Upscaling of CCS in Denmark

-risks and challenges of upscaling the CCS value chain

DTU Offshore

26 May 2025 - Rungstedgaard

DANSK

OFFSHORE

Why CO_2 should be stored in Danmark?

- CCS is crucial for DK to achieve its own climate goals in 2030, 2045 and 2050.
- Denmark can contribute to Europe becoming climate neutral with use of CCS. And Denmark is close to some of Europe's largest point emitter of CO_2 (Germany, Baltics)
- Denmark's subsoil is particularly suitable for storing CO_2 (onshore and offshore)
- DK has a strong know-how from the oil & gas industry
- The NZIA has already mandated that Danish oil & gas firms shall have storage capacity of above 4 mio. tons. In 2030.

But the challenge is immense, due to high CAPEX and many initial risks when building the value chain.

CCS in Denmark is only going to be a success, if large scale CO_2 storage is established, including infrastructure that supports large scale in all of Europe.

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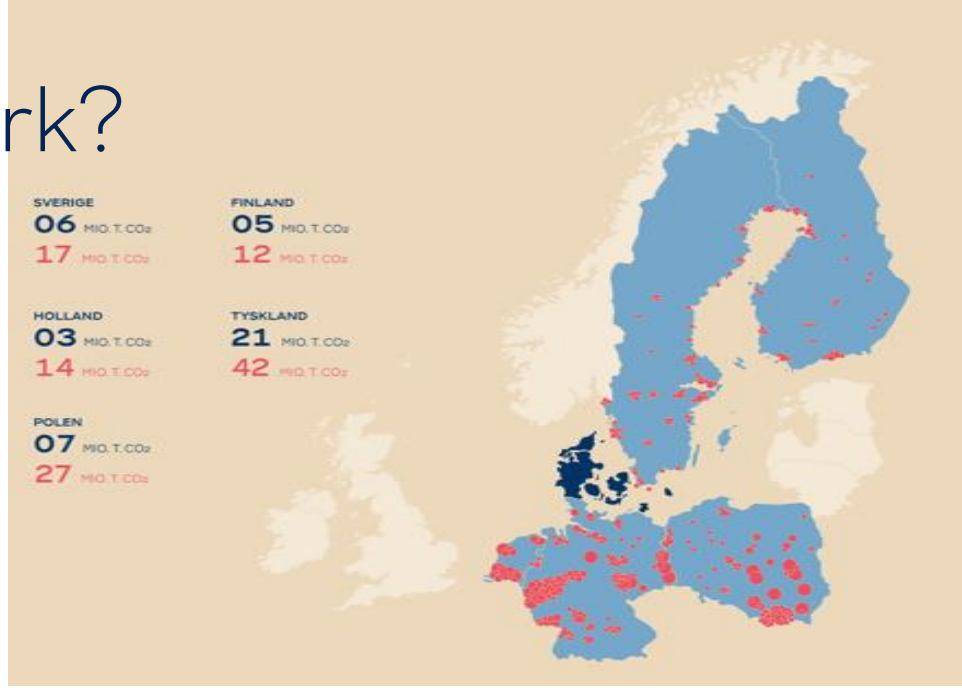
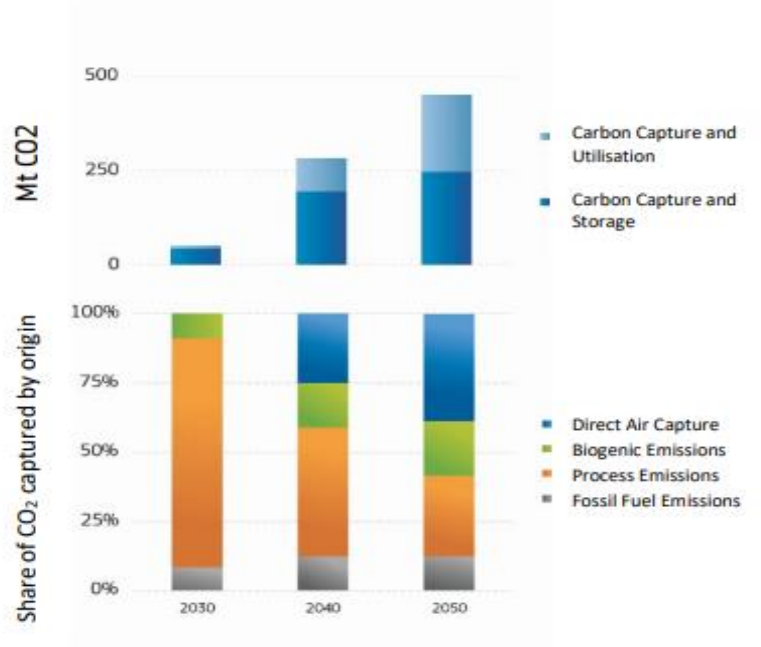


