

Norway's role in accelerating CO₂ transport and storage in Europe

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CARBON LIMITS

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A little bit of politics..

CARBON LIMITS

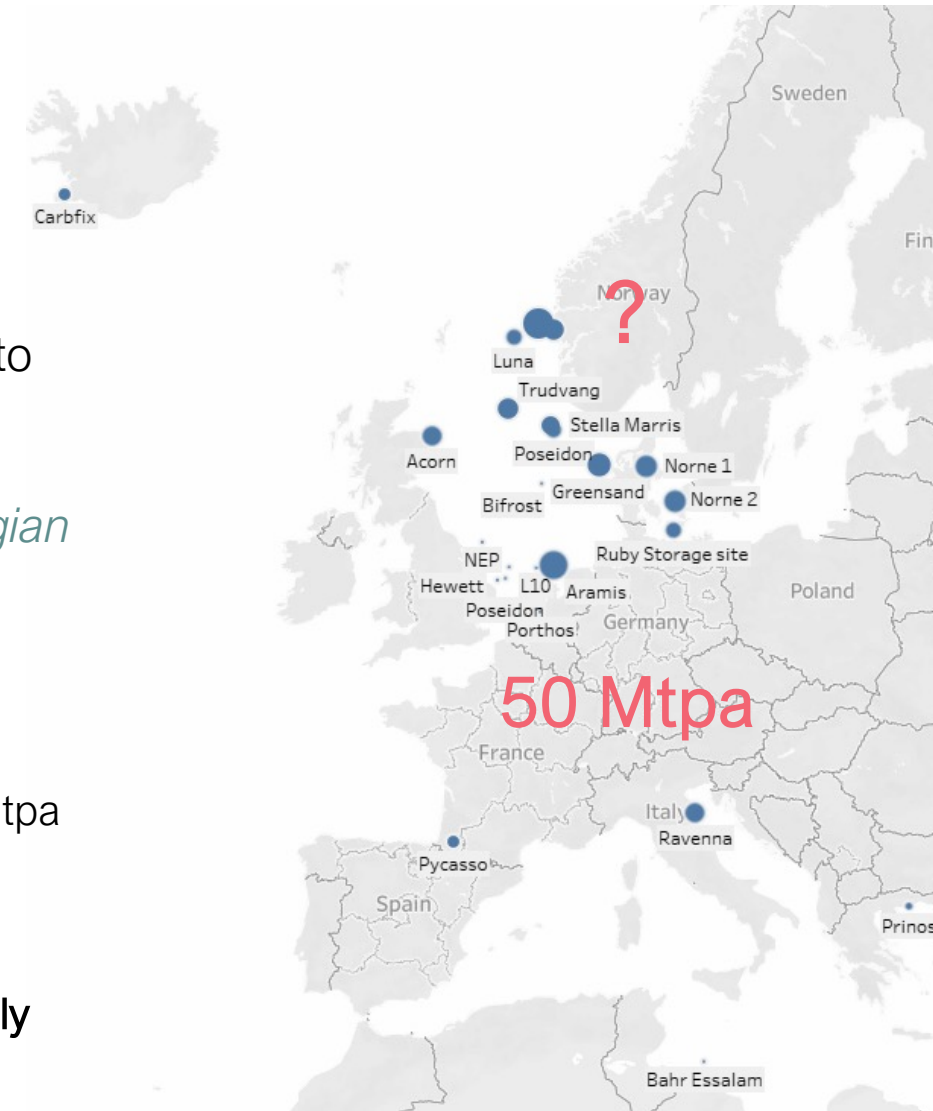
- The Net-Zero Industry Act -

50 Mtpa injection capacity target by 2030, ~280 Mtpa by 2040 and ~450 Mtpa by 2050

- Hearing in Norway on the possible **incorporation** of NZIA into the EEA agreement

