



Accelerating decarbonisation

**NORTHERN LIGHTS DELIVERS CO₂ TRANSPORT
AND STORAGE AS A SERVICE.**



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What is Northern Lights?

Northern Lights is developing the world's first cross-border, open access CO₂ transport and storage network. It will help Europe's industrial emitters to reduce emissions by providing flexible ship-based transport and permanent geological storage for captured CO₂ offshore Norway.

Capturing and storing CO₂ will help European industry increase their competitiveness through the energy transition, retain and potentially create new jobs.

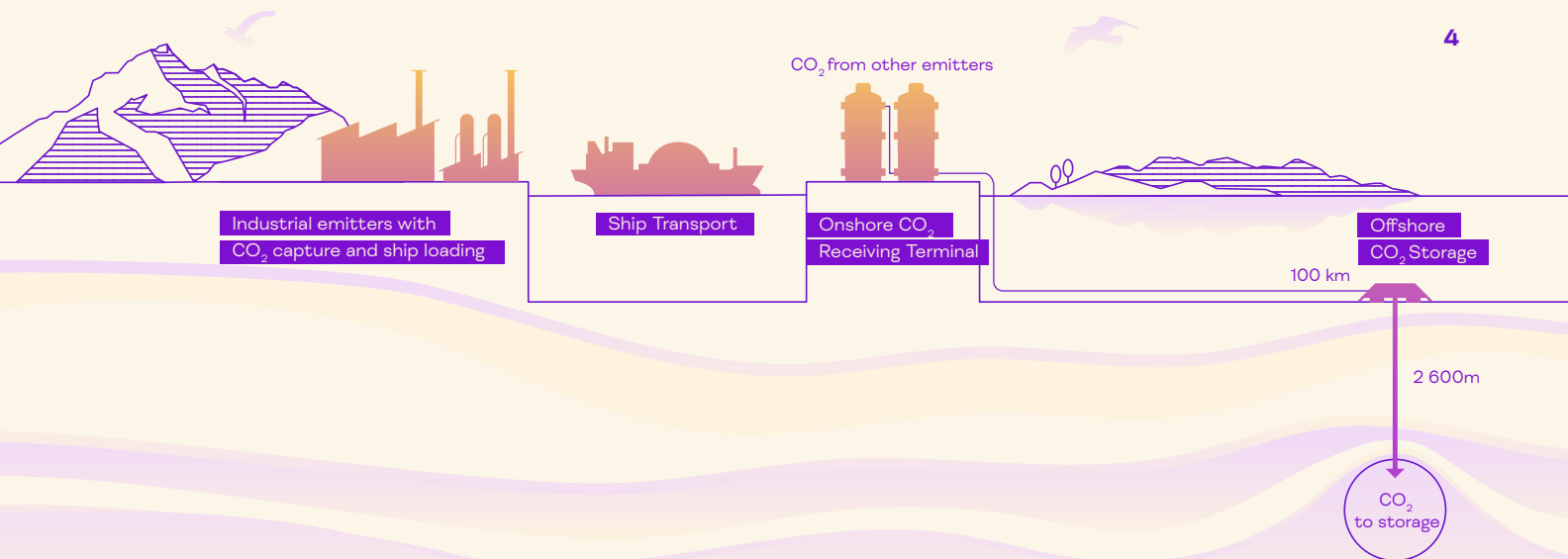
Northern Lights is an independent joint venture company, drawing on the technical competence of its owners, Equinor, Shell and TotalEnergies. It is the transport and storage component of Longship, the Norwegian Government's full-scale carbon capture and storage project, and its services are open to European industry.

WHY NORWAY?

Norway has safely stored CO₂ deep under the North Sea for over two decades. It is a world leader in carbon capture and storage, building on a wealth of industrial knowledge and technological expertise from its experience in oil and gas. It also has a strong regulatory framework that supports clean technologies.

Norway's Longship project aims to contribute to national CO₂ reduction targets and establish a new value chain and ecosystem around CO₂, facilitating low carbon energy for the future – in Norway and around the world.