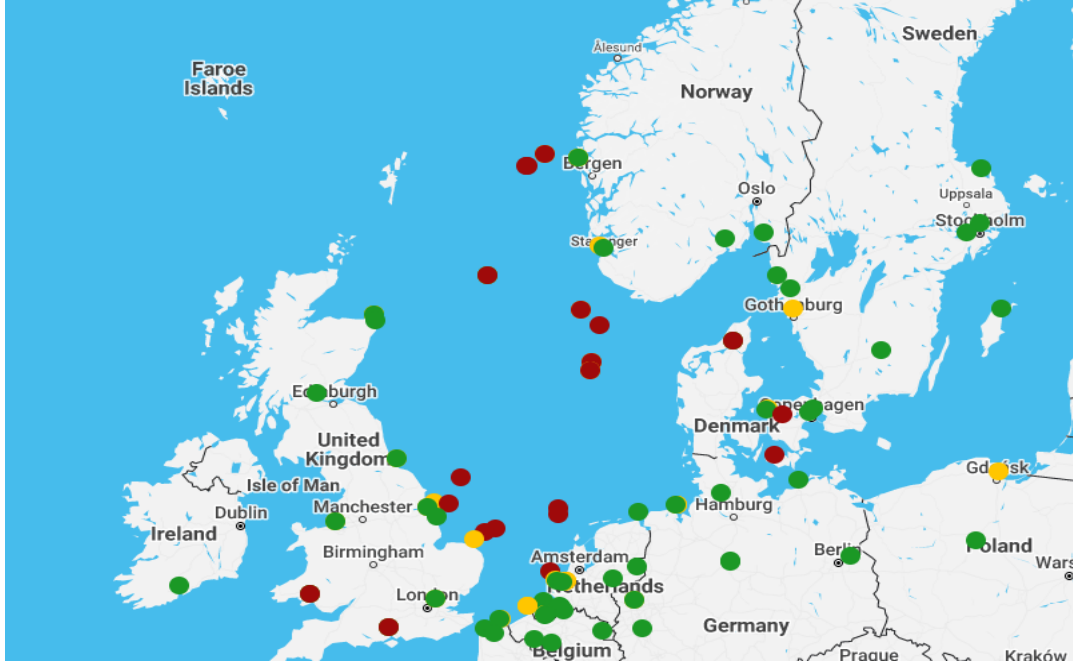
Source: Dansk Offshore , 2023



Source: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2024:62:FIN

How do we build an internal market for CCS?

- Requires implementing of the initiatives in the "Industrial Carbon Management Strategy" from the EU Commission *as fast as possible*.
- We need a strong **regulatory package.** Areas to cover could e.g. be:
  - Cross border transport of CO_2 shall be seamless
  - Standards for processes in place – e.g. for subsoil plume detection, transport of CO_2, HSE etc.
  - Certificates should be in place - EU ETS should be revised to account for storage of biogenic CO_2 too; certificates of origin should avoid separate transport systems.
  - Denmark's chair in EU 2025 will be key
- We need help to **financially derisk infrastructure**:
  - What? **Backbone infrastructure** (transmission pipes onshore, terminals, intermediate storage etc.) and **initially** also (like in the DK) trough entire value chain subsidies.
  - Why? To mitigate the high **initial risks** and **CAPEX** to build a European market.