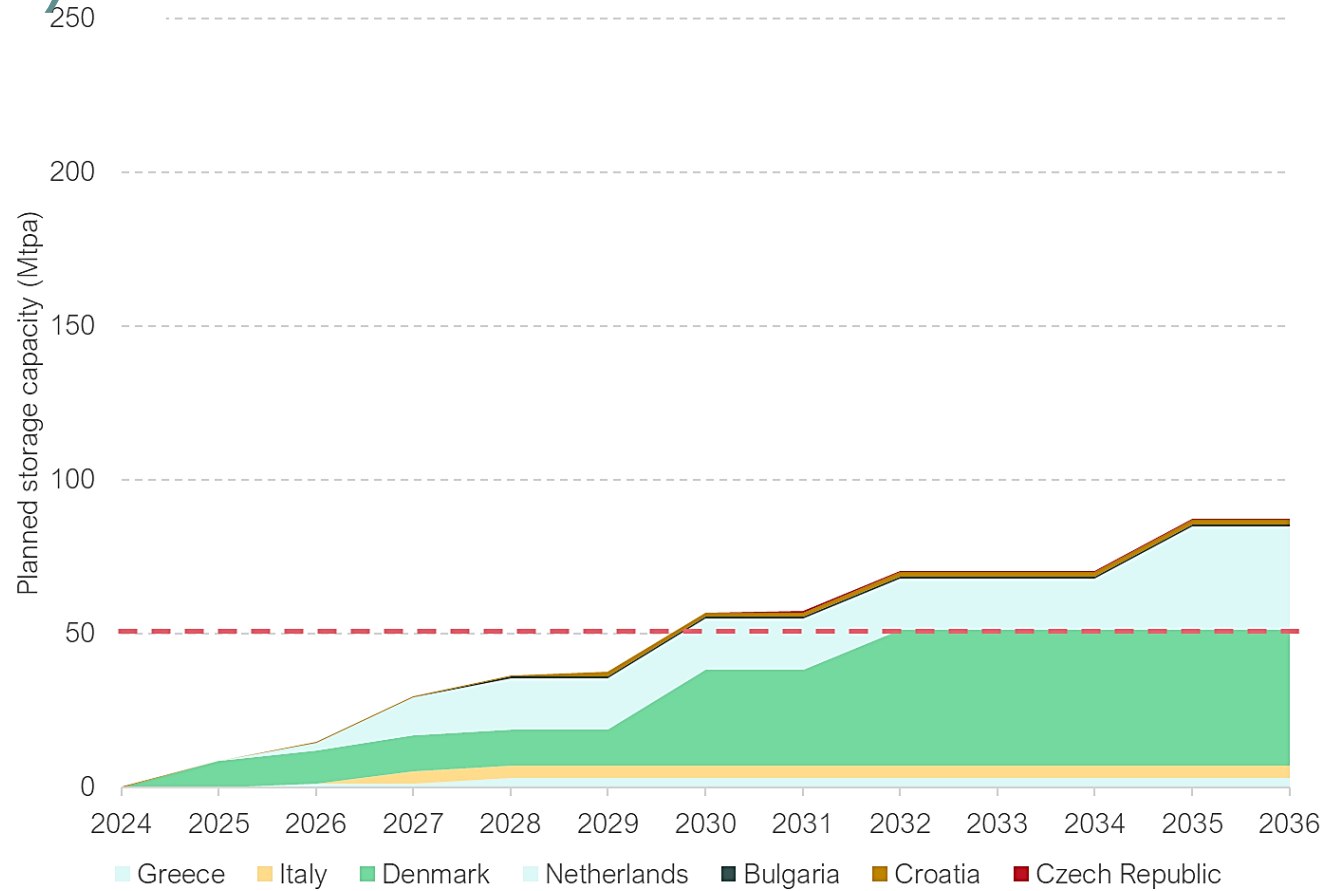
↳ *What would be the consequences for the Norwegian stakeholders?*

- Some of the concerns if NZIA is incorporated into the EEA agreement:
 - Should Norway's commitment be an **addition** to the 50 Mtpa target?
 - Should the Norwegian oil and gas companies be exempt from the licensee's injection capacity **obligation**?
 - Concerns about the requirements for making **data publicly available**



Politics aside, the planned storage capacity in the EU barely reaches 50 Mtpa in 2030 (as of March 2024)

