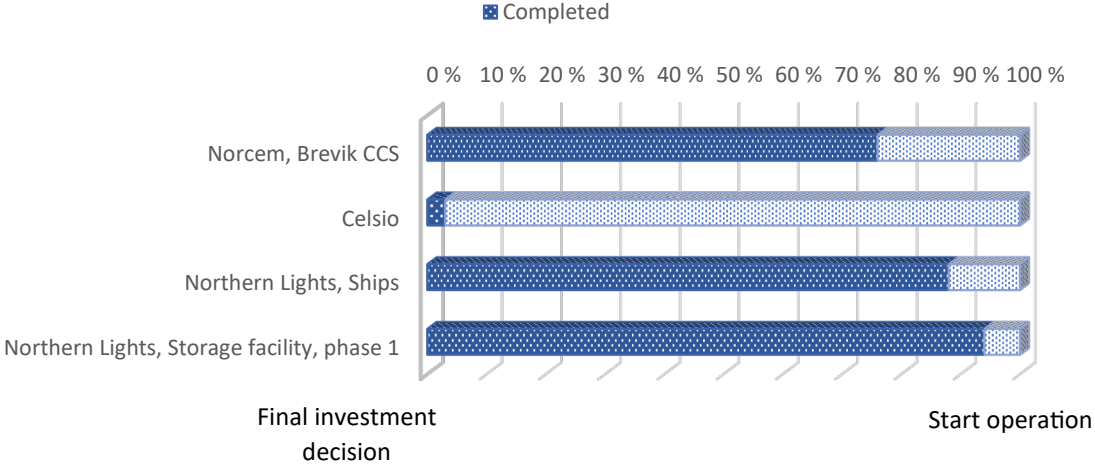


Status, Longship 21.06.2024

Highlights

- Construction of the Northern Lights CO₂ transport and storage infrastructure and Heidelberg Materials' capture plant in Brevik is progressing. Brevik CCS is 76% completed and the Northern Lights storage facility is 94% completed.
- Hafslund Celsio (Celsio) decided in April 2023 to put the implementation of the CO₂ capture project at the waste-to-energy facility at Klemetsrud on hold in order to assess solutions to reducing the costs of the project. Celsio is responsible for the implementation of the project and has signed two FEED contracts; one with Aker Carbon Capture and Aker Solutions to develop carbon capture at the waste-to-energy facility at Klemetsrud and one with Aker Solution for the intermediate storage at the Port of Oslo. A new project basis will be submitted to the government in the summer of 2024. The government will decide on support for the project and any amendment to the state aid agreement when there is a sufficiently mature and quality-assured project basis for the project.
- Longship - with captured CO₂ from Brevik and transport and storage by the Northern Lights - will become operational in 2025.
- Northern Lights will also transport and store up to 800,000 tonnes of CO₂ annually from Yara's ammonia and fertiliser plant in Sluiskil, Netherlands and 430,000 tonnes of biogenic CO₂ per year from Ørsted's two power plants in Denmark from 2026. These projects utilize the overcapacity in the Northern Lights infrastructure already established through the Longship project.
- Northern Lights was nominated by the EU Commission in December 2023 to receive € 131 million from Connecting Europe Facility (CEF) for construction works for a Phase 2.

Overall progress of Longship's construction phase:



Background – about Longship

- The CCS project Longship, partly funded by the Norwegian government, includes capture, transport and storage of CO₂.
- A carbon capture facility is currently being built at Heidelberg Materials' cement plant in Brevik, Norway. According to plan, the facility will capture approximately 400,000 tonnes of CO₂ annually.
- Celsio started building a carbon capture facility at their waste-to-energy plant in Oslo in August 2022 but decided to put construction on hold in April 2023 due to a large increase in cost estimates. According to the initial plan, approximately 400,000 tonnes of CO₂ will be captured annually from Celsio's plant.
- Northern Lights is currently developing a solution for the transport and storage of CO₂. The CO₂ will be transported by ship from the various emission sources, including the CO₂ from the industrial capture sites of Heidelberg and Celsio, to a receiving facility near Bergen, before being transported by pipeline for permanent storage in a reservoir located 2600 metres below the seabed.
- Several measures are needed to enable European countries to achieve carbon neutrality. Longship will help the hard-to-abate industries reduce their CO₂ emissions and make industrial carbon removals possible through capture of biogenic CO₂ (negative emissions).