Source:
https://iogpeurope.org/wp-content/uploads/2025/05/CO2-Storage-Projects-in-Europe-map_May25.pdf

EUROPEAN COMMISSION

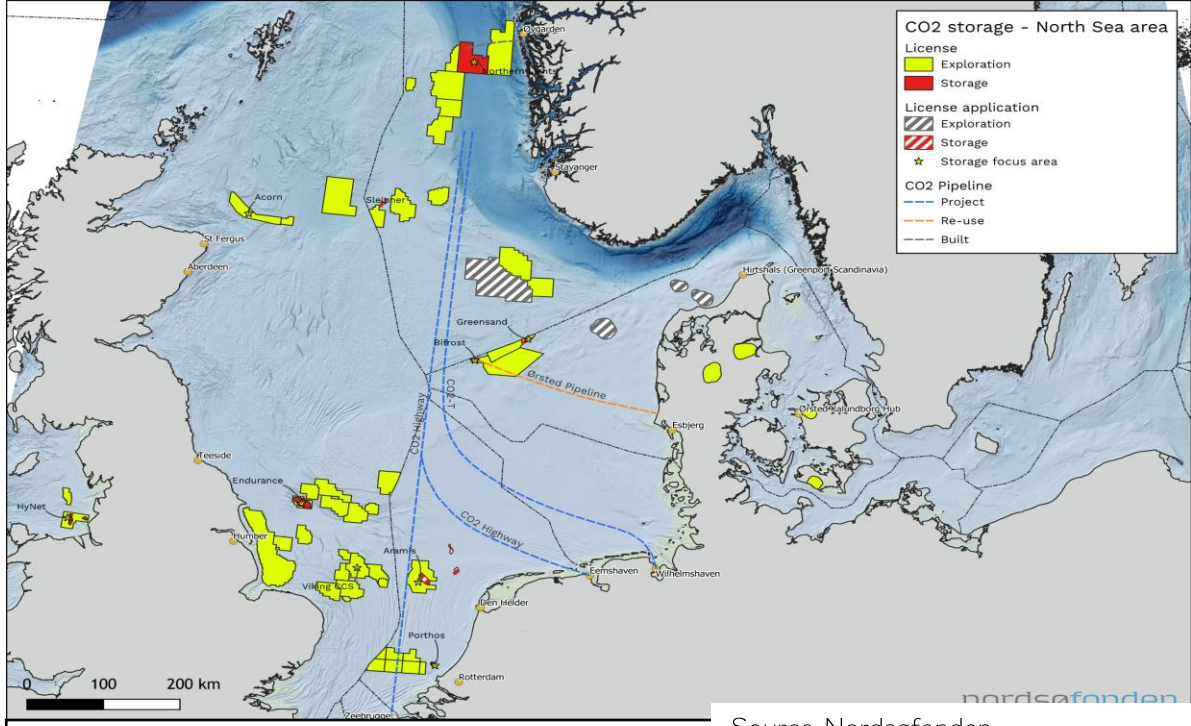
Strasbourg, 6.2.2024
COM(2024) 62 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