The Norwegian government is funding a significant part of the first phase of infrastructure development to demonstrate the potential in using carbon capture, transport and storage technology to decarbonize industry and to kickstart a commercially viable CO₂ transport and storage industry that can scale up as needed. It has explicitly opened access to European industry, will share knowledge and encourage EU member states to replicate its efforts.



HOW DOES IT WORK?

- The industrial emitter captures emissions at site, processes the CO₂ to meet quality specifications, liquefies it and transports it to a jetty.
- Northern Lights collects the CO₂ using newly designed ships, based on standards used for transporting liquified petroleum gas, and takes it to Norway.
- The CO₂ receiving terminal is located in Øygarden on the west coast of Norway. Construction started January 2021. Here there is a temporary buffer storage facility onshore and a 100 km pipeline to the offshore location where the CO₂ is injected in to a saline reservoir 2.6 km under the seabed for permanent storage.
- Rather than using an offshore platform, the injection infrastructure will be installed on the seabed, 300 m below sea level.
- The permanent CO₂ storage is regulated and monitored under both the EU and Norwegian CO₂ storage directives, as part of license EL001 granted by the Ministry of Petroleum and Energy.

WHEN CAN WE START SENDING CO₂?

Phase one of the project will be ready by mid-2024, with a capacity of up to 1.5 million tonnes of CO₂ per year. Our ambition is to expand capacity to over 5 million tonnes per year in Phase 2. The timing of the expansion will depend on market demand in Norway and Europe, and commercial viability.

Both phases will offer flexibility to receive CO₂ from European sources, in addition to the 800,000 tonnes of CO₂ per year, which will come from Longship, assuming both of the initial Norwegian capture projects are realised.

IS CO₂ STORAGE SAFE?

The Northern Lights JV owners, Equinor, Shell and TotalEnergies, have stored and closely monitored CO₂ in Norway and internationally for several decades without incident. That is why the Norwegian government is ready to import CO₂ from Europe and demonstrate the safety and viability of CO₂ storage as a climate solution.

The CO₂ is injected as a liquid into a sandstone reservoir saturated with salt water. The CO₂ is trapped in rock pores where it dissolves in the water and mineralises over time. Injected CO₂ migrates and accumulates below the caprock while reservoir pressure is increasing. Pressure build-up and CO₂ migration are constantly monitored. CO₂ cannot leak out of the rocks, even at higher pressures, given the 2.6 km of rocks above it.

HOW COULD POLICY ACCELERATE DEVELOPMENT?

In 2019 Northern Lights was awarded status as a Project of Common Interest (PCI) under the Trans-European Network for Energy (TEN-E) regulation. This PCI consists of 17 partner companies across seven European countries. As Europe looks to accelerate decarbonisation options, we see the following opportunities to accelerate cross-border CO₂ storage:

- Recognise multiple CO₂ transport methods apart from pipeline networks. The EU emissions trading scheme (EU ETS) does not include CO₂ transport methods such as ships, barges, rail and trucks in its monitoring regulations.
- The EU-ETS and the ongoing revision of the Trans European Networks for Energy (TEN-E) should recognise these modes of cross border CO₂ transport.
- Consider funding CO₂ storage as part of TEN-E, where this is part of cross-border supply chains.
- Further develop the EU ETS to encourage high-quality investments in CO₂ removal through geological storage.
- Consider incentives to promote standardisation of CO₂ shipping to facilitate interoperability within the European CCS system.

