



# Hi – we're Equinor

We energise the lives of 170 million people.  
Every day.



# Equinor | A broad energy company

Equinor is an international energy company committed to long-term value creation in a low-carbon future.

Our purpose is to turn natural resources into energy for people and progress for society.

Equinor's portfolio of projects encompasses oil and gas, renewables and low-carbon solutions, with an ambition of becoming a net-zero energy company by 2050.

Headquartered in Stavanger (Norway), Equinor is the leading operator on the Norwegian continental shelf. We are present in around 30 countries worldwide.



# Equinor ambitions | Net Zero by 2050

- We are committed to develop our company in support of the Paris Agreement's goal
- By 2030 we aim to spend 50% of all investment into renewables and low-carbon solutions
- Our low-carbon solutions are based on CCS targeting hard-to-abate part of the energy system

**CCS Ambitions:**  
**15-30** Mtpa  
CO<sub>2</sub> transport and storage  
capacity by 2035  
Equinor share

## Carbon Capture & Storage (CCS) Value Chain

### Capture



CO<sub>2</sub> is captured at the emission source  
- power, industry, waste, DAC etc

### Transport



The CO<sub>2</sub> is transported, usually by  
ship or pipeline to the injection facility

### Storage



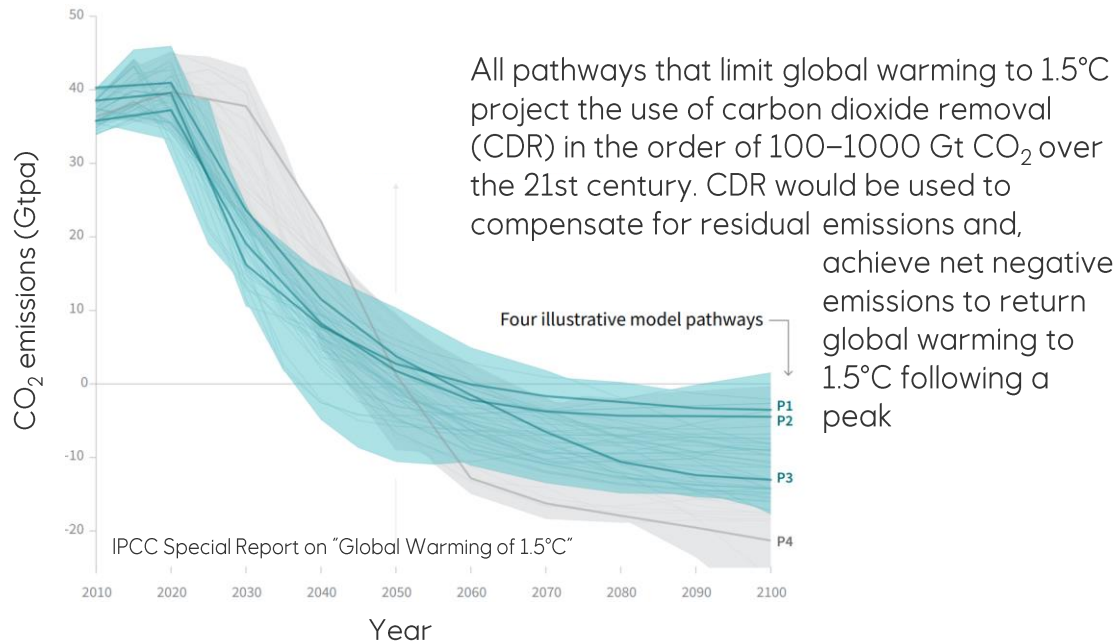
The CO<sub>2</sub> is injected and safely  
stored at depths typically > 1 km

