

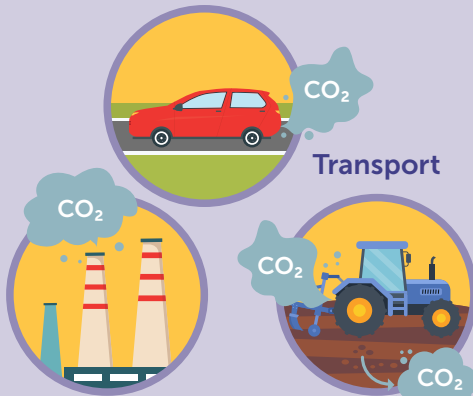
A guide to carbon capture and storage (CCS)

Sources of carbon dioxide (CO₂)



Respiration Decomposition Volcanic

Natural sources



Industrial Agriculture

Industry sources

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What is carbon dioxide (CO₂)?

CO₂ is a naturally occurring greenhouse gas. It has always been part of Earth's atmosphere, produced and absorbed through natural processes long before humans existed. A CO₂ molecule is made up of one carbon atom and two oxygen atoms. You can't see or smell it, and it is created naturally when people and animals breathe out, from natural fires, and through decomposition. CO₂ is also released when coal, oil or gas is burned.

Why is it important to reduce CO₂ emissions?

CO₂ is a greenhouse gas, meaning it traps heat in the atmosphere and contributes to the warming of the planet.

What is carbon capture and storage (CCS)?

Some industries such as Liquefied Natural Gas (LNG) production, minerals processing and cement manufacturing use high temperature or chemical processes which create CO₂ emissions. Even as these industries improve efficiency and adopt cleaner technologies, some emissions are difficult to avoid. CCS can help these industries reduce the amount of CO₂ they release by capturing the CO₂ before it reaches the atmosphere and storing it safely deep underground.

Global experts like the International Energy Agency (IEA) and the Intergovernmental Panel on Climate Change (IPCC) say CCS is vital for reaching net zero emissions by 2050.

CCS in LNG production process

1 Capture

Natural gas contains CO₂. Before natural gas can be turned into liquefied natural gas (LNG), this CO₂ needs to be removed. At LNG processing facilities, the gas is passed through special chemicals, that absorb the CO₂ and separate it from the methane (the part of the gas we use as fuel).

2 Compression

Once separated, the CO₂ is collected so it can be compressed, transported, and stored instead of being released into the atmosphere. The CO₂ is squeezed until it becomes a dense liquid so it is easier and safer to transport.

3 Transportation

The CO₂ can be moved through pipelines or on ships or even trucks. CO₂ is transported safely and at scale everyday all over the world through pipelines and trucking, and countries in Europe and Asia are already building ships to carry CO₂.

4 Storage

There are different ways CO₂ can be stored permanently underground. These methods use the same types of rock layers that held oil, gas, or water for millions of years. CO₂ can be pumped deep underground into porous rock with tiny holes which traps the CO₂, preventing it from entering the atmosphere.

A layer of dense, impermeable rock called a cap rock sits above the porous reservoir and acts as a seal, preventing the CO₂ from migrating upward and escaping to the surface.



Learn more about CCS