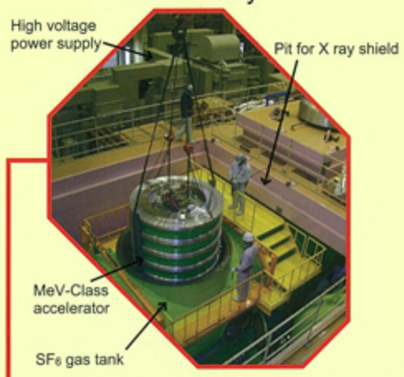
Fusion Research Test Facility for ITER Procurement

JADA pursues the procurement of ITER components through R&D and testing in these facilities developed for fusion research in JAEA.

Superconducting Coil Test Facility

Testing of superconducting magnets.

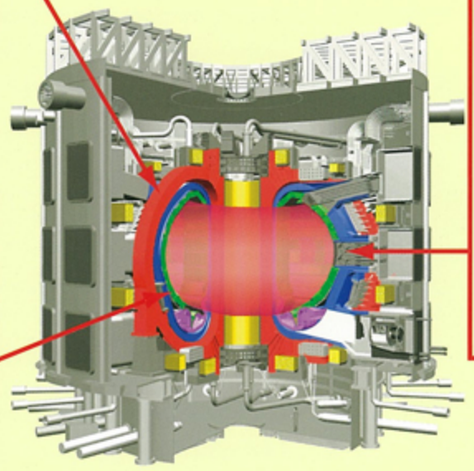
MeV Class Ion Source Test Facility



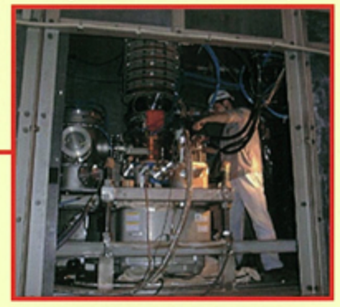
Testing of a 1 MeV accelerator for the neutral beam injection system

High Heat Flux test facility

High heat flux testing of the test blanket module and divertor.



Gyrotron Test Facility



Testing of the RF heating system

Fusion Neutronics Source Facility

Testing using fusion neutrons

Tritium Process Laboratory

Testing for the tritium plant.

Remote Handling Test Facility

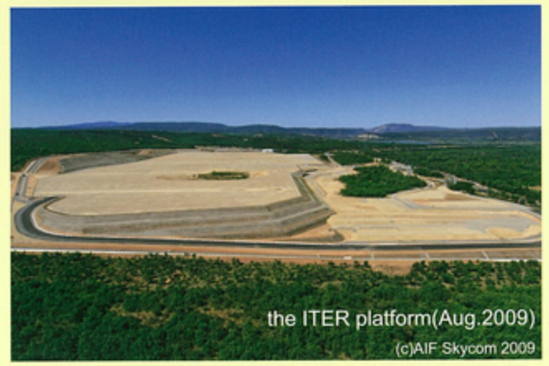
Testing of remote handling equipment

ITER Organization : International Legal Entity

The ITER project is managed by the ITER Organization, based in Cadarache, in the South of France. The ITER Organization is responsible for all aspects of the project such as obtaining the license to build and operate ITER, and ultimately for its de-activation at the end of its lifetime.
The ITER Organization was established by the ITER Joint Implementation Agreement, which was signed by the ITER Parties.

ITER organization founded (24th Oct. 2007) (※)

Rendering of ITER (※)



the ITER platform(Aug.2009)
(c)AIF Skycom 2009

※pictures from ITER Organization

Domestic Agency in Japan (JADA) : Japan Atomic Energy Agency

In order to manage and supply its in-kind contributions to ITER, each of the Parties has established its own Domestic Agency. The Domestic Agencies interact with the ITER Organization to procure components for ITER.
JAEA was designated as the domestic agency of the ITER Project in Japan, JAEA procures the equipment and devices such as the superconducting coils allocated to Japan and plays a role as the contact point for managing the contribution of personnel from Japan to the ITER Project.

(24th Oct. 2007)

Presentation of the designation document from Tokai, Minister of MEXT (right) to Okazaki, President of JAEA (left)

Japan Atomic Energy Agency

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