

WHAT IS CO₂?

CO₂ is a compound of carbon and oxygen and one of the most important greenhouse gases in the atmosphere.

Biogenic CO₂ is created by burning or decomposing organic matter.

Fossil CO₂ is released by the combustion of fossil fuels.

Although CO₂ is part of the carbon cycle, the current concentration in the atmosphere contributes to the greenhouse effect and climate change.

EXPLANATION & CONVERSION

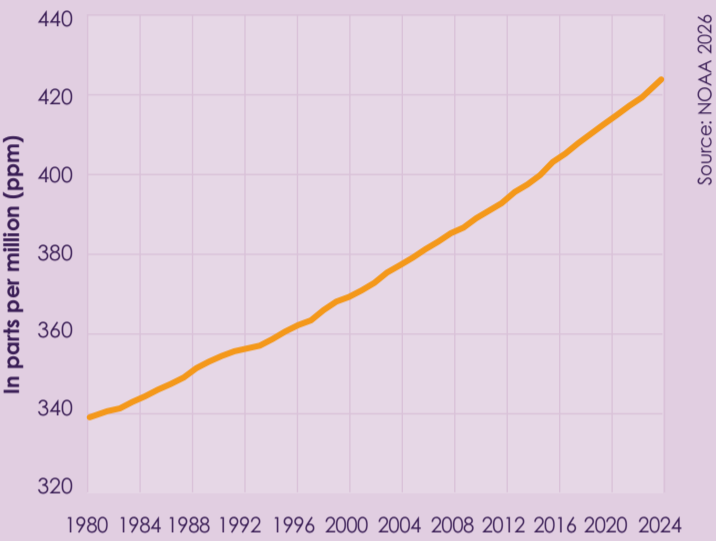
1 megaton = 1 million tonnes = 1 billion kilograms

The weight of 1 ton of CO₂ is equivalent to 1 water tank of 1,000 liters (1 m³).

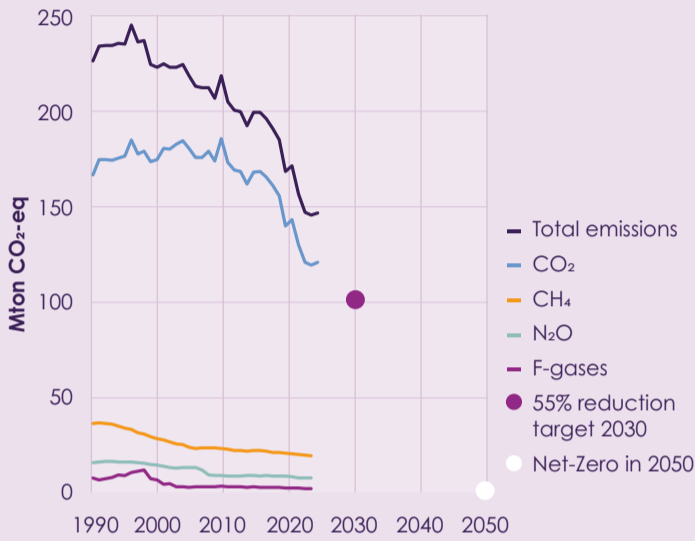
The volume of 1 ton of CO₂ is equivalent to the volume of a house of approximately 200 m² (500 M³, temperate climate).

The average emissions per Dutch person are more than 7 tons of CO₂ per year.

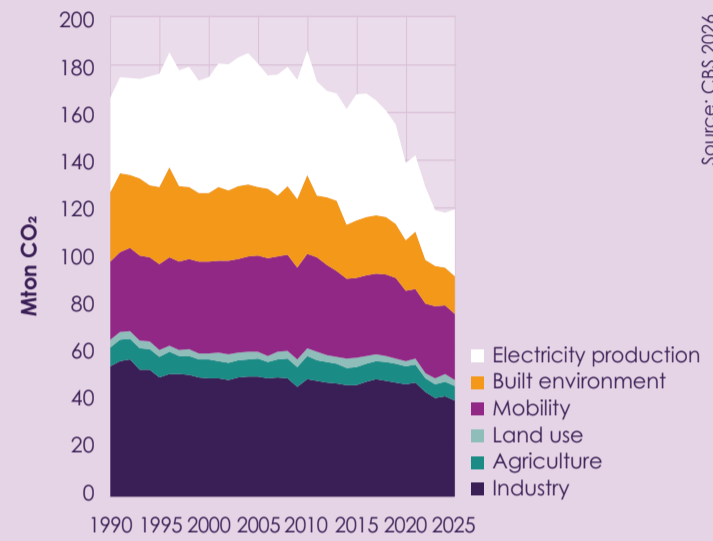
CO₂ CONCENTRATION IN THE ATMOSPHERE WORLDWIDE



