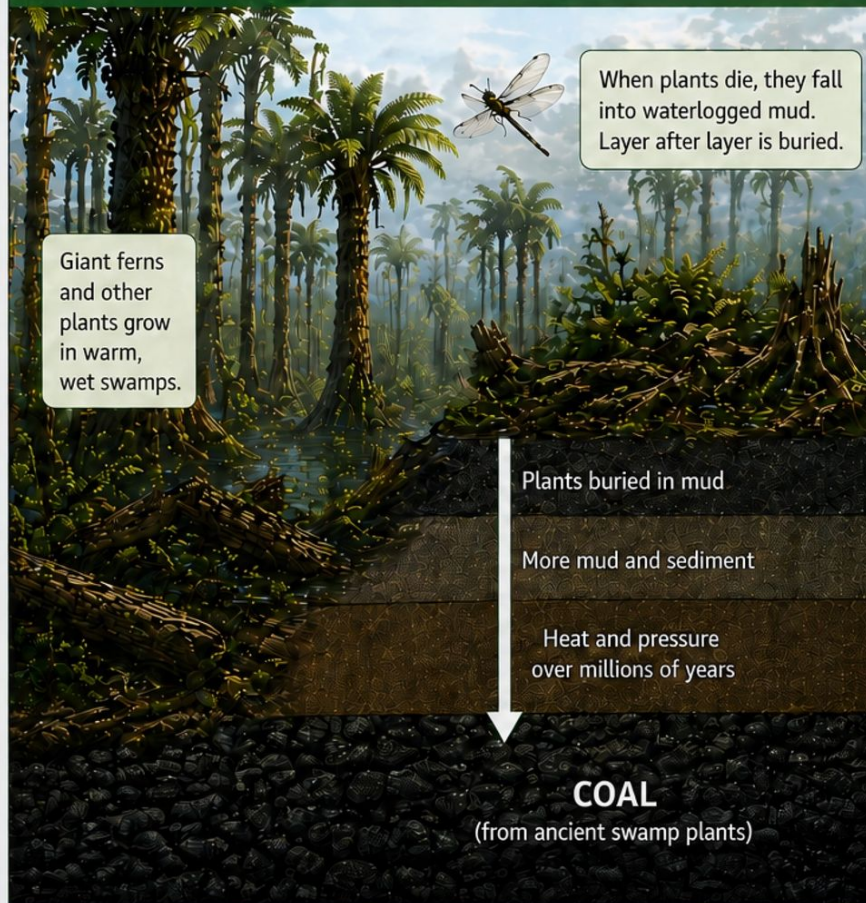


Illustration 3.2 - Origin of fossil fuels

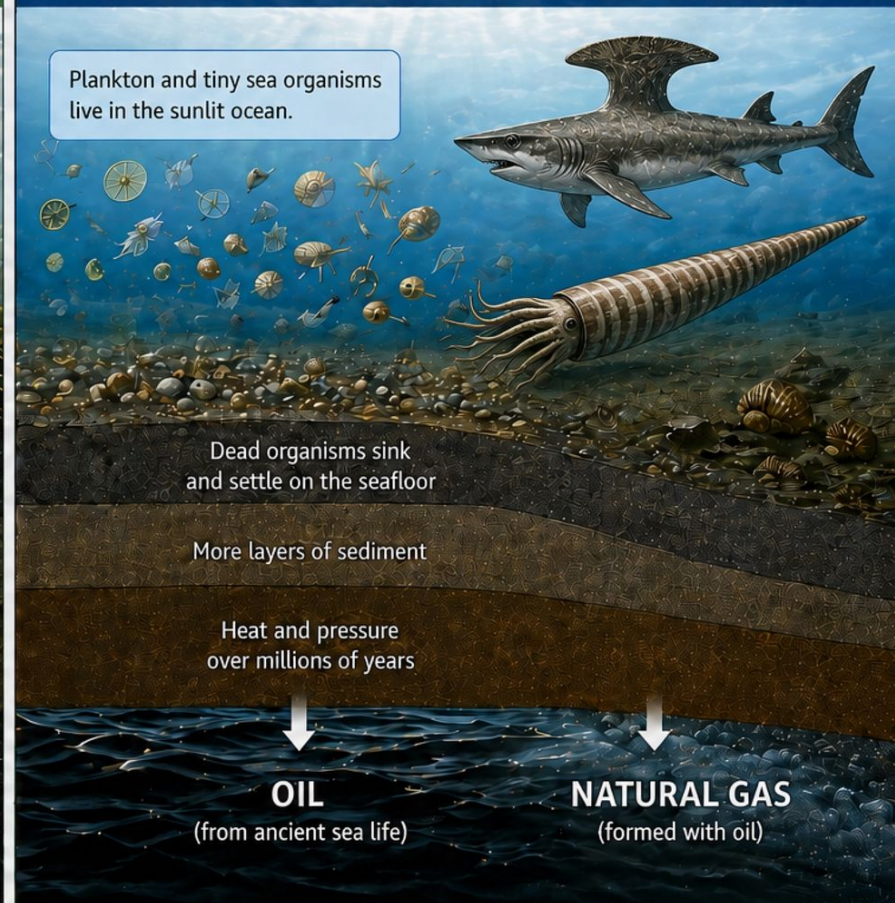
FROM ANCIENT LIFE TO FOSSIL FUELS

Buried over millions of years. Changed by heat and pressure. Stored as energy-rich fuels.

ON LAND – SWAMP FORESTS



IN THE OCEANS – TINY LIFE, BIG STORY



Fossil fuels are made from ancient life. They store carbon that was once in the air and in living things, locked away for millions of years.

Illustration 3.4 - The carbon sink

ILLUSTRATION 3.4

THE CARBON SINK MODEL – WHY CO₂ BUILDS UP

Emissions add CO₂ to the atmosphere. Nature absorbs some, but not all.
When more goes in than comes out, CO₂ levels rise.

CO₂ GOING IN (THE TAP)

Human activities release CO₂ into the atmosphere.



Electricity
and heat



Transport



Industry
(cement, steel,
chemicals)



Land use change
(deforestation)



Global human CO₂
emissions in 2025
≈37.4
billion tonnes
of CO₂ per year
(projected)

THE ATMOSPHERE (THE BATHTUB)

When more CO₂ goes in
than comes out, the level rises.

CO₂ IN THE ATMOSPHERE (parts per million)

≈280 ppm
Before the
Industrial
Revolution

≈315 ppm
Around
1950

≈424 ppm
2025
(latest)

CO₂ GOING OUT (THE DRAIN)

Nature removes CO₂
from the atmosphere.



Plants and forests
Absorb CO₂ as they grow
and store carbon.



Oceans
Absorb CO₂ at the
surface; some is stored
in deeper waters.



Soils
Store organic carbon
in soil and peat.



Weathering of rocks
Slow natural process
that locks CO₂ into
minerals.

Natural carbon
removal in 2025
≈30.0
billion tonnes
of CO₂ per year
(estimated)

THE BOTTOM LINE

In 2025, humans add about 37.4 billion tonnes of CO₂ to the atmosphere each year.

Nature removes about 30.0 billion tonnes.

The difference – about 7.4 billion tonnes per year – stays in the atmosphere.

Over time, this extra CO₂ builds up.

ATMOSPHERIC CO₂ IS RISING



This is why CO₂ builds up
and greenhouse warming
increases.

Reduce what goes in.
Increase what nature
can remove.

That is how we bring
the level back down.



The atmosphere is like a bathtub.

When the tap runs faster than the drain, the level rises.

Our goal:

Turn the tap down. Open the drain wider.



