

COUNTRY	CO ₂ STORAGE CAPACITY	COST
NORWAY	1.5 MtCO ₂ /YEAR IN PHASE 1	NOK 25.1 BN (€2.4 BN)

The Longship project: CCS to decarbonise heavy industries

In 1996, Statoil, the Norwegian state-owned oil company, launched the first commercial carbon capture and storage (CCS) [project](#) to decarbonise the natural gas it produces¹. By 2015, 15.5 MtCO₂ had been stored underground. In 2012, the largest technology centre for testing CCS technologies ([TCM](#)) was opened in Mongstad, Norway. As early as 2014, Norway developed a strategy for CCS aimed at identifying measures to promote the use of these technologies. Based on this, the Norwegian state-owned company Gassnova conducted a [pre-feasibility study](#) in 2015 which identified several emission sources and carbon storage sites.

Longship: the result of close collaboration between the government, industry and oil companies

In autumn 2020, the government announced the launch of the [Longship](#) project. A collaboration between Gassnova and oil giants Equinor (new name for Statoil), Shell, and Total, the project aims to capture CO₂ from two industrial sources in the Oslo Fjord region: the [Norcem](#) cement plant and a waste incineration plant in Oslo, the [Fortum Oslo Varme's CO₂ capture project](#). In 2019, the global cement industry emitted 2.3 GtCO₂, i.e., around 5% of global emissions. Phase 1 of the Longship project will see the installation of CCS infrastructure at German cement giant HeidelbergCement's [Norcem](#) plant in Brevik. In 2013, the plant set a goal of becoming the [first](#) net zero cement plant in the world by 2030. In 2019, Norcem alone emitted [900,000 tCO₂](#); the company wants to build an infrastructure capable of capturing 400,000 tCO₂/year, less than half of its emissions. Construction of the project is due to start in autumn 2022, with commissioning expected in 2024. Total investment and operating costs over ten years are estimated at €2.4 billion. The Norwegian government, which is committed to reducing its national emissions by 50-55% by 2030 compared to 1990, is investing [€1.6 billion](#), more than two-thirds of the total project cost.

Northern Lights: The backbone of CCS in Europe

Once captured, the CO₂ will be transported by ship, stored temporarily in Northern Lights's facilities in the Øy garden industrial zone, and then transported by pipeline 100 km off the coast and 2,500 m under the sea via [Northern Lights](#), a huge CO₂ transport and storage project. Led by the three oil companies, it has an initial annual storage capacity of [1.5 MtCO₂](#), with the possibility of increasing this to 5 MtCO₂ depending on market demand. In December 2020, the three companies [decided](#) to invest in the Northern Lights project (NOK 6.9 billion, or €680 million), closing the study phase in which they were involved. The Northern Lights project also paves the way for the production of blue hydrogen, facilitating its production from natural gas with CCS. Equinor, for example, is already producing blue hydrogen in Hull, England as part of the [Zero Carbon Humber](#) CCUS project. Northern Lights aims to capture emissions from the ArcelorMittal

group's steel plants in Dunkirk, Hamburg and Fent, the Preem refineries in Lykesil and Gothenburg in Sweden, and eventually more than [21](#) companies across Europe. The [first office](#) opened in September in the port city of Stavanger.

As part of the first phase of the CO₂ transport and storage, Northern Lights is building two CO₂ carriers, designed to transport liquid CO₂ with a cargo size of 7,500 m³ and a length of 130 meters. These ships will be built by Dalian Shipbuilding Industry Co., Ltd, and will use LNG as their primary fuel. The ships will also be equipped with a wind assisted propulsion system and air lubrication to reduce carbon intensity by approximately 34% compared to standard systems and are expected to be delivered by 2024.

¹ The gas contained in the reservoir contained 9% of CO₂, and had to reach a level of 2.5% to meet standards and allow for its export.

IMPLEMENTATION OF CCS ON THE BREVICK CEMENT PLANT

Source: [Euractiv](#), 2019

