

Frequently Asked Questions

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ITER Project.

27 Jun 2011 - 29 Sep 2019

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Fusion and the ITER Project

What is ITER?

ITER (the Latin word for "The Way") is a large-scale scientific experiment intended to prove the viability of fusion as an energy source. ITER is currently under construction in the south of France. In an unprecedented international effort, seven partners—China, the European Union, India, Japan, Korea, Russia and the United States—have pooled their financial and scientific resources to build the biggest fusion reactor in history. ITER will not produce electricity, but it will resolve critical scientific and technical issues in order to take fusion to the point where industrial applications can be designed. By producing 500 MW of fusion power from 50 MW of power injected in the systems that heat the plasma—a "gain factor" of 10—ITER will open the way to the next step: a demonstration fusion power plant.

On-site construction of the scientific facility began in 2010. As the buildings rise at the ITER site in southern France, the fabrication of large-scale mock-ups and components is underway in the factories of the seven ITER Members. The shipment of the first completed components began in 2014 and will continue for at least five years. Machine assembly will begin as soon as the giant Tokamak Complex is ready for occupation.

ITER is one of the most complex scientific and engineering projects in the world today. The complexity of the ITER design has already pushed a whole range of leading-edge technologies to new levels of performance. However, further science and technology are needed to bridge the gap to commercialization of fusion energy.

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What questions will be answered by ITER that have not already been answered by research to date?

Is there consensus in the scientific community about the ITER Project?

What has been accomplished in 60 years of tokamak research?

What are the advantages of ITER compared to the alternative approaches under development such as the W7-X Stellarator in Germany, and the inertial fusion programs in the US and France?

What is the ITER model for collaboration and cooperation?

ITER schedule

When will ITER be operational?

When will the first giant ITER components travel along the ITER Itinerary?

Is ITER running behind schedule?

What are the Members doing to address the project's difficulties/schedule delays?

We hear the project is delayed. Are the ITER Members prepared to contribute additional budget?

Was the ITER Project schedule affected by the natural disaster in 2011 in Japan?
Is there any danger that ITER will experience start-up difficulties as, for example, the LHC had with its array of magnets?

ITER cost

How is ITER financed?

How much is France contributing as Host?

Why have ITER costs risen?

Do we really know how much ITER will cost?

Is it worth spending billions on fusion or would the money be better spent in improving renewables like solar, wind and geothermal?

Are there risks of further cost increase?

Economic Benefits

Has ITER resulted in any positive economic benefits locally? Is ITER creating jobs?

What is the status of construction workers?

Some say that ITER construction will rely on migrant workers who are poorly paid and precariously housed. Is this true?

Doesn't ITER have a specific legal status ?

What hiring regimes apply?

How are the construction companies chosen?

How many levels of subcontractors are permitted?

How many workers are expected on the ITER worksite in the years to come? What percentage will come from outside of France?

I've heard that foreign workers on the ITER site are only paid EUR 300 per month. Is this true?

What controls are carried out by the French authorities on site working conditions? Several construction companies have reported the late payment of invoices. What is the situation?

What are the plans for housing thousands of people involved with ITER construction and assembly works?

Will infrastructure modifications be necessary to absorb the increase in traffic flow around the ITER site?

ITER licensing procedure

What has been the licensing process for ITER in France?

Will the post-Fukushima nuclear safety stress tests apply to ITER? If so, is there any risk that these stress tests will lead to additional costs?

ITER and the environment

What kind of nuclear waste will be produced by ITER, and in what quantity?

What arrangements are foreseen for radioactive waste generated by ITER during operation and decommissioning?

What effect will ITER operation have on local electricity and water supplies?

ITER safety

Is the energy stored in a 100-million-degree plasma dangerously large?

What would be the danger of an earthquake occurring near ITER, or a double disaster like earthquake and flooding?

What about malevolent acts?

Could ITER explode?

Could a Fukushima-type catastrophe occur at ITER?

What about the issue of nuclear decay heat that was so serious at Fukushima?

ITER will be built near a site with other nuclear installations. What is the additional risk due to the presence of more than one installation?

What will be the total amount of tritium stored on site? What are the procedures foreseen to confine and control the stock?

What would be the effect on the population near ITER of potential accidental

releases of tritium into the environment, including tritium?

What procedures are foreseen to avoid any loss of tritium, mostly during the first tests (incomplete fusion)?

Can you declare fusion is really safe, while it uses huge amount of tritium, generates strong neutrons, and brings about huge amount of radiological waste?

Is there any possibility that fusion opens a new way for the production of mass destruction weapons?

What measures are in place for occupational safety?

Disruptions : Everything you wanted to know

What are disruptions?

What are the consequences of disruptions?

Will ITER be able to withstand disruptions?

What disruption mitigation system is planned for ITER?

Fusion as a sustainable energy source

Why has fusion science developed much more slowly than fission science, which provided commercial reactors just a few years after its inception?

Will commercial fusion be available early enough to contribute to the energy transition needed to fight climate change and to replace fossil fuels?

If successful, when would fusion be able to add power to the grid? What steps would be required after ITER?

How much power would a fusion reactor be able to deliver and at what cost? Would it be competitive?

Is there any assurance that there will be enough tritium available for commercial deployment of fusion? Are lithium resources sufficient to fuel future fusion reactors in competition with other lithium usages?

Is the concept of tritium breeding sufficiently robust to start the ITER Project?

I recently read that there was a shortage of helium in the world and this was unlikely to improve as stocks are used up. How will this affect plans for the fusion superconducting magnets?

What are the benefits of pursuing fusion as compared to next-generation nuclear fission reactors?

Reliability of materials

Is it really possible to find materials which can cope with strong fusion neutrons?

How often will the ITER first wall need to be replaced during operation?

What are the procedures to dispose of the irradiated material contained in the first wall? Have safety risks been taken into account?

Is there any risk of damage in case of loss of superconductivity in the ITER superconducting magnets?