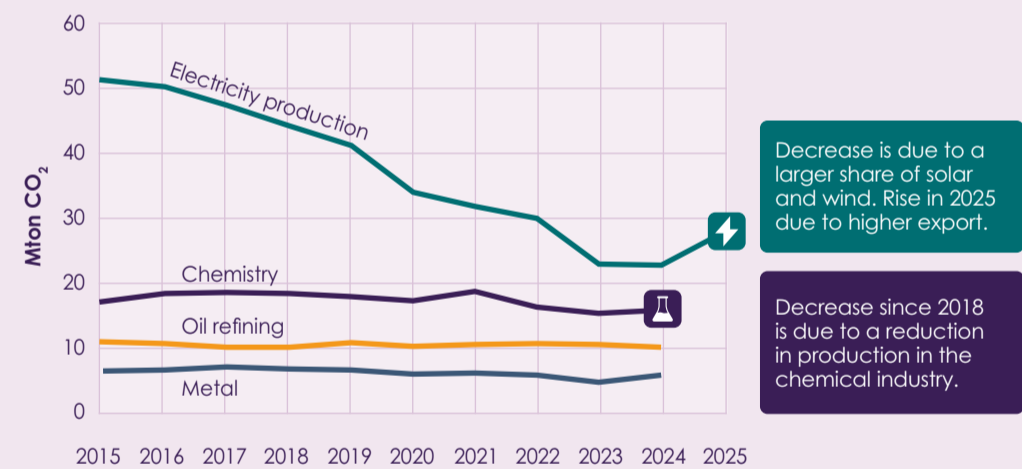
GREENHOUSE GAS EMISSIONS IN THE NETHERLANDS



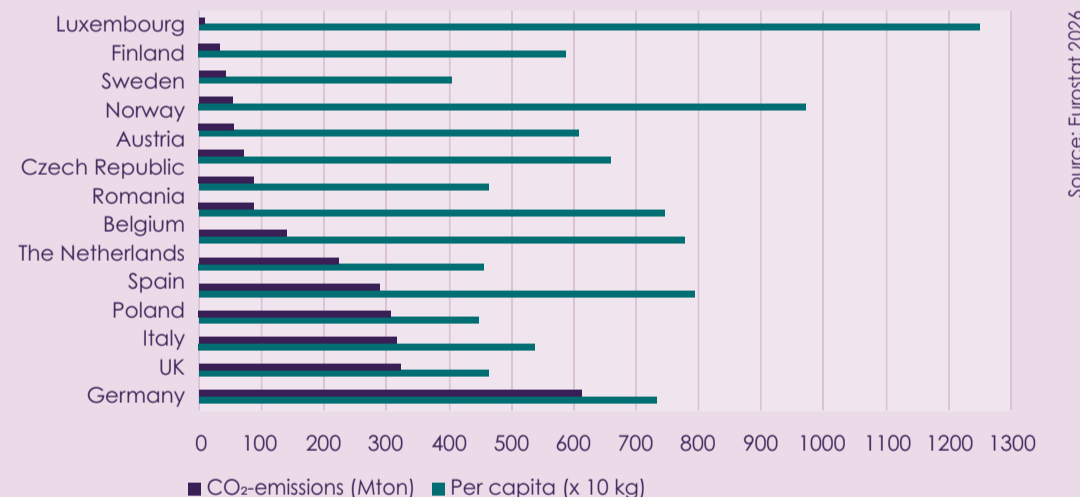
CO₂ EMISSIONS BY SECTOR IN THE NETHERLANDS



CO₂ EMISSIONS FROM INDUSTRY IN THE NETHERLANDS



CO₂ EMISSIONS IN EUROPEAN COUNTRIES



INDUSTRIAL CARBON MANAGEMENT

In addition to electrification and fuel switching, industrial carbon management is crucial to meet climate goals. Industrial carbon management includes Carbon Capture and Utilisation (CCU), Carbon Capture and Storage (CCS) and Carbon Dioxide Removal (CDR).

CO₂ can be captured in different places and ways.

CAPTURE OF FOSSIL CO₂

- Blue hydrogen production
- Heavy industry on natural gas
- Industry with process emissions
- Natural gas or coal power stations

CAPTURE OF BIOGENIC CO₂

- Waste incineration plants
- Bioenergy with Carbon Capture and Storage (BECCS) power plant

CAPTURE OF CO₂ ALREADY PRESENT

- Direct Air Capture (DAC)
- Direct Ocean Capture (DOC)

Captured CO₂ can be reused - for a short or longer period of time. We call this Carbon Capture and Utilisation (CCU).