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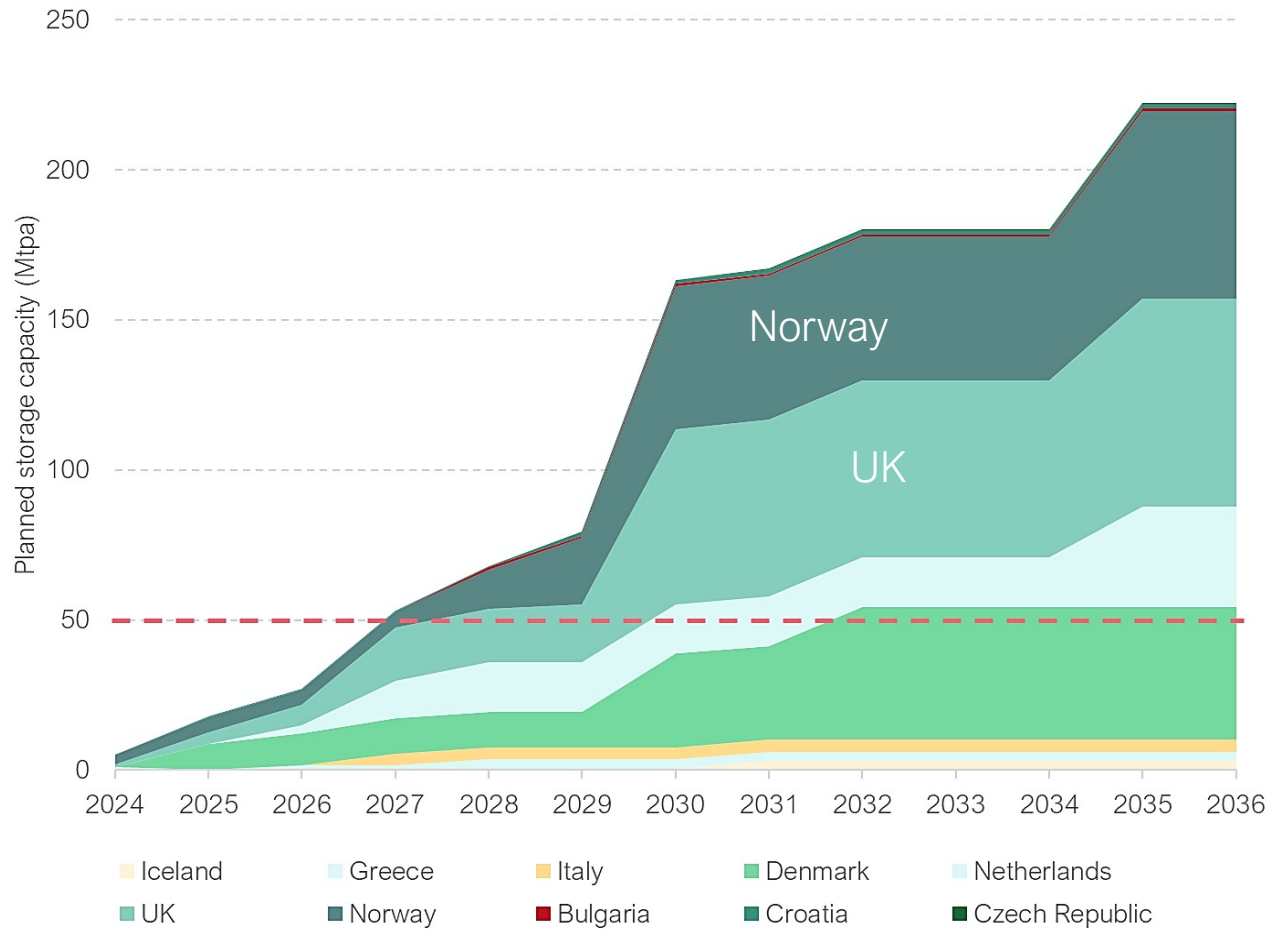


