

The world's largest cement CO₂ capture facility began operation at Brevik, Norway in June 2025, marking a major milestone in industrial carbon capture. Once captured, the CO₂ is dehydrated, liquefied and then loaded onto CO₂ ships, part of the Langskip transport network. These vessels deliver the CO₂ to a new terminal at Øygarden, where it is held before onward transfer to permanent geological storage under the North Sea.



At a glance

FACILITY:

Brevik CCS

SECTOR:

Cement

LOCATION:

Brevik, Telemark, Norway

OPERATOR:

Heidelberg Materials

COMMISSIONED:

2025

Concrete is, by tonnage, the largest manufactured product industry. In 2024, around 30 billion tonnes of concrete were produced. Included in this were around 4 billion tonnes of cement. The cement sector is a challenging sector to decarbonise, producing up to 8% of global greenhouse gas (GHG) emissions.

Around two-thirds of those GHGs come from unavoidable calcination CO₂, which is a consequence of heating limestone in a kiln that creates Portland cement clinker, the main component of traditional Portland cement. Much of the rest is from fuel combustion to heat cement kilns. The Global Cement and Concrete Association has stated that CCS is critical for cement's decarbonisation¹. The cement industry is working on multiple levers to reduce CO₂ with consistent progress, yet for deep decarbonization CCS is indispensable.

Located on the fjords of southern Norway, the Brevik cement facility has been producing cement for over a century. Today, it can produce around 1 million tonnes per year of cement for the European market.

The Brevik project has benefited from funding by the Norwegian government and Heidelberg Materials, with some support from other European programs and partners. The Brevik capture plant employs "Big Catch"

technology from SLB Capturi. This implements the "Advanced Carbon Capture™" process, using a proprietary amine-based solvent. The technology incorporates heat integration, using waste heat from the downstream CO₂ compressor as well as from the cement process to provide much of the energy needed for the capture system. Indeed, waste heat availability was chosen as the basis for the capture capacity specified.

Downstream of the capture unit, the CO₂ is compressed to a pressure of ~15 atmospheres and liquefied by cooling to -26°C. The liquid CO₂ is temporarily held in a set of dockside storage tanks.

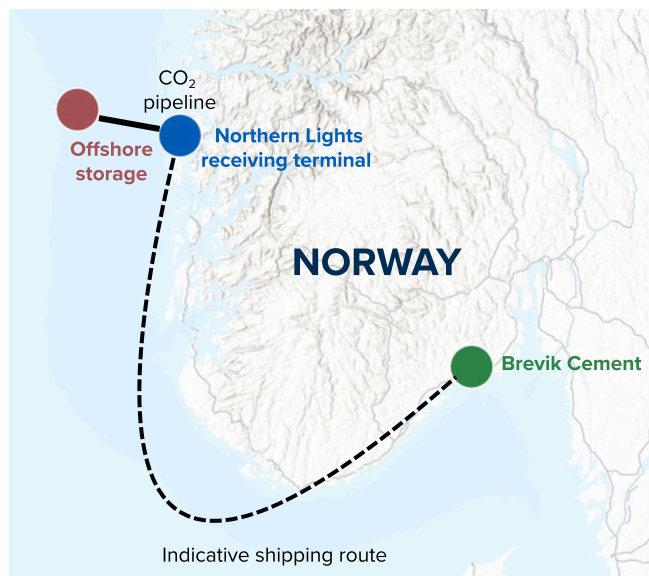
From here, it is loaded onto the Northern Pioneer or Northern Pathfinder, purpose-designed CO₂ carriers built in Dalian, China, for shipping to the Northern Lights CO₂ terminal in Øygarden in Vestland county in western Norway. From there, it is pumped via pipeline to subsea storage 2.6km under the North Sea seabed.

Heidelberg Materials is selling near-zero carbon cement from the Brevik plant under the evoZero® brand, where premium products could attract a margin opportunity². Their first year's production of evoZero® has already been pre-sold, demonstrating there is strong demand for low-carbon cement products.

Brevik CCS Key Facts

Capacity & Transport	Storage	Commercial & Financial Metrics	Strategic Significance
<p>Capture Capacity: 400,000 tpa CO₂</p> <p>Capture Technology: SLB Capturi “Big Catch” modular application of “Advanced Carbon Capture” technology</p> <p>Transport: Dedicated liquid CO₂ transport ships <i>Northern Pioneer</i> and <i>Northern Pathfinder</i>. Each ship can hold 7,500 m³ of liquefied CO₂.</p> <p>Pipeline Length: ~100 km</p>	<p>CO₂ Stored: Johansen Formation (Aurora complex), North Sea</p> <p>Storage Type: Saline aquifer</p> <p>Injection Depth: ~2.6 km below seabed</p>	<p>Capital Expenditure³: ~€421 million</p> <p>Estimated Abatement Cost⁴: NOK 1150 (~€100) per tonne CO₂</p> <p>Funding Sources: Grant funding, avoidance of local carbon pricing, green premium for low-carbon cement sales, company financing.</p>	<p>Retrofit of an operating facility shows CCS as a clear pathway to decarbonise existing industry.</p> <p>Demonstrates first commercial-scale CO₂ capture on a cement manufacturing plant and dedicated sea-based liquid CO₂ transport with CCS.</p> <p>Foundation CO₂ capture partner for the Northern Lights transport and storage network.</p>

Summary: Northern Lights



CO₂ captured at Brevik is liquefied and transported by ship to the Northern Lights CO₂ receiving terminal at Øygarden in Western Norway.

Liquid CO₂ is pumped to high pressures and flows via a 100 km long subsea pipeline to the storage well beneath the North Sea.

Northern Lights is a shared CO₂ transport and storage infrastructure project and will soon be receiving CO₂ from other capture facilities in Norway and internationally.

Phase 1 of Northern Lights has a storage capacity of 1.5 Mtpa and is operational. Phase 2 will expand its capacity to 5 Mtpa and is under construction.

¹ <https://gccassociation.org/wp-content/uploads/2024/11/GCCA-Cement-Industry-Progress-Report-202425.pdf>

² https://www.heidelbergmaterials.com/sites/default/files/2025-03/Heidelberg_Materials_Investor%20Presentation_FY_2024.pdf

³ <https://energywatch.com/EnergyNews/Cleantech/article13445570.ece>

⁴ <https://ccsnorway.com/longship-potential-for-cost-reductions-in-the-ccs-chain/>