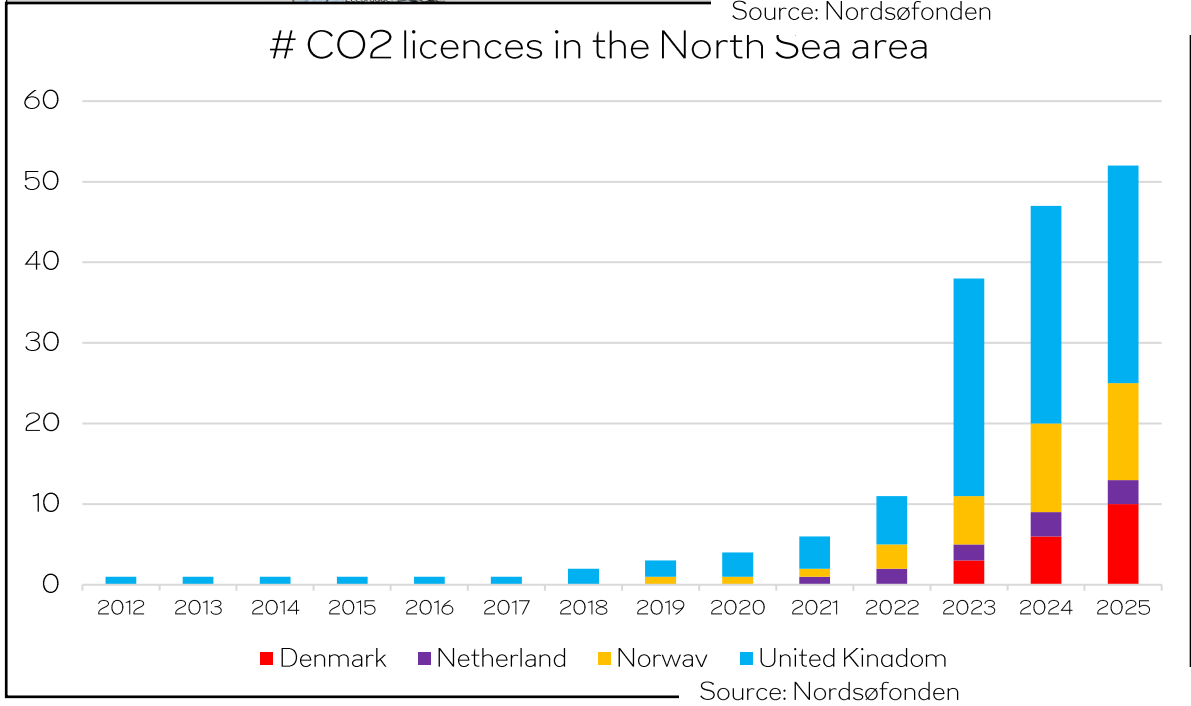
Towards an ambitious Industrial Carbon Management for the EU

Will we see a new European industry?

- Over 50 licenses in Northern Europe, 1 is operational
- Denmark is amongst first movers, when it comes to being operational – but between 2026 and 2030, well over 20 mio. tons in storage capacity becomes operational.
- Significant capacity will thus be added in Northern Europe before we see Denmark's "ketchup effect" coming in 2030.
- The conclusion is therefore that even though Denmark is a "first mover", significant CO2 storage capacity will be added in Northern Europe between 2027 and 2030.
- This can lead to greatly increased competition for CO2, unless the capture and transport capacity is not also scaled up as well.



Source: Nordsøfonden



Source: Nordsøfonden

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Dansk Offshore – who are we?

Oil, gas and CO_2-storage licensholders

nordsøfonden

BlueNord

TotalEnergies

INEOS

Harbour Energy

DANOIL EXPLORATION A/S

Ørsted

equinor

Supplier Industry members

SEMCO maritime

NHV

AOF

NorSea

ALTRAD

DTU

BEL AIR

MAERSK TRAINING

ACTEMIUM

RAMBØLL

RelyOn

SDU

ETS ESBJERG TUBULAR SERVICES

PLESNER

International Procurement Service

randstad

BUREAU VERITAS

INTERNATIONAL SOS WORLDWIDE REACH. HUMAN TOUCH.

Q-STAR ENERGY

Welltec

Elmann

MOURITSEN

MitKursus.dk

M.

WSCO

AMU vest

DNV·GL

COPCO

martec 57°25'7N, 010°30'3E MARITIME AND POLYTECHNIC COLLEGE

Rybners UDDANNELSER

OSM

EMERSON.

EXPLICIT emissions data

HALLIBURTON

EMS engineered market solutions

Roxtec

Schlumberger

I·K·M

KPMG

ERHVERVS AKADEMI SYDVEST

MAERSK H2S SAFETY SERVICES

Lubbers logistics group

DDHS Danish Drugtest & Health Services

FOGA Consult ApS

EY Building a better working world

Caverion Building Performance

HOLBERG international incident investigation

pwc

SCORE DANMARK A/S

GLOBAL GRAVITY

KEY WEST DENMARK

HEAD ENERGY

HORTEN

TEKNOLOGISK INSTITUT

Danske Andelskassers Bank A/S

Weatherford

YOU'LL NEVER WORK ALONE JAK

Adapteo.

ABB

Swagelok

Sydbank

LE34

FMS

ESBJERG HAVN

SIMAC

NORTHERN partners

TRANEMO ADVANCED WORKWEAR

BLUE WATER SHIPPING

ARBEJDSMILJØEksperten