# Why CCS | A requisite to meet climate goals

**UN Intergovernmental Panel on Climate Change (IPCC)** points to CCS as a necessity to keep global warming to 1.5°C

## Global total net CO<sub>2</sub> emissions | Pathways to reach 1.5°C

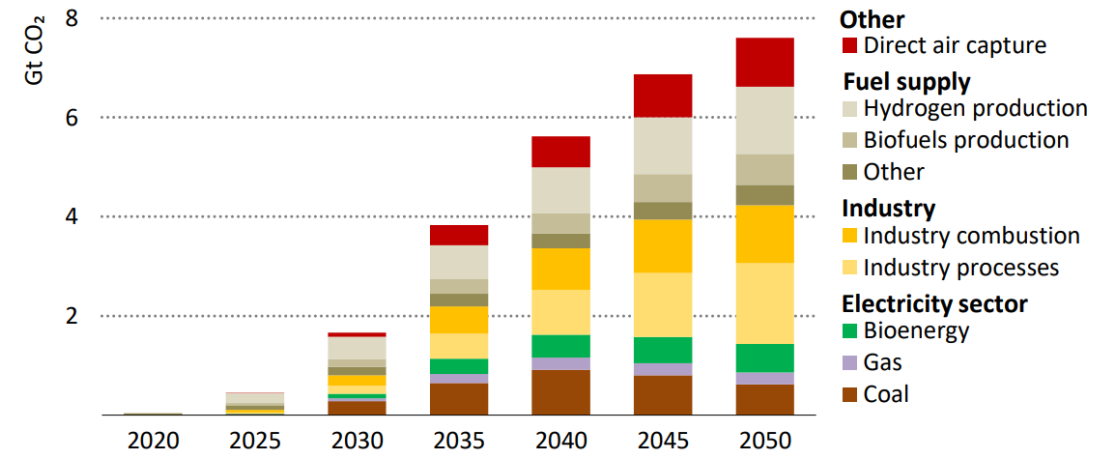
From IPCC Special Report on "Global Warming of 1.5°C" ([link](#))



**The International Energy Agency (IEA)** states that we will need to store billions of tones of CO<sub>2</sub> every year to reduce global warming

## Global CCS by source | Scenario to achieve net zero by 2050

From IEA's Net Zero by 2050 | A roadmap for the Global Energy Sector ([link](#))



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**By 2050, 7.6 Gt of CO<sub>2</sub> is captured per year from a diverse range of sources. A total of 2.4 Gt CO<sub>2</sub> is captured from bioenergy use and DAC, of which 1.9 Gt CO<sub>2</sub> is permanently stored.**