Source: Carbon Limits 2023, 2024

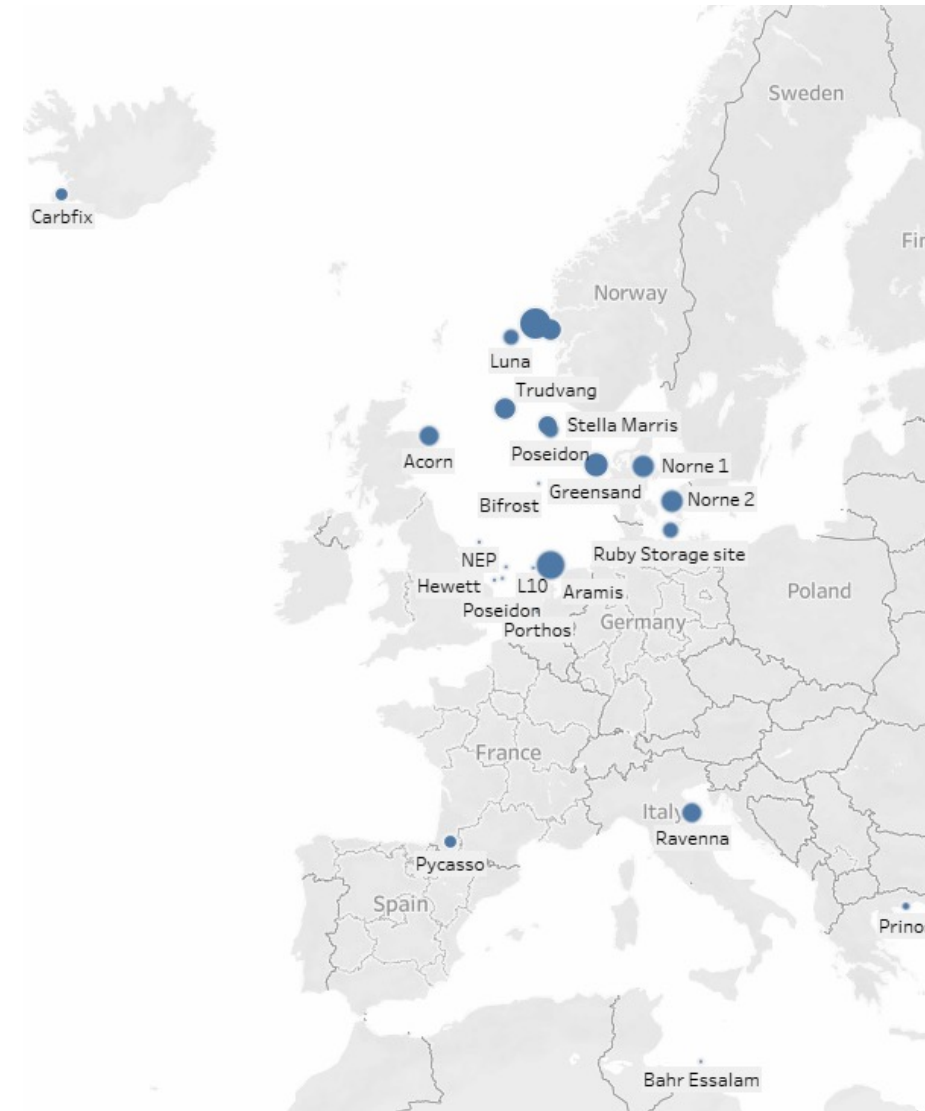


EU would need Norway and the UK to meet the climate target of 50 Mtpa stored by 2030

CARBON LIMITS



Source: Carbon Limits 2023, 2024



Source for the data behind the graph - <https://iogpeurope.org/wp-content/uploads/2024/03/Map-CO2-Storage-Projects-in-Europe.pdf>

Longship is Europe's first complete value chain for the capture, transport, and storage of industrial CO₂ emissions.



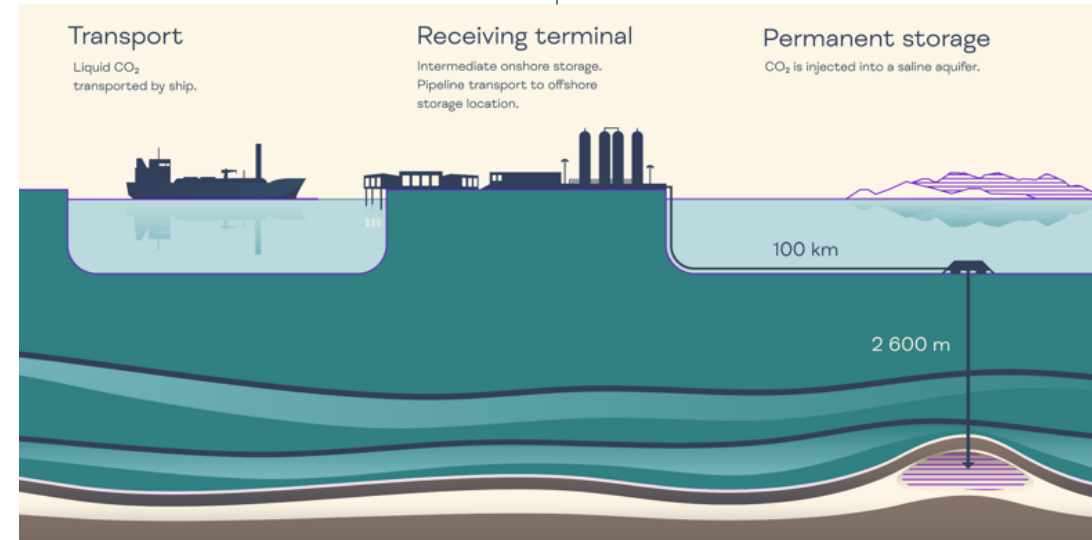
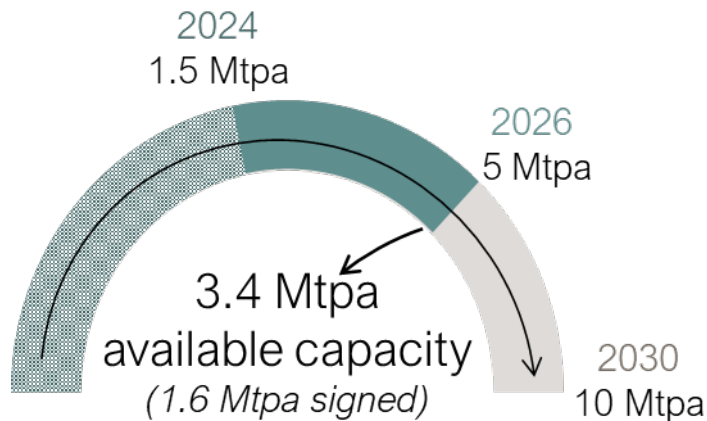
- Launched in 2020 and approved in 2021
- Cooperation between the Norwegian state and government agencies, R&D institutions, academia and the industrial partners
- CO₂ sources:
 - Cement factory - Breivik CCS
 - Hafslund Oslo Celsio's waste incineration plant
- Liquefied CO₂ collected by ships, transported to an intermediate storage facility in Øygarden, and stored in the North Sea - 2600 meters below the seabed
- The total cost estimate for Longship is approximately 2.6 billion USD and the government's share of the costs is estimated at 1.7 billion USD

