

World first: Air Liquide's innovative technology converts Ammonia into Hydrogen at industrial scale, paving the way for new low-carbon supply chains

Air Liquide announced the successful start-up of the world's first industrial-scale ammonia cracking pilot unit with a 30 tons per day ammonia to hydrogen conversion capacity at the Port of Antwerp-Bruges, Belgium. This groundbreaking innovation demonstrates a key missing technology brick to a viable pathway for converting ammonia into hydrogen, and unlocks challenges of transportation of hydrogen. This technology proven at the industrial scale for the development of world scale ammonia cracking plants enables access to low-carbon and renewable hydrogen for the decarbonization of industry and mobility.

The ability to efficiently transport hydrogen over long distances is a persistent challenge in developing a robust global hydrogen economy. Ammonia (NH₃), formed by hydrogen and nitrogen molecules, emerges as a valuable hydrogen carrier. It can be cost-effectively produced in regions rich in renewable energy sources, such as solar, hydro, and wind or other low-carbon power. A well-established global infrastructure already exists for the large-scale production, transportation, and utilization of ammonia. This allows for the export of ammonia from energy-abundant regions to end-users worldwide, where it can then be "cracked" back into hydrogen, providing a crucial component for decarbonizing industry and mobility.

This new, proprietary ammonia cracking technology expands Air Liquide's portfolio for low-carbon and renewable hydrogen production. As part of the successful development of this unit, key proprietary innovations were developed across critical areas including process safety, material testing, advanced catalysis for ammonia cracking, ammonia combustion, and efficient molecule separation. The project's success showcases Air Liquide's ability to scale up technologies from laboratory research to industrial applications and develop first-of-their-kind solutions for its clients.

Armelle Levieux, member of Air Liquide's Executive Committee, notably supervising Innovation and Technology activities as well as Hydrogen Energy activities, stated: *"The commissioning of our ammonia cracking pilot unit in Antwerp is a key milestone. This is a world's first which paves the way for new low-carbon hydrogen supply chains. By proving the viability of industrial-scale ammonia cracking, Air Liquide demonstrates its capacity to innovate and provide concrete solutions for its customers, and contributing to the Energy Transition. I am immensely proud of the work and commitment of all our teams who made this achievement possible."*



This industrial scale pilot plant has been supported by the Flemish Government through VLAIO (Flemish Agency for Innovation and Entrepreneurship).

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Air Liquide is a world leader in gases, technologies and services for industry and healthcare. Present in 60 countries with approximately 66,500 employees, the Group serves more than 4 million customers and patients. Oxygen, nitrogen and hydrogen are essential small molecules for life, matter and energy. They embody Air Liquide's scientific territory and have been at the core of the Group's activities since its creation in 1902.

Taking action today while preparing the future is at the heart of Air Liquide's strategy. With ADVANCE, its strategic plan, Air Liquide is targeting a global performance, combining financial and extra-financial dimensions. Positioned on new markets, the Group

benefits from major assets such as its business model combining resilience and strength, its ability to innovate and its technological expertise. The Group develops solutions contributing to climate and the energy transition — particularly with hydrogen — and takes action to progress in areas of healthcare, electronics and high technologies.

Air Liquide's revenue amounted to more than 27 billion euros in 2024. Air Liquide is listed on the Euronext Paris stock exchange (compartment A) and belongs to the CAC 40, CAC 40 ESG, EURO STOXX 50, FTSE4Good and DJSI Europe indexes.