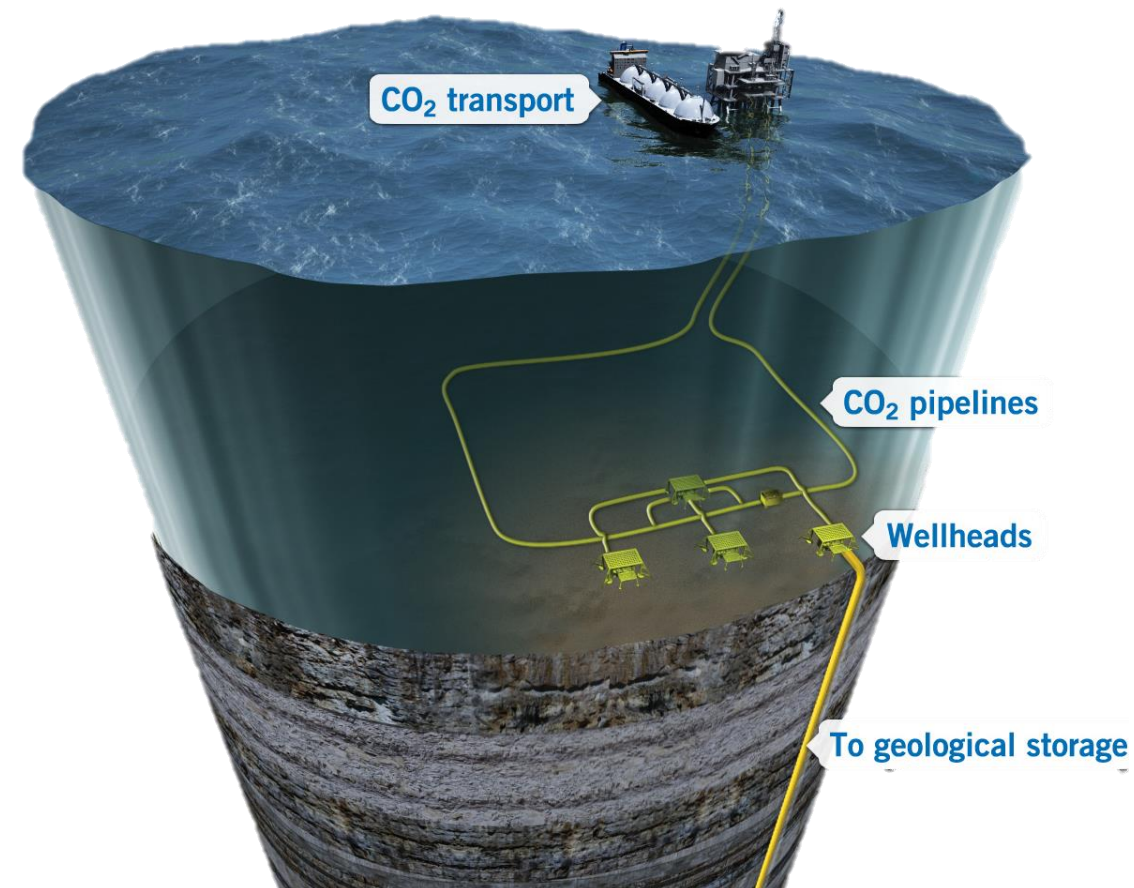


# Is CCS safe? | Yes, several mechanisms in place

## Several trapping mechanisms assuring safe containment

- **Structural trapping:** sealing cap rock preventing the CO<sub>2</sub> to escape upwards
- **Capillary/residual trapping:** large part of the CO<sub>2</sub> is trapped and immobilized in pore throats between sand grains
- **CO<sub>2</sub> dissolution:** with time, the injected CO<sub>2</sub> will dissolve in the salt water in the reservoir and sink down
- **Mineralization:** Some dissolved CO<sub>2</sub> will form minerals, thus becoming completely immobile

The CO<sub>2</sub> is also **monitored** during and after injection with a variety of proven technologies (as demonstrated at Sleipner)



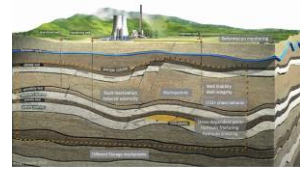
# Technology maturity | We have 26 years experience



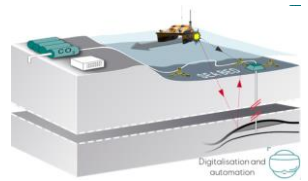
- Equinor is a leading pioneer in this technology and has been storing CO<sub>2</sub> offshore the coast of Norway since 1996
- Operator of two of three existing full-scale offshore projects (Sleipner & Snøhvit)
- 14 years of piping CO<sub>2</sub> offshore for storage (Snøhvit)
- 7 years of onshore CO<sub>2</sub> injection (In Salah, Algeria)
- Operator of Technology Centre Mongstad (CO<sub>2</sub> capture) since 2012
- Project developer of the world's first open-source transport and storage infrastructure project (Northern Lights)

## Continuing technology focus

CO<sub>2</sub> Storage Resource Maturation & Optimization



CO<sub>2</sub> Storage Integrity and Monitoring



Cost Effective CCS Wells



CO<sub>2</sub> Transport Technology



CO<sub>2</sub> Capture Technology



# Equinor's low carbon portfolio | October 2022

## USA

Tri-state Energy Hub

Project name	Project type	Country
Northern Lights (NL)	CO <sub>2</sub> transport & storage	NO
Northern Endurance Partnership	CO <sub>2</sub> transport & storage	UK
Smeaheia	CO <sub>2</sub> transport & storage	NO
Polaris	CO <sub>2</sub> transport & storage	NO
European CO2 Trunkline	CO <sub>2</sub> transport & storage	DE,NO,BE
H2H Saltend	Blue hydrogen	UK
Aldbrough H2 storage	Hydrogen storage	UK
Net Zero Teesside (NZT)	Power + CCS	UK
Keadby 3	Power + CCS	UK
Peterhead	Power + CCS	UK
Keadby Hydrogen Power Station	Hydrogen to power	UK
H21	Hydrogen fuel switch	UK
H2M Eemshaven	Blue hydrogen	NL
AquaSector	Green hydrogen	DE
H2GE Rostock	Blue hydrogen	DE
H2BE	Blue hydrogen	BE
NorthH2	Green hydrogen	NL, BE, DE
Clean Hydrogen to Europe	Blue hydrogen	NO
Barents Blue	Blue ammonia	NO
US Tristate	Power+CCS+H <sub>2</sub>	US

## NORTHWEST EUROPE & UK

- Blue H<sub>2</sub> / NH<sub>3</sub>
- Green H<sub>2</sub>
- CCS



# Northern Lights | First open access CO<sub>2</sub> T&S

## NORTHERN LIGHTS SCOPE

### CO<sub>2</sub> capture

Capture from industrial plants.  
Liquefaction and temporary storage.



