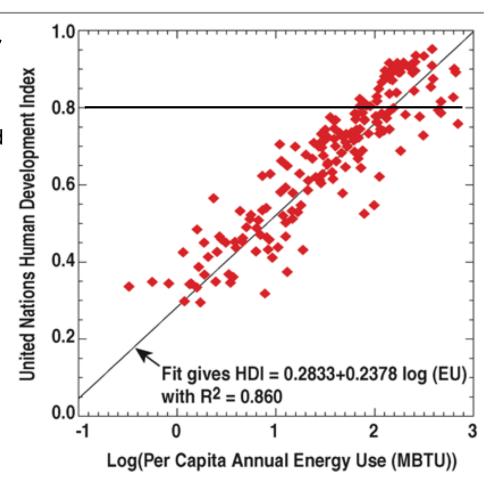


Standard of Living IS related to Energy Use

- How much energy does the world need for a "reasonable" standard of living?
 - Use the slope of the correlation of HDI and Log(EU) to project the energy associated with the whole world at HDI ≥ 0.8
 - The resulting <u>incremental</u> energy is >800 10¹⁸ J/yr or more than 1.6x the present energy use (~500 10¹⁸ J/yr)
 - This does not take into account population increase

If we want to increase the standard of living of the world population we need to increase the production of energy (in addition to use it more efficiently)



The role of Fusion

Fusion fuels are widely available and nearly inexhaustible

There is no risk of any fission type accident

Fusion reactors produce no CO2 and no high activity, long-lived nuclear waste (and the rest product is non toxic Helium!)

Energy from fusing 1 gram of fusion fuels = Energy from burning 8 tons of oil

Big Science Sweden November 2019 © 2019, ITER Organization 4He + 3.5 MeV

n + 14.1 MeV

ITER mission

"To demonstrate the scientific and technological feasibility of fusion power for peaceful purposes"

A plasma of Deuterium + Tritium is heated to more than 100 million C

The hot plasma is shaped and confined by strong magnetic fields

Helium nuclei sustain burning plasma

Neutrons transfer their energy to Blanket

Achieve fusion power of 500 MW with P_{fus}/P_{in} ($\equiv Q$) \geq 10 for 300-500 s (i.e. stationary conditions)

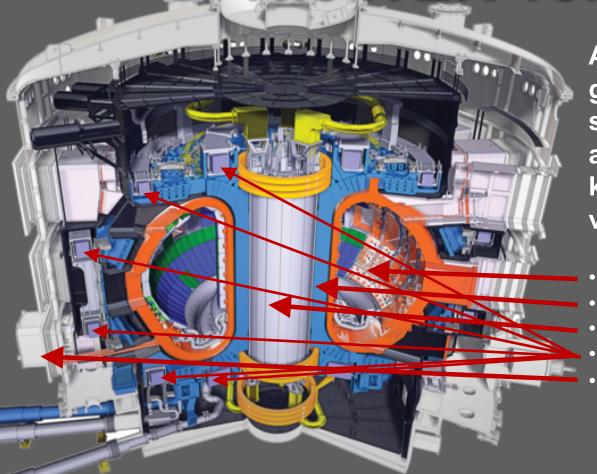
Input (heating power): 50 MW

Output (fusion power): 500 MW



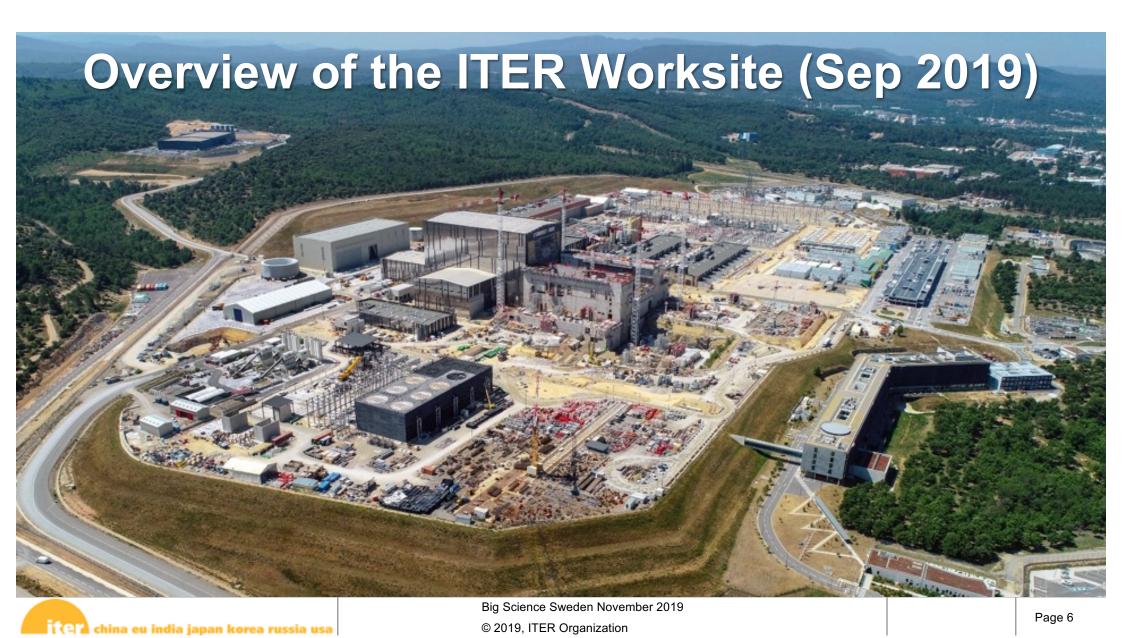
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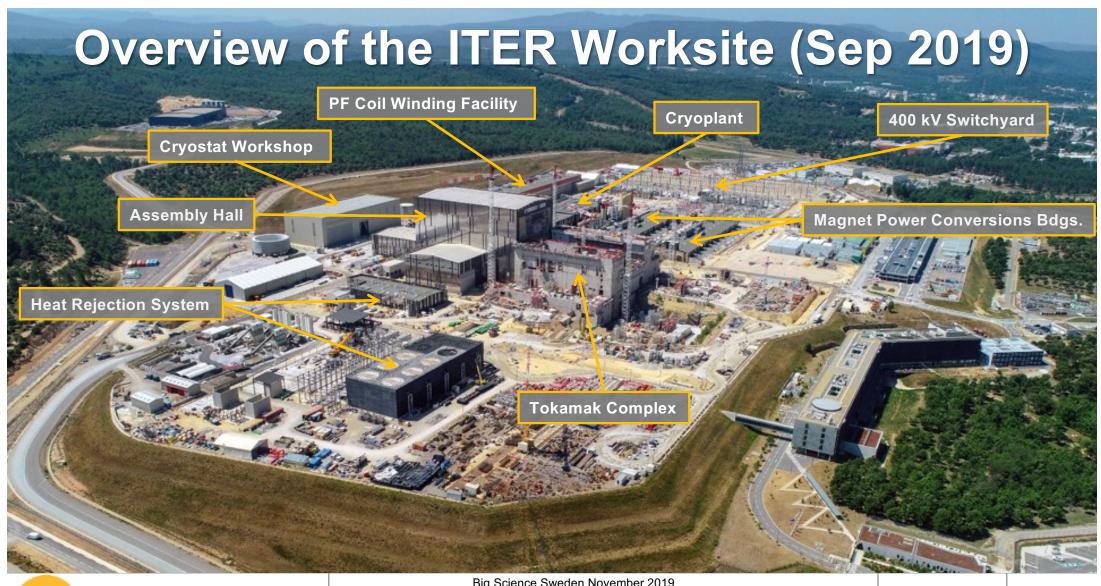
The ITER Tokamak