Roles in Longship

- **Ministry of Energy** – Responsible for Norway's CCS policy and Longship on behalf of the Norwegian government
- **Ministry of Foreign Affairs** – Coordinates Norway's foreign service and embassies
- **Gassnova** – State owned company following up Longship on behalf of the Ministry of Energy
- **Northern Lights** – Transport and storage company (Joint Venture owned by Equinor, Shell and TotalEnergies) planning to receive CO₂ from Heidelberg Materials and Hafslund Celsio, and aiming to provide transport and storage as a service to multiple companies in Europe.
- **Brevik CCS – Heidelberg Materials** – Capture project under construction at the cement plant in Brevik
- **Hafslund Celsio** – Owner of a waste-to-energy plant in Oslo. A new project basis for their CO₂ capture project will be submitted to the government in the summer of 2024.

Status Northern Lights

- Construction of the Northern Lights CO₂ storage facility is **94,0%** completed (2024.04.30). The storage infrastructure consists of an onshore receiving terminal, a subsea pipeline, two injection wells and the storage complex. Pre-commissioning and commissioning activities of the Northern Lights facilities has started or is soon about to start.
- Dalian Shipbuilding Offshore Co., Ltd. (DSOC) is building ships dedicated for CO₂ transport for Northern Lights. The overall progress for the first two ships, including detailed design, engineering, procurement etc., are now **88,4 %** completed (2024.04.30).
- Northern Lights has entered into a transport and storage agreement with Yara to store up to 800,000 tonnes of CO₂ annually from Yara's ammonia and fertiliser plant in Sluiskil, Netherlands from 2025. The agreement is approved by the Norwegian Ministry of Energy. Northern Lights has also entered into a transport and storage agreement with Ørsted to store 430,000 tonnes biogenic CO₂ per annually from two power plants in Denmark from 2026.
- Northern Lights has ambitious growth plans and aims to expand its storage capacity in line with market development and the maturation of commercial agreements. For the next phase development, Northern Lights targets an additional capacity of 3.5 million tonnes per year.
- Northern Lights was nominated for the award €131 million under the EU Connecting Europe Facility (CEF) funding scheme. Almost €480 million is awarded to four CO₂ transport and storage projects in Europe. According to the European Commission, they constitute the first building blocks of a future Europe-wide carbon value chain that are scheduled for completion before the end of the decade and are therefore expected to contribute to the EU's 2030 decarbonization objectives.
- Northern Lights has been included a Project of Mutual Interest (PMI) by the European Commission on its [new list of EU energy Projects of Common and Mutual Interest \(europa.eu\)](#)
- Northern Lights received 894 visitors to site in April, bringing the total number of visitors up to a total more than 8,000 since start.



Northern Lights' CO₂ receiving terminal in Øygarden.

Status Heidelberg Materials

- Overall accumulated actual progress is **76,2%** for the Brevik CCS Project (2024.04.30).
- Brevik CCS and Aker Carbon Capture (capture technology provider) have stipulated an overall target of being Mechanical Complete (construction finished and facility ready for commissioning) on 01.12.2024. The work and progress experienced during April 2024 has increased the likelihood of reaching this milestone. A small, but important step towards completion was lifting into position of the compressor and compressor motor in the beginning of May 2024.
- A very important milestone was reached in August 2023 with the lifting into position of the absorber and absorber stack. This piece of equipment is now the highest point of the Brevik Plant and is a very visible testimony of Brevik CCS.
- The Norwegian state and Heidelberg Materials have signed an agreement securing completion of the capture project after the communicated cost overrun. According to the agreement, Heidelberg Materials has undertaken to complete the project and cover increased costs. In return, the company retains a larger share of the potential return on the project. The state will provide a start-up grant of up to NOK 150 million when the facility is ready to ship the first load of CO₂ to Northern Lights.
- Brevik CCS has experienced vast interest internally and externally.
- Heidelberg Materials has since the start of Longship further progressed in the field of CCS, and now has several planned projects underway. One of them is Slite CCS on Gotland, Sweden, which is one of Europe's largest CCS projects with a target of capturing up to 1.8 million tonnes of CO₂ annually. This corresponds to 4 % of Sweden's total emissions today.



