Carbon Dioxide

Concentrating on continuity of supply
Conscious of what you care about
We build confidence
in Carbon Dioxide Supplies

Understanding the importance of the supply continuity

Aware that a continuous gas supply is one of the key success drivers for our customers, Air Liquide is committed to the following European Action Plan:

- **Continue global investment program**
- **Confirm new sourcing strategies by enlarging raw gas sourcing portfolio**
- **Continue to manage multi-country Sourcing and Supply Chain by a dedicated organization**

Our objective is to fulfill customers’ needs while enhancing our expertise and competitiveness and contributing to sustainable growth.

We are strongly focused on business fundamentals:

**Building confidence for our customers**

**What is Carbon Dioxide?**

Carbon dioxide (CO₂) is in varying concentrations a natural part of our air. It is colorless, tasteless, non-flammable, with very faint sour odor and about 1.5 times heavier than air.

![Pressure-Temperature phase diagram of CO₂](image)

**Properties**

CO₂ is almost inert, has a high solubility in water, and bacteriostatic and fungistatic effect, i.e. it has an inhibitory effect on bacteria and fungi. Under atmospheric pressure carbon dioxide exists only as a gas or in solid form as dry ice (sublimation point at -78.5°C). In order to attain a liquid form, CO₂ must be put under a pressure of more than 5.18 bar. As dry ice, CO₂ has another interesting feature: it does not melt under normal conditions, but sublimes, i.e. it goes directly from a solid to a gaseous state.

At last, in a so-called hypercritical state (pressure> 74 bar, temperature> 31°C) it is an excellent solvent.
Our Supply Chain is engineered and monitored to ensure on time Carbon Dioxide deliveries

How do we manage the CO₂ supply for our Customers?

We recover raw CO₂ gas as a normal ‘By Product’ of industrial processes. To improve the supply reliability, we have diversified our raw gas portfolio thanks to new BIO Ethanol sources.

We have our own Engineering & Construction division providing ‘In House’ LCO₂ technology for gas compression, purification and liquefaction.

We manage a European Laboratories Network consistently auditing the quality of the raw gas and the final product (LCO₂).

Over last decades we have built the largest production network over Europe. Every day we control more than 400 movable road and rail assets reducing environmental impact.

For more than 3,000 customers all over the continent we provide the expertise in customer installation design (storage tank & vaporizers) suitable for specific gas application.

Thanks to our Industrial Management System we run our daily business with the highest standards for Safety, Reliability and Sustainability.
To satisfy your industrial process needs, we have designed a set of branded solutions.

How do we differ on the Carbon Dioxide market?

For our Customers, we have developed a range of added value branded solutions adapted to each specific application. We provide the highest product grade compliance with flexible set of services:

- Audits, trainings, assistance
- Application Equipment for your process
- Technical expertise

**ALICAL™**  
Food-grade gas to address the food safety regulations for the whole food and beverages value chains with large and tailor-made solutions for each food segment, ensuring total quality and skilled approach of contamination risks mastery.

**PHARCALIS™**  
Compliant gases for the pharmaceutical and biotech industries, specifically designed to respect pharmaceutical best practices, and ensuring total quality of products and services. Air Liquide is the ideal provider for the entire pharmaceutical value chain.

**ARCAL™**  
Mixing component for premium shielding gases delivered with innovative TOPs or in liquid. They are mainly used in automotive and metal fabrication.

**LASAL™**  
Component for lasing gas mixtures of CO₂ laser sources. They are used for laser cutting and welding applications in automotive and metal fabrication.

**ASPAL™**  
Innovative solutions to address water treatment in order to increase economical performances and improve environmental records thanks to comprehensive four turnkey offers: drinking water, cooling water, process & waste water.

**CARBOGLACE™**  
By a natural phenomenon, solid CO₂ called Dry Ice (-78°C) is subliming into cold gas. It is mainly used for transportation under controlled temperature, temperature regulations, clean blasting, cold fitting, cryo-grinding.
The Highest Quality Carbon Dioxide supplied by Air Liquide is a recovered by-product from industrial and BIO processes

Because we recover our raw CO₂ gas, no new carbon dioxide enters the atmosphere

The By-Product Carbon Dioxide we process and liquefy used to come mainly from the ammonia and petrochemical industry. In recent years a BIO Ethanol industry has developed in Europe and Air Liquide has invested in new LCO₂ plants processing BIO Carbon Dioxide originating from natural fermentation of biomass (cereals, sugar beets,...).

BIO Carbon Dioxide processed by Air Liquide

Air Liquide is now the leader in BIO Carbon Dioxide on the European Market. We process and liquefy more than 20% of the total Carbon Dioxide with natural fermentation origin. These new BIO sources, diversifying our sourcing portfolio, have made us more reliable in product supply.

We care about today and tomorrow

More than 70% of the Carbon Dioxide we process and liquefy is applied in the food industry. Air Liquide provides the highest food grade product certified by The Foundation for Food Safety Certification (FSSC 22 000).

We are constantly investing to upgrade our Supply Chain to meet the highest expectations. Every year we optimize the number of kilometers we drive to reduce the CO₂ emission for the product we transport.
Our presence in Europe

- Production & Sales
- New Development
- Production
- External Sourcing
- Rail Depot

Present in 80 countries, Air Liquide provides industrial and medical gases and related services. The Group offers innovative solutions based on constantly enhanced technologies. These solutions, which are consistent with Air Liquide’s commitment to sustainable development, help to protect life and enable our customers to manufacture many indispensable everyday products. Founded in 1902, Air Liquide has more than 46,200 employees. The Group has successfully developed a long-term relationship with its shareholders built on trust and transparency and guided by the principles of corporate governance. Since the publication of its first consolidated financial statements in 1971, Air Liquide has posted strong and steady earnings growth. Air Liquide is listed on the Paris stock exchange and is a component of the CAC 40 and Eurostoxx 50 indices (ISIN code FR 0000120073).