

Air Liquide and Carbon Dioxide Backgrounder

Carbon dioxide gas (CO₂) is formed from the combustion of two elements: carbon and oxygen. Carbon dioxide is a colorless, fire resistant gas formed during respiration, combustion, and organic decomposition. It has a wide range of uses, from food refrigeration and carbonation to fire extinguishers and aerosols.

Carbon Dioxide Applications

Air Liquide produces carbon dioxide, which is typically a by-product of other manufacturing processes, then compresses, purifies and stores the gas in a refrigerated liquid state. Air Liquide provides carbon dioxide for the following industries:

- Oil and Gas Extraction – Used for fracturing formations and enhanced oil recovery
- Food and Beverage – Carbonation and dispensing of beverages, freezing and chilling, preservation, Modified Atmosphere Packaging (MAP) and distribution of foods
- Healthcare – Surgical dilation by intra-abdominal insufflations
- Welding – Shielding of welds against oxidation
- Primary Metals Manufacturing – Used for fume suppression
- Waste Water Treatment – Used for pH control
- An environmentally-friendly alternative to sulfuric acid
- Basic Chemicals – including calcium carbonate

Air Liquide also provides carbon dioxide for “snow” found in fire extinguishers, and to control pH in order to regulate waste waters and swimming pools.

Clean Gas Generation and Carbon Dioxide

Carbon dioxide is separated, treated and re-injected into the oil and gas formation for enhanced oil recovery as part of a new technology introduced by Clean Energy Systems that enables generation of electric power without pollution. Air Liquide is helping to develop the technology and is the industrial gas manager for the project. The new gas generation system, which emits no nitrogen, sulfur dioxide, particulate matter or other harmful elements often associated with conventional power systems, replaces the boiler in a conventional power plant.

The gas generator can combine any one of a range of alternative fuels with oxygen and cooling water to produce a working fluid of steam and carbon dioxide. This working fluid drives turbines, which generate electricity. The steam is then cooled in a condenser to a liquid water state and the carbon dioxide is processed to food-grade quality and then resold, reused or recycled. This technology offers the power industry the most cost-effective means of 100 percent carbon dioxide separation and capture.