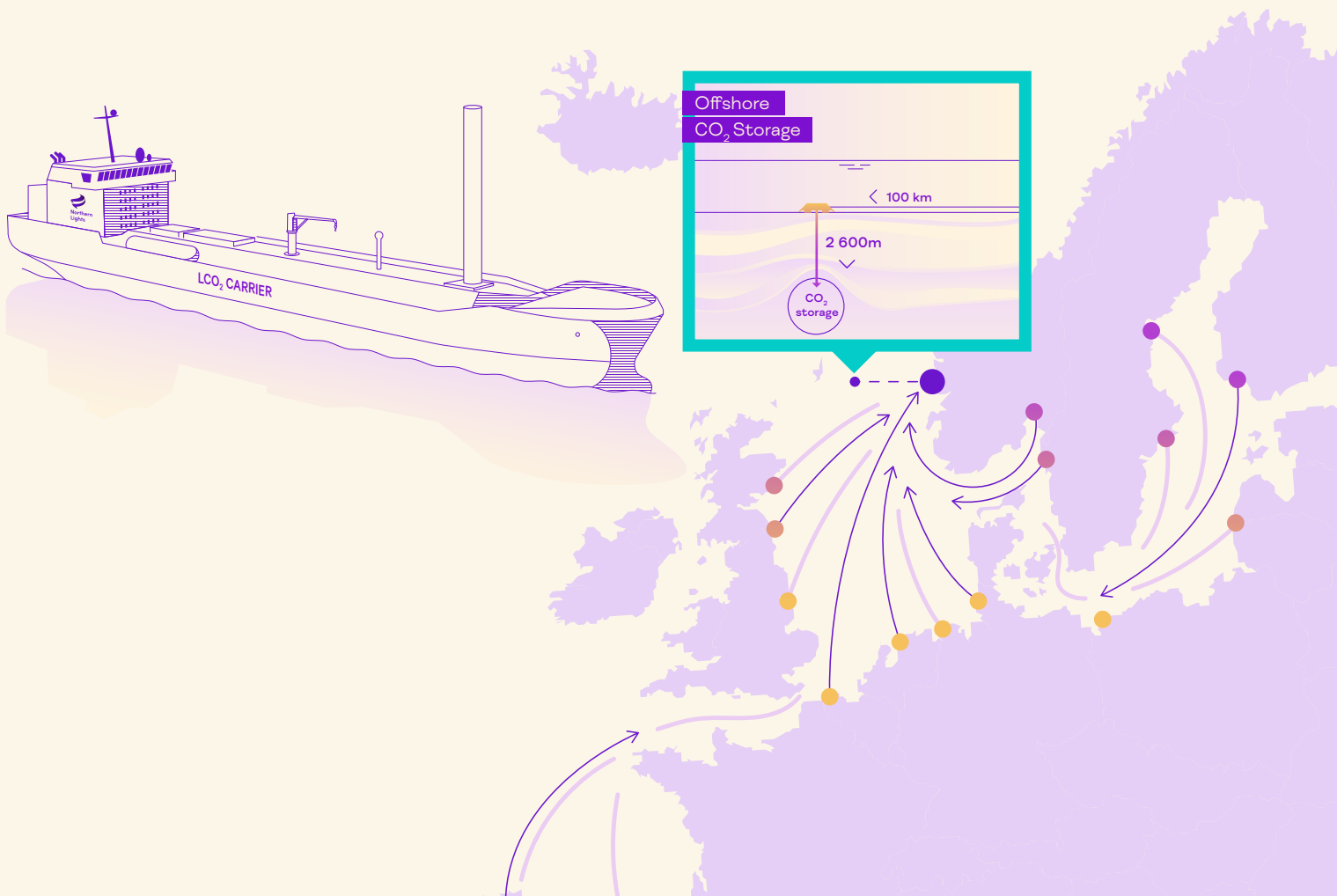
Northern Lights offers companies across Europe the opportunity to store their CO₂ safely and permanently underground in Norway. It will be the first ever cross-border, open-source CO₂ transport and storage infrastructure network

BØRRE JACOBSEN
MANAGING DIRECTOR



KEY FACTS

Start operations	2024
Start -up capacity	1.5 million tonnes per year
Location onshore receiving terminal	Øygarden, west coast of Norway
Location geological storage	100 km offshore, 2.6 km below seabed
Water Depth	300 m
CO ₂ Monitoring	4D seismic, mandatory in regulations
Timing of expansion to 5 million tonnes per year	Depending on market demand and commercial viability
Target customers	Cement, waste-to-energy, steel, refineries, chemicals, fertilisers, bioCCS and Direct Air Capture





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