Heidelberg Materials' plant will be transformed with a new capture plant on site.

Status Hafslund Celsio

- Hafslund Celsio decided in April 2023 to put the implementation of the CO₂ capture project at the waste-to-energy facility at Klemetsrud on hold in order to assess solutions to reducing the costs of the project. The company's own estimates showed that the project's expected costs were approximately NOK 3 billion higher than at the time of the investment decision.
- Celsio is responsible for the implementation of the project and has signed two FEED contracts; one with Aker Carbon Capture and Aker Solutions to develop carbon capture at the waste-to-energy facility at Klemetsrud and one with Aker Solution for the intermediate storage at the Port of Oslo. The capture facility will be based on Aker Carbon Capture's modularized Just Catch 400 unit, with a design capacity to capture up to 400,000 tonnes of CO₂ per year.
- A new project basis will be submitted to the government in the summer of 2024. The government will decide on support for the project and any amendment to the state aid agreement when there is a sufficiently mature and quality-assured project basis for the project.
- Hafslund Celsio is owned by Hafslund, Infranode and HitecVision. On June 1st. 2024 the company changed its name from Hafslund Oslo Celsio to Hafslund Celsio to align with the other Hafslund fully or partly owned companies.
- The changes to the CCS project in Oslo will not have any impact on the completion of Longship as a whole chain for capture, transportation and storage of CO₂. The Heidelberg Materials will be able to capture, and Northern Lights will be able to transport and permanently store CO₂ from 2025.



Ground works on site at Hafslund Celsio's waste incineration plant in Oslo.

CO₂ storage in Norway

- In total, six exploration licenses to store CO₂ on the Norwegian Continental Shelf have so far been awarded pursuant to the CO₂ Storage Regulation, in addition to Northern Lights' exploitation permit
 - In March 2024 two new areas for injection and storage of CO₂ in the North Sea were announced but are not yet awarded.
 - In August 2023, an exploration license for CO₂ storage east of the Sleipner East field was awarded to Sval Energi AS, Storegga Norge AS and Neptune Energy Norge AS.
 - In March 2023, two exploration licenses for CO₂ storage in the southern part of the North Sea were awarded. Aker BP ASA and OMV (Norge) AS was awarded the eastern CO₂ storage acreage. Wintershall Dea Norge AS and Alterra Infrastructure Group through its subsidiary Stella Maris CCS AS were awarded the northwestern acreage.
 - In October 2022, two companies - Wintershall Dea Norge AS og CapeOmega AS - have been offered exploration license for CO₂ storage in an acreage in the Norwegian part of the North Sea. CapeOmega's part of the license was sold to Total Energies in August 2023.
 - In April 2022, three companies were offered exploration licenses to store CO₂ in two areas on the Norwegian Continental Shelf. The area in the North Sea was offered to Equinor ASA. The area in Barents Sea was offered to a group including Equinor ASA, Horisont Energi AS and Vår Energi AS. Equinor ASA and Vår Energi AS is no longer part of this license. PGNiG Upstream Norway and Horisont Energi are now partners on the Polaris project (in the Barents Sea) whereas PGNiG is operator.
 - Northern Lights was awarded an exploitation permit (EL001 "Aurora") for the storage part of Longship in 2019.

Resources

- [Spørsmål og svar om Langskip-prosjektet - regjeringen.no](https://www.regjeringen.no/no/Spørsmål-og-svar-om-Langskip-prosjektet)
- [Tidslinje for Langskip \(CCS\) - regjeringen.no](https://www.regjeringen.no/no/Tidslinje-for-Langskip-(CCS))
- [Full-scale CCS project in Norway - Longship | Reaching the climate goals \(ccsnorway.com\)](https://www.ccsnorway.com/)
- [Northern Lights \(norlights.com\)](https://www.norlights.com/)
- [Norcem og karbonfangst | Norcem](https://www.norcem.com/)
- <https://www.celsio.no/karbonfangst-ccs/>

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