EXAMPLES OF SHORT REUSE

- In food
- In greenhouse horticulture
- In industrial processes
- For synthetic fuels

EXAMPLES OF LONG REUSE

- As a raw material for cement-bound building materials
- In timber construction

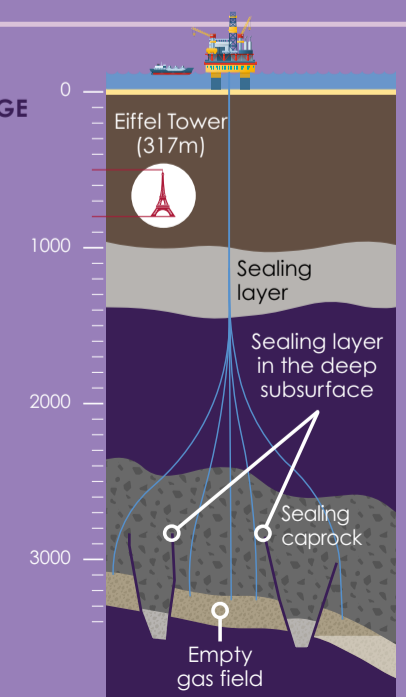
TEMPORARY

Carbon Dioxide Removal (CDR)

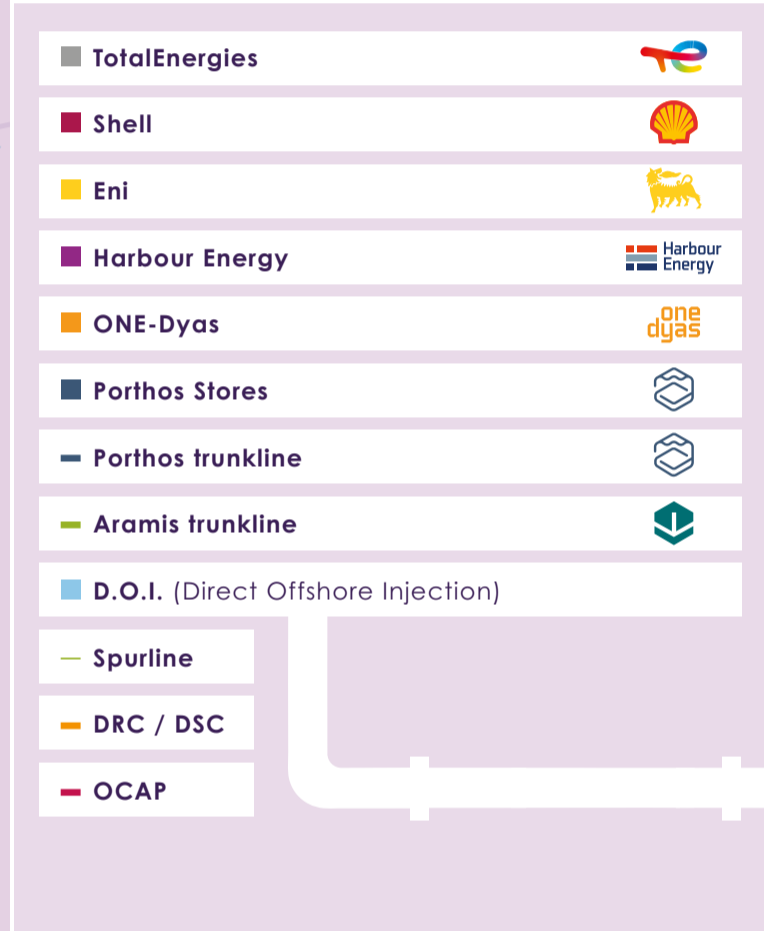
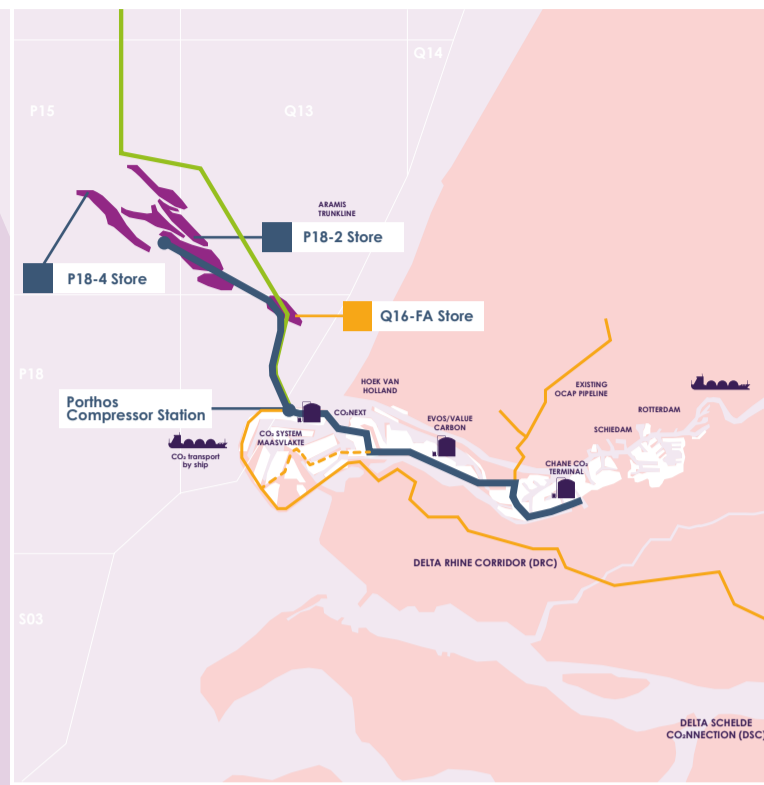
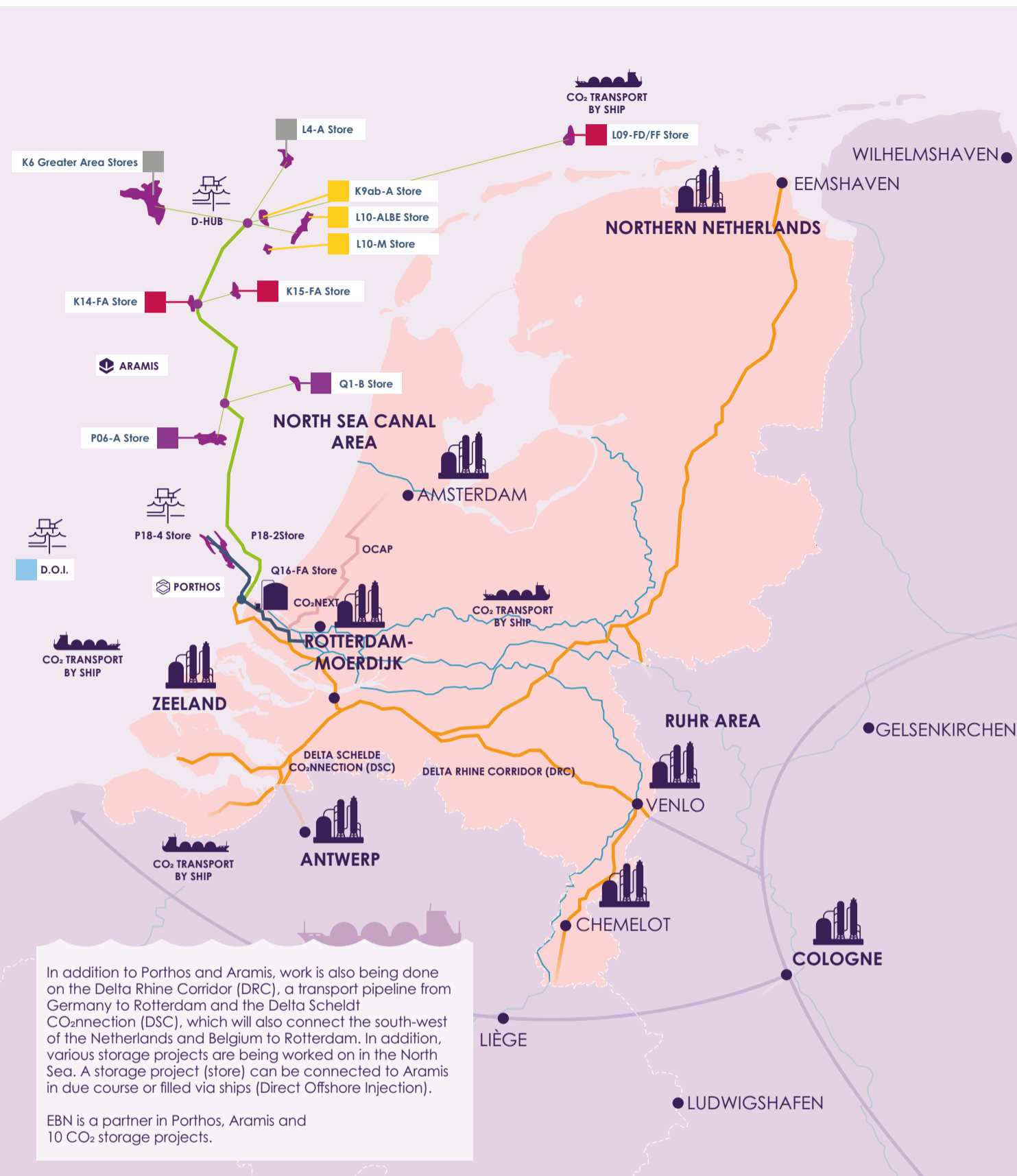
Captured CO₂ can be safely stored permanently. We call this Carbon Capture and Storage (CCS).

