

IN BRIEF

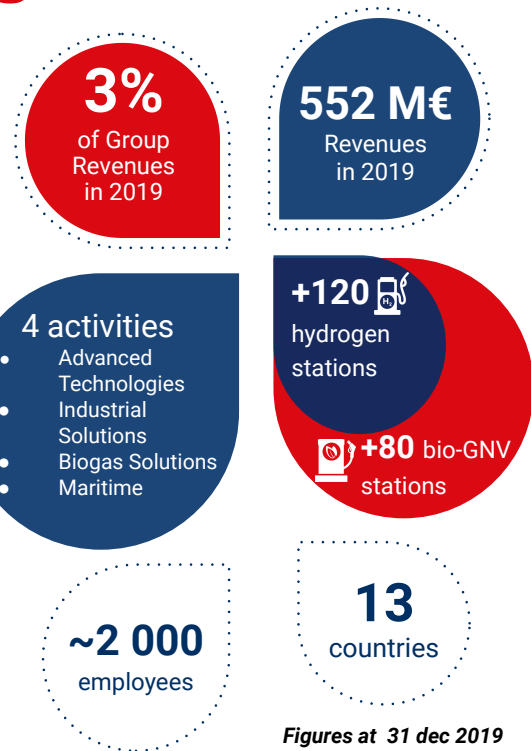
Global Markets & Technologies

Supporting the rising markets of energy transition and deep tech

The Global Markets & Technologies World Business Unit (GM&T) delivers technological solutions - molecules, equipment and services - to support the rising markets of energy transition and deep tech in order to drive Air Liquide sustainable growth.

To support the energy transition, GM&T brings sustainable solutions to the clean energy market with hydrogen energy and Bio-Natural Gas for vehicles, refrigerated transport using nitrogen for heavy-duty vehicles, but also the treatment and injection of Biogas into the energy grid and multimodal solutions for the maritime industry. As a player in the deep tech sector, GM&T designs and develops technologies dedicated to space exploration, aerospace and big science. Thanks to patented technologies and cryogenics expertise, GM&T continues to breakthrough scientific boundaries. Finally, GM&T has expertise in the delivery and sale of helium and other rare gases (mainly xenon, krypton & argon) to customers worldwide.

In 2019, significant advances were made in the GM&T branch, with, for example, the development of Turbo-Brayton technology.



Space



Air Liquide has supported space activities for many years, by supplying gases on the launch pads to designing high-tech equipment for launchers, satellites and space exploration. In the field of launchers, Air Liquide designs and manufactures cryogenic tanks for rocket propulsion. In satellites, the Group develops advanced technologies that are essential for earth observation and astrophysical missions. Finally, in space exploration, Air Liquide's teams contribute to the "Luna" project, which seeks to establish a lunar analogue facility, and also to the "ExoMars" mission, which will send a rover to the Red Planet in 2020 to analyze its subsoil.

Turbo-Brayton, a virtuous solution for maritime industry



By re-liquefying natural gas boil-off generated by carrier vessels, Turbo-Brayton technology saves natural gas and helps reduce greenhouse gas emissions. Around 50 Turbo-Brayton cryogenic units were sold the last two years for a total value of almost 180 million euros, with the potential to avoid more than 240,000 tons of CO₂-equivalent emissions per year. The potential applications are numerous, both in shipping and for liquifying biogas from household or agricultural waste methanization facilities.

From biomethane production to clean mobility, an example of circular economy



In France, near Bordeaux, Air Liquide has deployed a biomethane production unit coupled with a multi-energy distribution station. Biogas from organic matter of agricultural origin is transformed into biomethane, then injected into the natural gas network directly connected to the station. It is then used by heavy-duty trucks under the name of bio-NGV (Natural Gas for Vehicles). Nowadays, the GM&T business operates 19 biomethane production units around the world with a capacity of 1.1 TWh/year and has deployed more than 80 bio-GNV stations in Europe.

ITER



Under construction at Saint-Paul-Lez-Durance (France), ITER is designed to demonstrate the technological and scientific feasibility of fusion as a large-scale, safe and carbon-free source of energy. The cryogenic plant designed by Air Liquide is a key component, since it provides the cooling essential to the system.

DID YOU KNOW?

Air Liquide's GM&T teams design and manufacture hydrogen refueling stations for vehicles: cars, buses, trucks, trains and soon boats and airplanes contributing to the deployment and increasing use of hydrogen in the transport sector.

From liquid biomethane and thanks to the development of several technological bricks within the Group, it is possible to produce low-carbon hydrogen.

