

World premiere: Air Liquide inaugurates its CO₂ cold capture system, Cryocap™

Today, in France, Air Liquide inaugurated Cryocap™, a unique industrial installation that enables the capture of CO₂ released during hydrogen production via a cryogenic process. Connected to Air Liquide's largest hydrogen production unit in France, located in Port-Jérôme, Notre-Dame-de-Gravenchon (Normandy), Cryocap™ represents an investment of around 30 million euros that was decided by the Group in 2012, and which received an additional public financial support¹ of close to 9 million euros.

Developed jointly by Air Liquide R&D and Engineering & Construction teams, Cryocap™ is being rolled out for the first time in Port-Jérôme, on the SMR (Steam Methane Reformer²) of Air Liquide which produces hydrogen for the neighboring refinery, Esso Raffinage SAF (ExxonMobil group). Hydrogen is used to remove the sulfur content of the automotive fuels the refinery produces, in order to bring them into compliance with environmental standards in the transportation sector.

Cryocap™ is the first CO₂ capture technology using a cryogenic process³. Cryocap™ enables the capture of CO₂ emissions resulting from the production of hydrogen by natural gas reforming, while improving efficiency, leading to an increased hydrogen production. After being purified, the captured CO₂ can be used to meet a variety of industrial needs for carbonic gas supply (carbonation of sparkling beverages, food preservation and freezing, etc.). The Cryocap™ unit has an annual capture capacity of 100 000 tonnes of CO₂ at this site.

This innovation is part of Air Liquide's broader Blue Hydrogen* approach, whose goal is the gradual decarbonization of the Group's production of hydrogen dedicated to energy applications, opening the way for 100% clean mobility.

François Darchis, member of the Air Liquide Executive Committee supervising Innovation, commented: ***"We take particular pride in rolling out for the first time in France Cryocap™, a technology which illustrates Air Liquide's ability to innovate for environmental preservation. Cryocap™ contributes to decarbonized hydrogen mobility for the hydrogen-powered electric vehicles on the market."***

***Blue Hydrogen**

Is an Air Liquide program whose goal is to gradually decarbonize its production of hydrogen dedicated to energy applications. In practical terms, Air Liquide has made a commitment to produce at least 50% of the hydrogen necessary for these applications through carbon-free processes by 2020 by combining:

- the use of renewable energies, water electrolysis, and biogas reforming
- the use of the technologies for the capture and upgrading of carbon emitted during the process of producing hydrogen from natural gas.

Hydrogen, a clean energy

Used in a fuel cell, hydrogen combines with oxygen from the air to produce electricity while releasing only water. Hydrogen can be produced from diverse sources of energy, including natural gas, but also from many renewable energy sources. This makes hydrogen one of the solutions for the supply of clean energy, while its storage capacity offers a guarantee of supply safety.

¹ Public support from the Haute Normandie region, the community of Caux Vallée de Seine communes, and ADEME (French Environment and Energy Management Agency) through the *Programme d'Investissement d'Avenir*, a program for investment for the future.

² A process mostly used today in the large-scale production of hydrogen, natural gas steam reforming releases CO₂

³ A process with no chemical components that uses low temperatures to compress, liquefy and then separate gases at the heart of the SMR process. Cryocap™ captures emitted CO₂ and valorizes residual hydrogen.

Air Liquide France Industrie

Air Liquide France Industrie is a subsidiary of the Air Liquide Group and brings together all of the Group's industrial gas production and commercialization activities in France, with 3 complementary business lines: Large Industries, Industrial Merchant, and Electronics. The subsidiary has nearly 2 400 employees working at 80 sites located across France and helping more than 300 000 customers optimize their performance durably: from craftsmen to petrochemical companies and from analytic laboratories to the automobile aeronautic, steel and agrifood industries.

The Engineering and Construction activity (Global E&C Solutions)

The Engineering and Construction activity (Global E&C Solutions) builds the Group's production units (mainly air gas separation and hydrogen production units) and also supplies third-party customers with these units. From design to engineering and construction, its exclusive and innovative technologies are making a contribution to the transformation of the energy sector and to the protection of the environment.

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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.