### Transport

Liquid CO<sub>2</sub>  
transported by ship.



### Receiving terminal

Intermediate onshore storage.  
Pipeline transport to offshore  
storage location.



### Permanent storage

CO<sub>2</sub> is injected into a saline aquifer.

100 km

2 600m



- Equinor together with Shell and TotalEnergies, are developing **Northern Lights** which is offering a CO<sub>2</sub> transport and storage service to industry
- Industry can capture their emissions and bring it to the harbor where the Northern Lights will collect it by ship and bring it to Norway for geological **offshore storage**
- The construction work is well ahead, and first CO<sub>2</sub> injection will **start in 2024**
- Northern Lights is part of a full CCS value chain called **Longship** which is heavily funded by the Norwegian government
- Two Norwegian industrial CO<sub>2</sub> capture projects are part of Longship, one **cement factory** and one **waste to energy plant**
- This ensures progress along the full value chain; capture, transport and storage, we are solving the "**chicken and egg**" problem
- Northern lights is **marketing spare capacity** and the interest from industry in Europe is overwhelming. Capture projects are being matured by a broad range of industries, such as cement, steel, waste to energy and power



# Smeaheia | Form basis for a European CO<sub>2</sub> trunkline

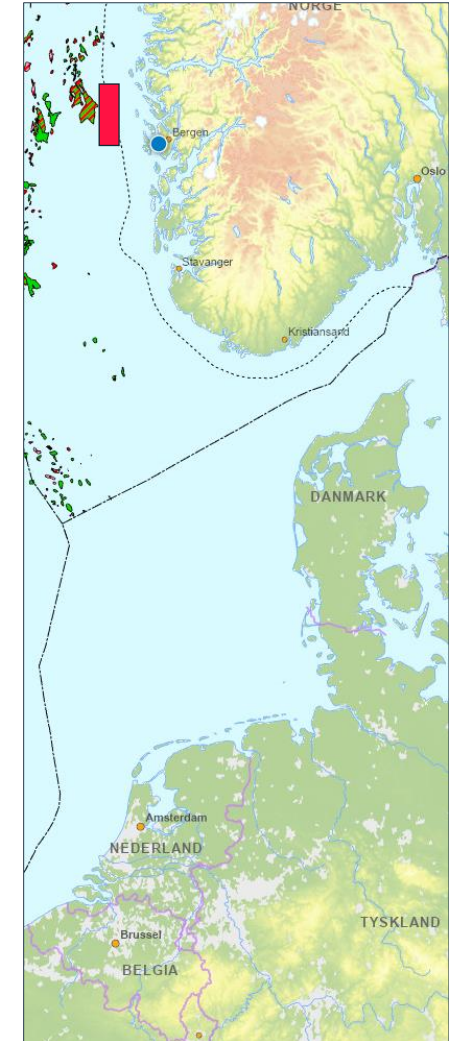
- The “Smeaheia” CO<sub>2</sub> storage license awarded Equinor in April 2022
- 20 Mtpa storage potential
- A CO<sub>2</sub> pipeline can **reduce cost for transport by more than 50%** compared to what offered today

## A European CO<sub>2</sub> trunkline

- Urgent need to accelerate development of European CO<sub>2</sub> transport and storage capacity
- Equinor partnering with Wintershall DEA and Fluxys to develop CO<sub>2</sub> pipeline systems (see map)
- Capacity to transport 20 to 40+ Mtpa
- Operational before end of this decade (ambition)



Map indicating position of Smeaheia





«Most people are talking about a low-carbon future, but we are building it here and now»

Sverre J. Overå, Project Director, Northern Lights