Focus on Northern Lights - a CO₂ transport and storage service provider

Norwegian North Sea



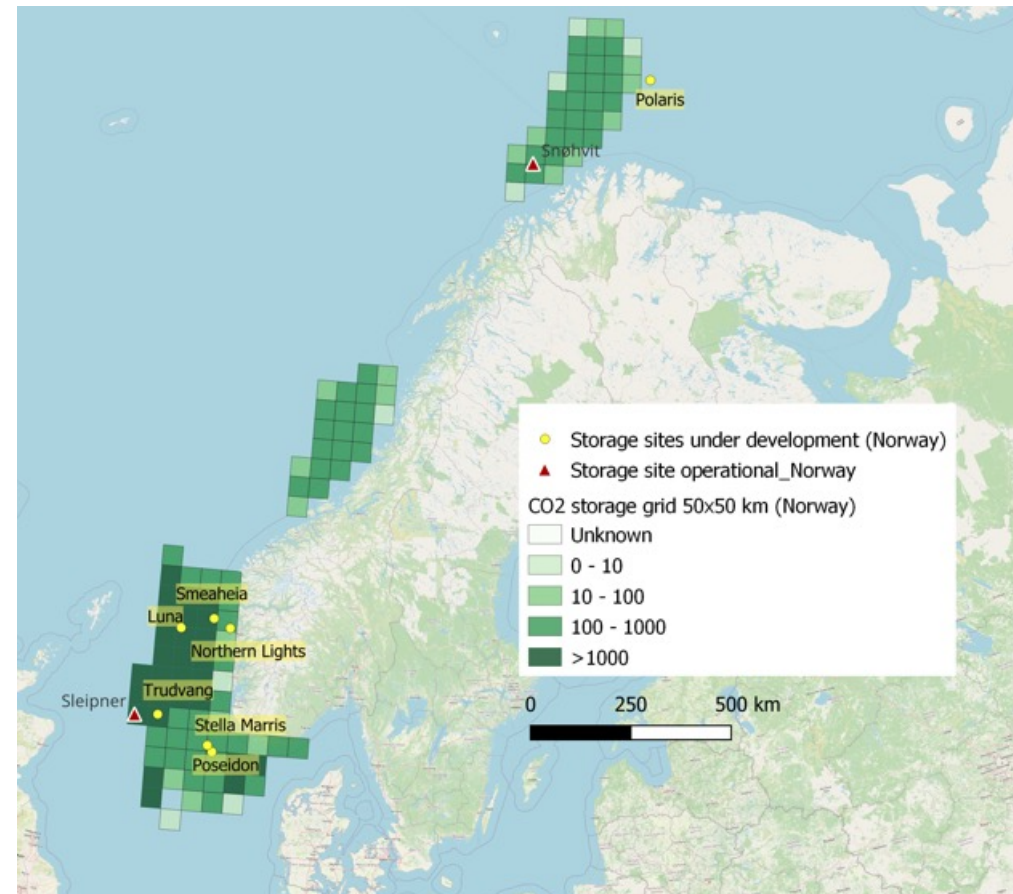
- Status: Under construction (planned operation – early 2025?)
- Support to Northern Lights – NOK 10.4/14.2 bn
- Long-term customer contracts:
 - Yara in Netherlands (ammonia production in Sluiskil)
 - Ørsted in Denmark (CHP)





CO₂ theoretical storage capacity estimates on the Norwegian shelf range from 29 - 86 GtCO₂

CO₂ storage capacity on the Norwegian continental shelf and planned CO₂ storage projects



Source: Carbon Limits based on <http://www.geology.cz/geocapacity>, <https://www.npd.no/en/facts/publications/co2-atlases/co2-atlas-for-the-norwegian-continental-shelf/>, <https://gassnova.no/en/news/safe-carbon-storage>

Dynamic storage development in Norway

The Norwegian Continental Shelf offers significant opportunities for the injection and storage of CO₂ and the government has launched several licensing rounds related to CO₂ storage.

