



Solutions Coalition

Ensuring the continued supply of CO₂.

A collaborative effort to safeguard America's supply chain by providing facts, resources and information about the vital role carbon dioxide plays in our economy.

Carbon dioxide is a necessary and useful gas. A certain level of carbon dioxide is essential for life. Humans need carbon dioxide to regulate respiration and control blood pH. Plants use carbon dioxide to create oxygen through photosynthesis.

At the same time carbon dioxide being released into the atmosphere from the burning of fossil fuels has been identified as a major contributor to climate change. It is often referred to a "greenhouse gas". As a result, carbon dioxide is generally viewed as a chemical that must be avoided and there is increasing policy and legislation being enacted around the world to limit CO₂ atmospheric emissions.

CO₂ – Benefits to Society

In addition to our biological need for carbon dioxide, CO₂ has many beneficial uses in today's society.



HERE ARE JUST A FEW

- **Carbon dioxide, either as a gas, liquid, or solid (dry ice), is often used to preserve or freeze foods.** Liquid carbon dioxide or dry ice is used to quickly freeze foods. Although mechanical refrigeration is also used to freeze foods, it often cannot achieve the low temperatures possible from using liquid carbon dioxide or dry ice. Quickly freezing foods preserves their color and texture by limiting the formation of ice particles which can affect these qualities.
- **Carbon dioxide gas is used to preserve packaged foods and fruits** by displacing oxygen in packaging.
- **Carbon dioxide is used** throughout the meat and poultry industry in such applications as **animal stunning** and to keep meat cool during blending.
- **Dry ice is often used in many medical applications** such as flash freezing biological samples, removing growths, providing refrigeration for vaccines and other cooled medications during transportation.
- **Carbon dioxide is used to create enhanced growing atmospheres** in green house and similar growing environments. The enhanced atmosphere **promotes better, faster growth with higher product yields.** Because this is a biologic process uniquely dependent on carbon dioxide, there are no known alternatives.
- **Carbon dioxide is used in water and wastewater treatment to control ph.** Alternatives, such as acid and chlorine are available, but come with their own considerations and requirements.
- **Dry ice** (produced by Carbon dioxide) is used across many industries to **clean surfaces and increase sanitation** without introducing environmental toxins that are produced using other cleaning materials. It can also be used as an environmentally friendly way to quickly stop leaks and remediate industrial spills, leaving no waste product behind after the cleanup effort.
- **Carbon dioxide is used with oxygen and other gases in specialty gas mixtures to help diagnose disease.** For example, mixtures of oxygen with varying amounts on carbon dioxide are used to assess lung function for patients with respiratory diseases such as chronic obstructive pulmonary disease (COPD). Because carbon dioxide is essential for regulating respiration, there are no available alternatives for making these mixtures.
- **Carbon dioxide is an effective cleaning solvent, used in industries such as semiconductor or electronic manufacture,** eliminating the need to use other solvents with known physiological or environmental problems. Dry ice is also used for blast cleaning, replacing sand and other grit materials.
- **Carbon dioxide puts the “fizz” into carbonated beverages.** Without carbon dioxide many beverages, such as soda, soft drinks and beer, would be very flat.



CO₂ – A Greenhouse Gas to Be Controlled and Limited

According to the U.S. EPA CO₂ is the primary greenhouse gas emitted through human activities, representing 79% of total emissions, followed by methane (11%), nitrous oxide (7%) and fluorinated gases (3%). Greenhouse gases trap heat in the atmosphere which scientists say leads to global warming.

The main human activity that emits CO₂ is the combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation. Certain industrial processes and land-use changes also emit CO₂. The main sources of CO₂ emissions in the United States are described below.

Transportation. The combustion of fossil fuels such as gasoline and diesel to transport people and goods was the largest source of CO₂ emissions in 2020, accounting for about 33% of total U.S. CO₂ emissions and 26% of total U.S. greenhouse gas emissions.

Electricity. Electricity is a significant source of energy in the United States and is used to power homes, business, and industry. In 2020, the combustion of fossil fuels to generate electricity was the second largest source of CO₂ emissions in the nation, accounting for about 31% of total U.S. CO₂ emissions.

Industry. Many industrial processes emit CO₂ through fossil fuel consumption. Several processes also produce CO₂ emissions through chemical reactions that do not involve combustion. Examples include the production of mineral products such as cement, the production of metals such as iron and steel, and the production of chemicals. The fossil fuel combustion component of various industrial processes accounted for about 16% of total U.S. CO₂ emissions in 2020.

In 2021, over 120 nations committed to net-zero emissions by 2050.

As part of these commitments, individual countries have set interim targets. In the U.S. President Biden has set a goal of reducing U.S. greenhouse gas emission by 50–52 percent from 2005 levels by 2030; Canada has also pledged to cut its greenhouse gas emissions by 40–45 percent from 2005 levels by 2030.

Putting the CO2 Industry in Perspective

Today, use of CO2 in North America for the critical applications described above amounts to approximately 0.23% of the total CO2 emissions. Even if the reduction targets set by the US and Canada are met by 2030, critical use applications for CO2 will still amount to less than 0.5% of all emissions.

Because there are few, if any, alternatives for CO2 in many of these applications, and because the amount CO2 used is minimal in comparison to that being emitted by transportation, electrical generation and industrial processes, it is important to maintain CO2 availability for these uses. To be clear, not all CO2 is bad. In fact, every one of our lives would be severely impacted without it.



0.23%

Today's total CO2 emissions use in North America for critical applications.

Sourcing CO2

The CO2 industry is largely dependent upon obtaining gas CO2 feedstock as a byproduct of other manufacturing processes such as ammonia production, hydrogen production and ethanol fermentation.

Industry-wide CO2 supply and related supply chains remain fragile, stemming from ongoing pandemic impacts at CO2 feed gas sources including: deferred planned feedstock plant maintenance, unplanned feedstock plant interruptions, and permanent CO2 source plant closure. CO2 supply and availability is also seasonally dependent. In the warmer months, the demand for CO2 increases, and any variation in supply is magnified.

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