Clean energy



Efficient transport



Protect forests



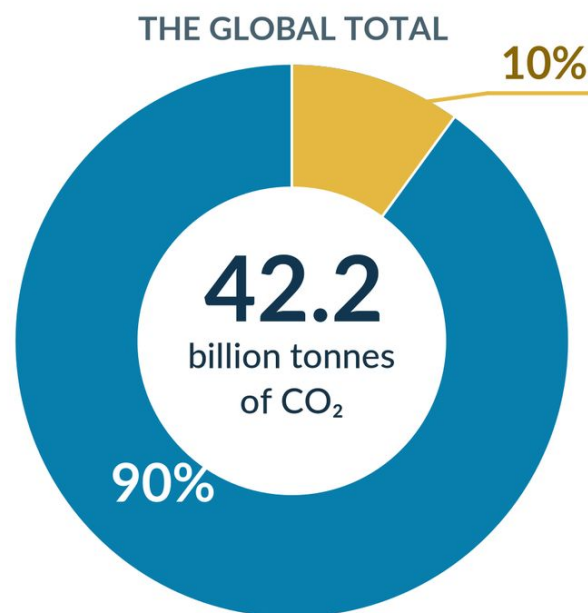
Restore nature

Note: Numbers rounded. Sources: Global Carbon Project (Friedlingstein et al., 2025) – Global Carbon Budget 2025 (data released 2026).

Illustration 3.3 - Source of human CO₂ emissions

WHERE HUMAN CO₂ COMES FROM

Global CO₂ emissions — 2025 projection



≈90% **Fossil fuels and industry**
38.1 billion tonnes

≈10% **Net land-use change**
4.1 billion tonnes

EXAMPLES OF EMISSION SOURCES



Electricity and heat

Burning coal, oil and gas for power and heating.



Transport

Fuel for cars, lorries, ships and aircraft.



Industry

Making cement, steel and other materials.



Land-use change

Clearing forests and changing how land is used.

Cars are only part of the picture. Energy, industry and land use all matter.

Source: Global Carbon Budget 2025 (November projections). Shares rounded; land-use change is net of removals.

Illustration 3.6 - Low carbon concrete

ILLUSTRATION 3.5

ONE BRIGHT THING — TURNING CO₂ INTO SOMETHING USEFUL

People are finding smart ways to capture CO₂ and put it to work.



These ideas are still developing.
They do not replace cutting fossil fuel use.
But they show what is possible.

1. LOCKING CO₂ AWAY IN CONCRETE

CO₂ can be captured and injected into fresh concrete. It reacts with the calcium in the concrete and turns into solid minerals, locking the CO₂ away permanently.

1 Capture

CO₂ is captured from industrial emissions.

2 Inject

The CO₂ is injected into fresh concrete.

3 React

The CO₂ reacts with calcium to form stable minerals.

4 Lock away

CO₂ becomes part of the concrete, permanently.



This can reduce the amount of cement needed, which helps lower emissions.



Stronger concrete



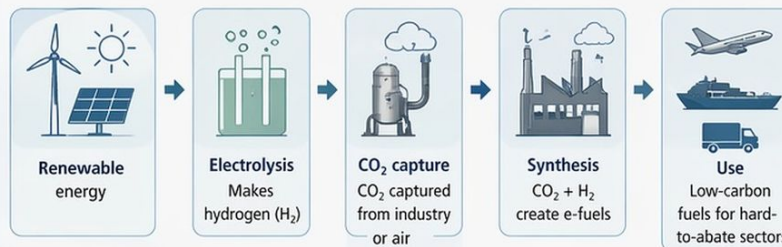
Uses less cement (lower emissions)



CO₂ locked away for good

2. TURNING CO₂ INTO FUELS

Using renewable energy, CO₂ can be combined with hydrogen to make synthetic fuels. These fuels can power planes, ships and heavy industry.



These fuels can replace fossil fuels in sectors where clean options are limited today.

3. MAKING OTHER USEFUL PRODUCTS

CO₂ can also be used to make everyday products and important industrial materials.



Plastics

CO₂ can be used to make some types of plastic.



Chemicals

CO₂ is a building block for many valuable chemicals.



Building materials

CO₂ can help make strong, low-carbon materials.



Minerals

CO₂ can be turned into stable mineral products.



THE BIG IDEA

CO₂ does not have to be only a waste gas. With new technology and smart thinking, it can become part of the solution.

THE BOTTOM LINE

Using CO₂ in useful ways cannot solve climate change by itself. But every tonne captured and used — or locked away — keeps it out of the atmosphere and helps build a better future.



Understanding carbon gives us more choices. More choices help us build a cleaner, safer, more resilient world. That is something to feel hopeful about.



Note: Carbon capture and utilisation (CCU) technologies are developing rapidly. Commercial deployment is growing but still limited at global scale.

Sources: Global Carbon Project (2025); IEA (2025); GCCSI (2024); McKinsey (2024)