

## Air Liquide awarded a new contract for the ITER project, strengthening its leadership in extreme cryogenics

Air Liquide announces the signature of a new contract with ITER-India for the design and manufacturing of 19 cryogenic lines for the ITER project. This latest contract comes after two earlier ones, signed in 2012 and in 2013, bringing to around 250 million euros the total amount signed by Air Liquide for the ITER project. This latest announcement illustrates Air Liquide's leadership in extreme cryogenics for major scientific projects.

The objective of the **international ITER project** is to develop an experimental reactor in order to demonstrate the **scientific and technological feasibility of fusion** as a new source of energy. To obtain the very powerful electromagnetic fields required to confine and stabilize the fusion, it is necessary to use superconducting magnets that only function at extremely low temperatures.

The **new cryogenic lines** will transport helium at **extremely low temperatures** close to absolute zero in some cases (-269°C). Their fabrication requires the use of **high tech processes** and sophisticated design.

After having already completed the large scale cryogenic installations for the CERN<sup>1</sup>, **Air Liquide, an expert in cryogenics, is a major industrial partner of the ITER project**. It notably supplies the helium and nitrogen refrigerators used in ITER's cryogenic plant, which will be **the largest centralized refrigeration system ever built**, as well as the **19 cryogenic lines**.

**François Darchis**, member of the Air Liquide Executive Committee supervising Innovation, commented: ***"We would like to thank ITER-India for its confidence. This success demonstrates once again the unique expertise of Air Liquide in the field of very low temperatures and its capacity to provide very high tech systems to address ambitious scientific challenges. Air Liquide is thus contributing to the major global scientific projects and to the development of the energy solutions of the future."***

**Prof. D. Bora**, Director, Institute for Plasma Research, India, commented: ***"ITER's cryogenic system is one of the most complex systems known today after the CERN, and we are happy that Air Liquide is associated with us in this drive for fusion."***

### **Air Liquide and scientific cryogenics**

Air Liquide has unique expertise in the field of very low temperatures and recognized knowhow in the design, production, and installation of high-capacity gas liquefaction and refrigeration systems (the CERN's LHC, in Switzerland, and the world's largest helium liquefaction plant, in Qatar, for example). Air Liquide has also supplied cryogenic equipment for the biggest fusion projects of the last 25 years (Tore Supra, JET, SST-1, KSTAR and JT-60SA under the ITER Broader Approach Agreement and ITER currently underway).

### **ITER and the Tokamak**

Based in Cadarache, in the South of France, the ITER project centers around the Tokamak (toroidal magnetic confinement chamber). Using electromagnetic fields, this sophisticated scientific instrument will make it possible to generate plasma to create the conditions necessary for the controlled fusion of atoms which generates the same type of energy as the sun. This fusion process generates little waste and rules out the risk of a nuclear chain reaction. ITER will test the fundamental technologies to initiate the next stage, called "DEMO": a demonstration fusion reactor capable of producing energy for commercial purposes. The ITER project brings together contributions from Europe, the United States, Russia, Japan, China, South Korea, and India.

<sup>1</sup> CERN (Conseil Européen pour la Recherche Nucléaire) is the European Organization for Nuclear Research.

## **ITER-India**

ITER-India (Institute for Plasma Research, Gandhinagar, India) is the Indian domestic agency for ITER, in charge of managing the equipment provided by India for the project. It ensures the execution of the ITER project from India.

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World leader in gases, technologies and services for Industry and Health, Air Liquide is present in 80 countries with more than 50,000 employees and serves more than 2 million customers and patients. Oxygen, nitrogen and hydrogen have been at the core of the company's activities since its creation in 1902. Air Liquide's ambition is to be the leader in its industry, delivering long-term performance and acting responsibly.

Air Liquide ideas create value over the long term. At the core of the company's development are the commitment and constant inventiveness of its people.

Air Liquide anticipates the challenges of its markets, invests locally and globally, and delivers high-quality solutions to its customers and patients, and the scientific community.

The company relies on competitiveness in its operations, targeted investments in growing markets and innovation to deliver profitable growth over the long-term.

Air Liquide's revenues amounted to € 15.4 billion in 2014, and its solutions that protect life and the environment represented more than 40% of sales. Air Liquide is listed on the Paris Euronext stock exchange (compartment A) and is a member of the CAC 40 and Dow Jones Euro Stoxx 50 indexes.