An intense magnetic field, generated by powerful superconducting magnets, shape and confine the hot plasma, and keep it away from the vacuum vessel wall.

- Vacuum Vessel: 8 000 t. 850 m³
- 18 TF Coils: 360 t. 17-m high
- 1 Central Solenoid: 1 000 t. 13-m high
- 6 PF Coils: 200-400 t. 8 to 24 m diameter
- Cryostat: 30 x 30 m

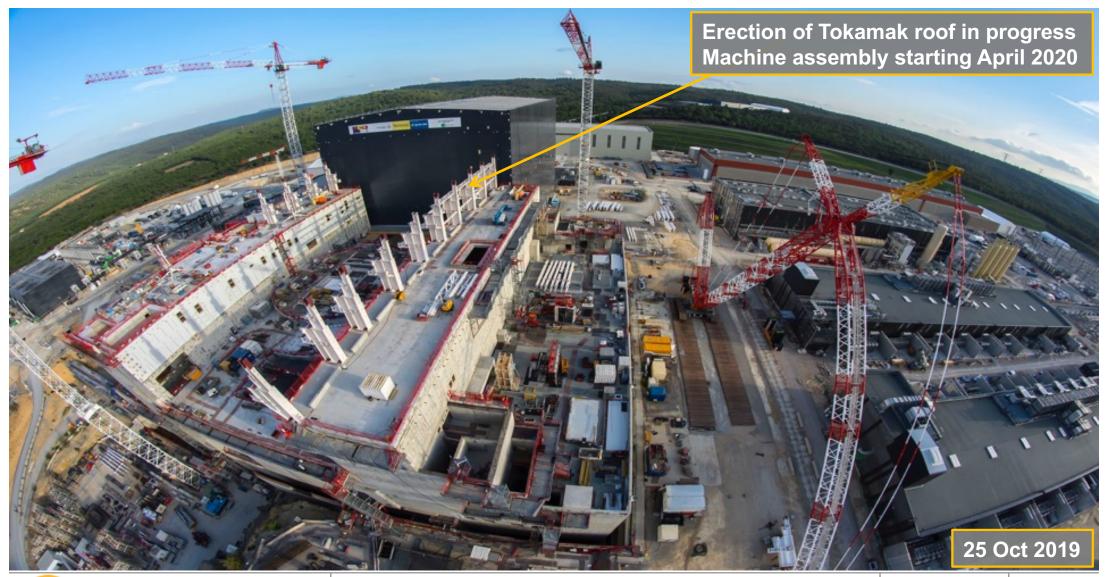




itera china eu india japan korea russia usa

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Solenoid

Central

Fabrication









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Summary

- ITER can contribute to pave the way to secure future world energy supply
- ITER Construction towards first plasma is 65 % complete
- Coming years will be busy
 - Machine Assembly
 - Commissioning auxiliary systems (cooling, cryo, power supplies,...)
 - Operation and Maintenance

Opportunities

ITER Organization Business Opportunities

https://www.iter.org/proc/overview

ITER Organization Jobs Opportunities

– https://www.iter.org/jobs

ITER Project Associate (Academia OR Industry)

https://www.iter.org/jobs/IPA

Fusion for Energy (F4E) Business Opportunities

- https://fusionforenergy.europa.eu/procurementsgrants/iterlO.aspx
- https://industryportal.f4e.europa.eu/IP PAGES/ehome.aspx