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Exploitation license

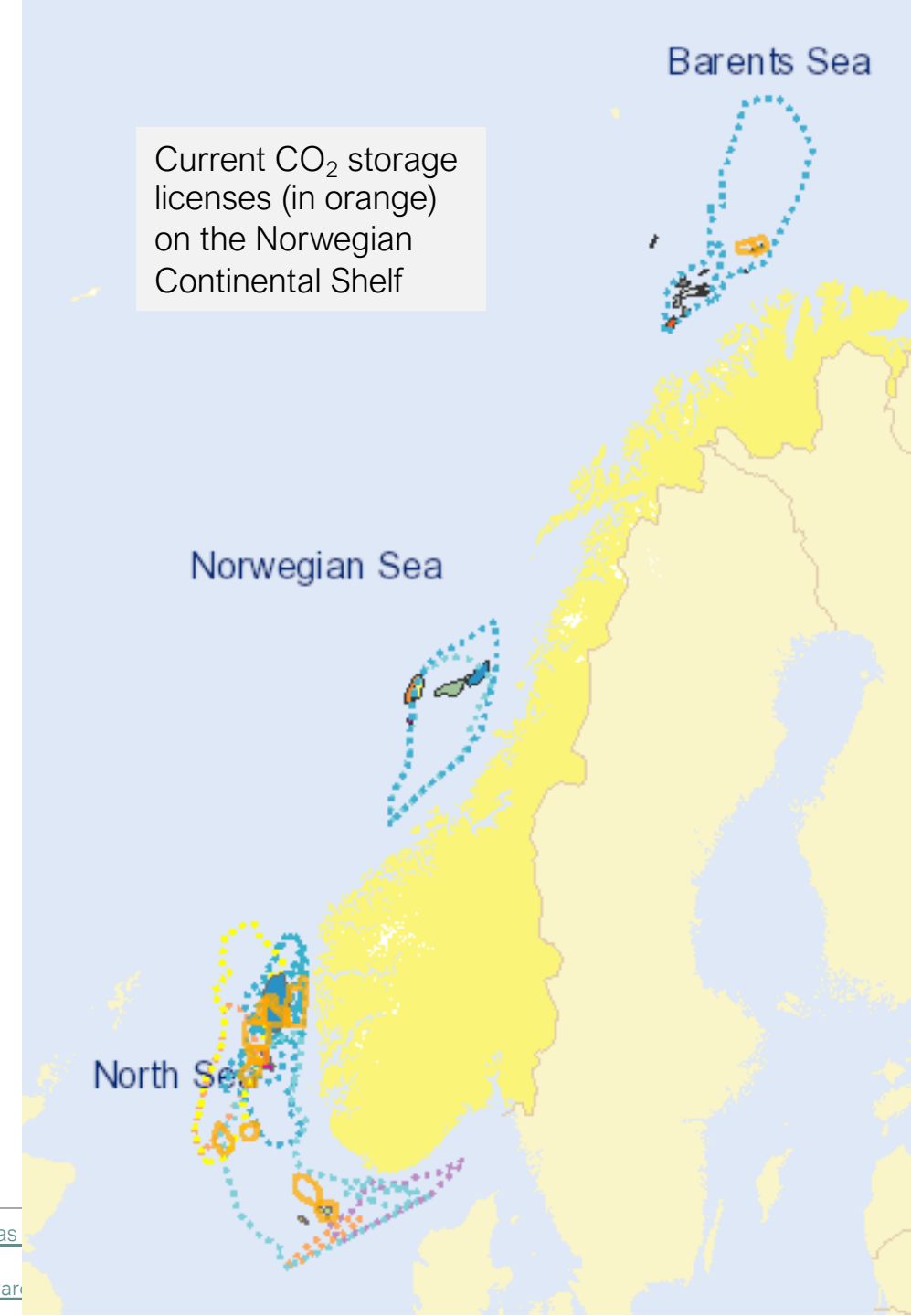
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Exploration licenses