EXAMPLES OF PERMANENT STORAGE

CO₂ can be permanently stored in the deep subsurface, in geological reservoirs such as gas fields and in aquifers.



PERMANENT



In addition to Porthos and Aramis, work is also being done on the Delta Rhine Corridor (DRC), a transport pipeline from Germany to Rotterdam and the Delta Scheldt CO₂connection (DSC), which will also connect the south-west of the Netherlands and Belgium to Rotterdam. In addition, various storage projects are being worked on in the North Sea. A storage project (store) can be connected to Aramis in due course or filled via ships (Direct Offshore Injection).

EBN is a partner in Porthos, Aramis and 10 CO₂ storage projects.

CONTRIBUTION OF PORTHOS AND ARAMIS

Porthos

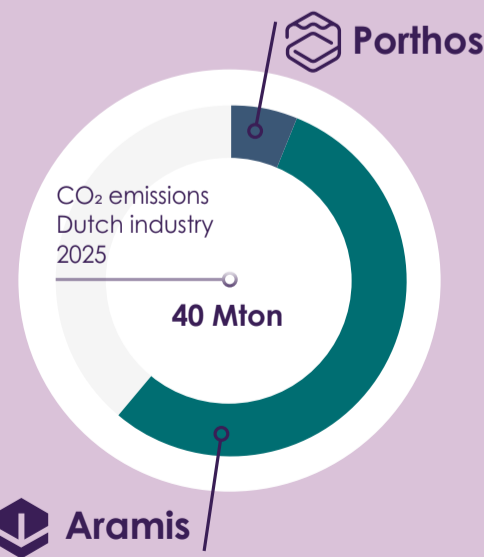
- First large-scale CCS project in the EU
- Transport and storage of CO₂ from the port of Rotterdam
- Storage in several outsourced gas fields under the North Sea
- Designed to accommodate larger CO₂ volumes in future
- Capacity 2.5 Mton CO₂ per year
- Injection period: 15 years
- Total storage: ~ 37.5 Mton CO₂

Aramis

- European infrastructure project for transport and storage of CO₂
- Suitable for multiple industry clusters and companies in The Netherlands and beyond
- Reception of CO₂ via pipeline or ship (via CO₂next hub terminal)
- Pipeline capacity 22 Mton per year, expected starting volume 5 - 7.5 Mton per year
- Injection period: ~20 years or more
- Initially using 3 stores

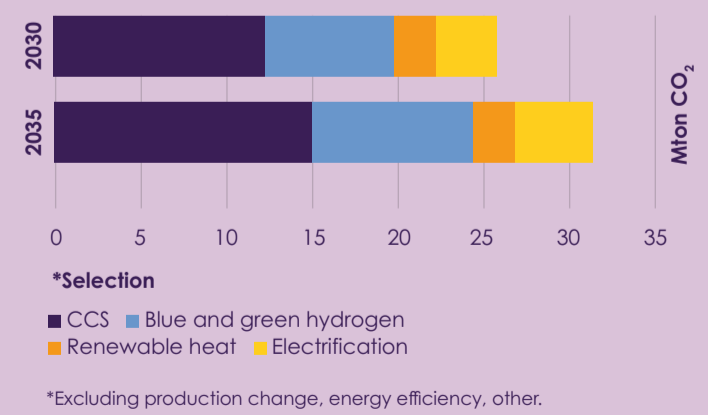
CCS CONTRIBUTES SUBSTANTIALLY TO EMISSION REDUCTIONS

CCS reduces CO₂ emissions industry by more than half



According to Dutch industry, CCS and blue & green hydrogen are considered the largest contributors to emission reductions

Potential greenhouse gas emission savings by project type according to industry (CES 3.0)



*Selection
 ■ CCS ■ Blue and green hydrogen
 ■ Renewable heat ■ Electrification

*Excluding production change, energy efficiency, other.

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