In 2024, exploration licenses for CO₂ storage in 4 areas in the North Sea have been awarded to 6 companies

Latest call for CO₂ storage exploration licenses was launched in June 2024 (3 areas) and was closed on August 29th

Possible CO₂ storage sites on the Norwegian shelf, Norwegian Offshore Directorate [NOD - CO2 Storage Atlas](https://www.offshore-energy.biz/norways-energy-ministry-launches-seventh-call-for-co2-storage-licenses/#:~:text=So%20far%2C%20seven%20licenses%20have,fifth%20time%20acreeage%20was%20awar)
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More transport infrastructure is needed

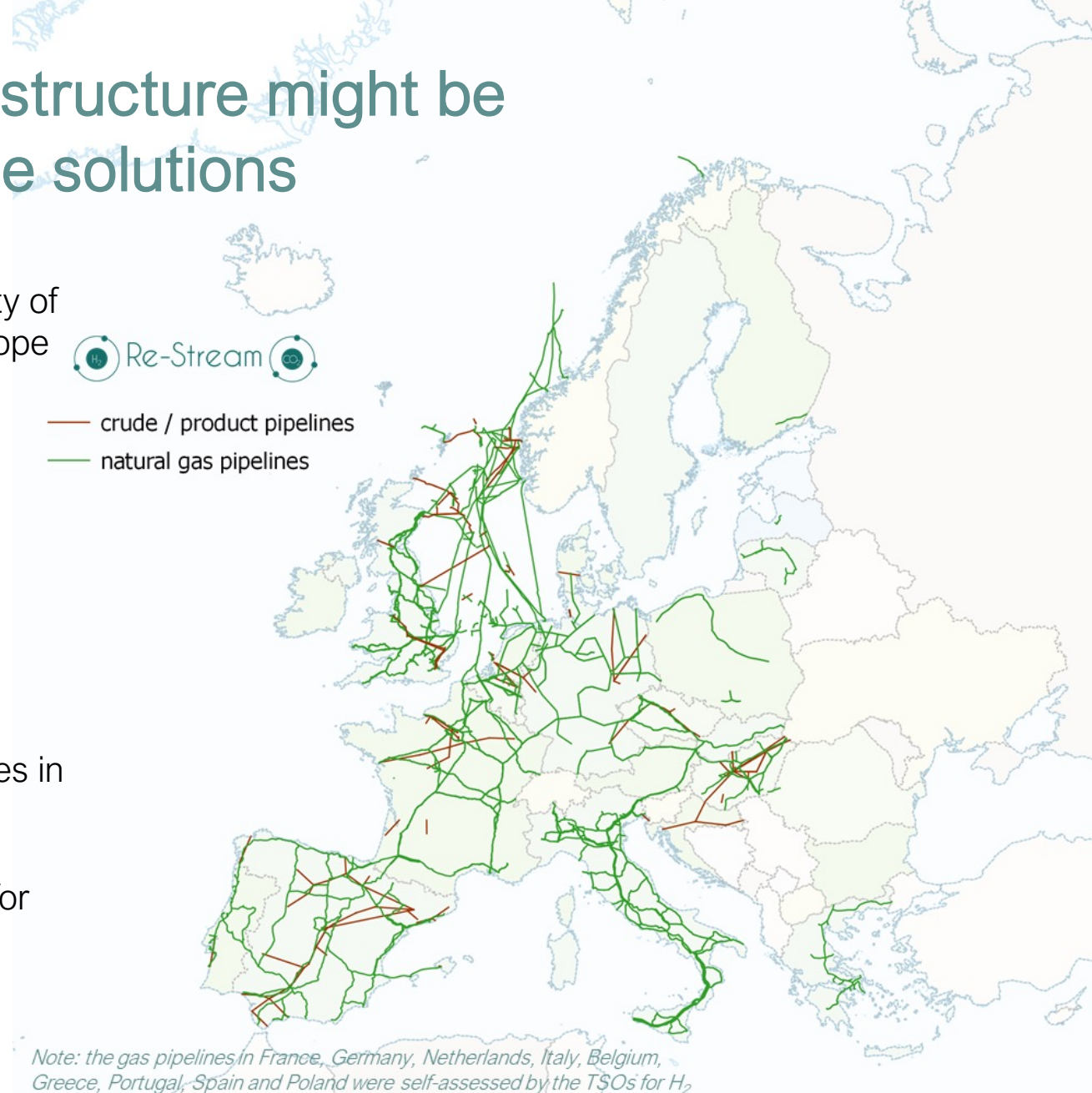
Pipelines are the best?

- As of today, Norway does not have an established CO₂ transport network
 - only one 153 km long CO₂ pipeline that transports CO₂ from LNG processing plant to an offshore injection site at Snøhvit gas field
- Most of the planned CCS projects in Norway are building their infrastructure from the ground up, with CO₂ storage hubs onshore (for most cases)
- Norway is the first mover when it comes to cross-border CO₂ transport for storage, with ships being the transport solution for the first projects
- For large amounts of CO₂ being transported to Norway, pipelines should be a cheaper solution
- In some cases, depending on project specification, it might be possible to:
 - Repurpose the existing oil and gas infrastructure for CO₂ transport



Repurposing of the existing infrastructure might be considered as one of the possible solutions

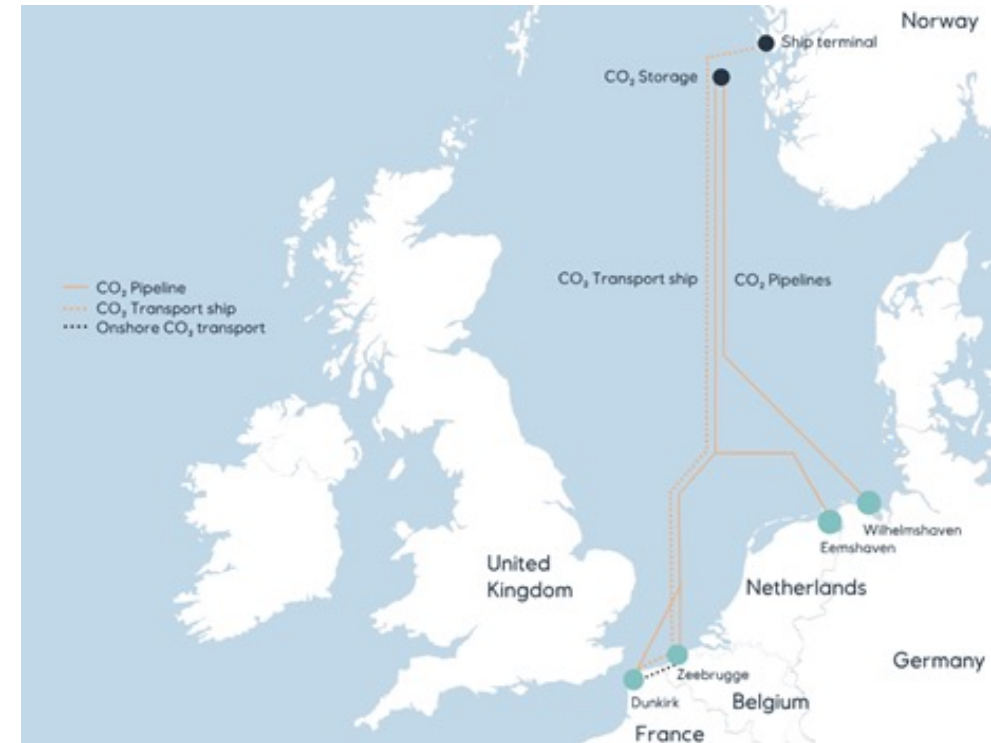
- 2021 Re-stream study investigated the possibility of reusing existing oil and gas infrastructure in Europe for CO₂ transport
- Data collected from 65 pipeline operators and analysed for ~58,000 km pipelines
 - 50% total offshore pipeline length
 - 30% onshore oil and gas pipelines length
- The study concluded that majority of the pipelines in Norway can be retrofitted for CO₂.
- However, these pipelines are and will be in use for some decades (?) to come



Investing in new infrastructure is another solution

Example - CO₂ Highway Europe pipeline

- Project developer – Equinor
- The pipeline would connect North-West Europe with the CO₂ storage sites in the North Sea
- Planned capacity – 30-50 Mtpa by 2035
- Part of the EU2NSEA project of common interest (PCI) - European cross-border CO₂ pipeline network
- Project development agreement (PDA) with GRTgaz (France) signed in 2024 and an agreement with Fluxys (Belgium) signed in 2022
- The FID is expected in 2025. However, it will depend on the emitters being able to take their FIDs pretty much at the same time





To conclude...

So far, Norway has been the first mover in developing large scale CO₂ transport and storage solutions in Europe

As such, Norway can play a significant role in unlocking and scaling up CO₂ transport and storage in Europe, as long as...



To conclude...

So far, Norway has been the first mover in developing large scale CO₂ transport and storage solutions in Europe

as long as...

- the CCS value chain stakeholders stop “sitting on the fence”
- governments ensure strong long-term incentives and predictability

Thank you for your attention!



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