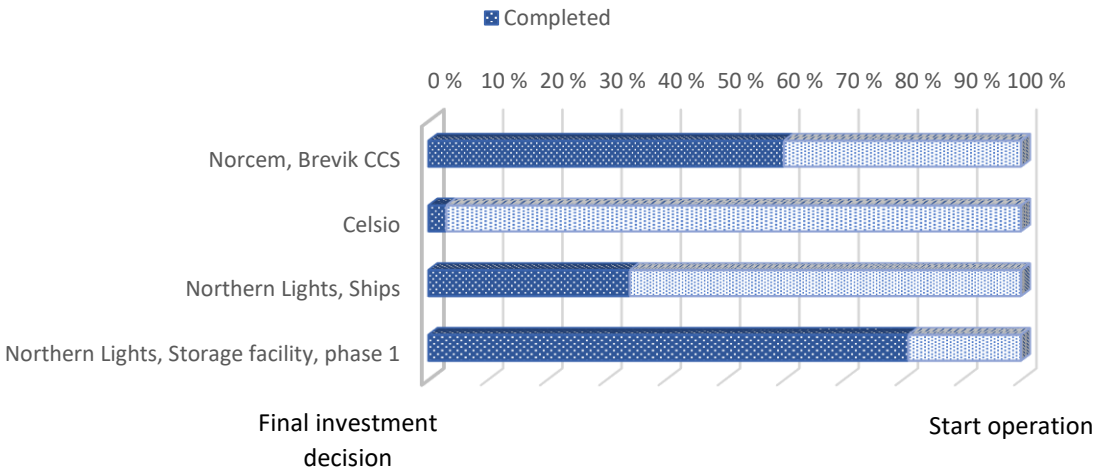
Status, Longship 30.06.2023

Highlights

- Construction of the Northern Lights CO_2 transport and storage infrastructure and Heidelberg Materials' capture plant is progressing. Brevik CCS is 60,4% completed and the Northern Lights storage facility is 81,3% completed. Hafslund Oslo Celsio decided to put construction of the CO_2 capture plant on hold in April 2023.
- Longship will be operational with captured CO_2 from Brevik, transport and storage in 2025, slightly behind the initial plan (late 2024), according to the latest communication from the Government (Prop. 118 S (2022-2023))
- Northern Lights has entered into a transport and storage agreement with Ørsted to store 430,000 tonnes biogenic CO_2 annually from two power plants in Denmark from 2026.
- 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 CO_2.
- 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 CO_2 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. The project has entered into a cost reducing period of 12 months. According to the initial plan, approximately 400,000 tonnes of CO_2 will be captured annually from Celsio's plant.
- Northern Lights is currently developing a solution for the transport and storage of CO_2. The CO_2 will be transported by ship from the various emission sources, including the CO_2 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 CO_2 emissions and make industrial carbon removals possible through capture of biogenic CO_2 (negative emissions).

Roles in Longship

- **Ministry of Petroleum and 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 Petroleum and Energy
- **Northern Lights** – Transport and storage company (Joint Venture owned by Equinor, Shell and TotalEnergies) planning to receive CO_2 from Heidelberg Materials and Hafslund Oslo Celsio, and aiming to provide transport and storage as a service to multiple companies in Europe.
- **Brevik CCS – Heidelberg Materials** – Capture site under construction at the cement plant in Brevik
- **Hafslund Oslo Celsio** – Capture project, now on hold, at the waste-to-energy plant in Oslo

Status Northern Lights

- Construction of the Northern Lights CO_2 storage facility is **81%** completed (2023.05.31).
- Fabrication and installation of the onshore plant is on schedule and budget and will be ready in 2024. All of the 12 storage tanks are installed.
- The visitor centre was opened in October 2022 by the Norwegian prime minister Jonas Gahr Støre.
- Preliminary results from drilling operations confirm the storage capacity of at least 5 million tonnes CO_2 per annum. The drilling of one CO_2 injection well and one contingent injection well is completed.
- Dalian Shipbuilding Industry Co., Ltd. (DSIC) is building two ships dedicated for CO_2 transport for Northern Lights. The overall progress for the ships, including detailed design, engineering, procurement etc., are now **34 %** completed (2023.05.31) and the first ship will be delivered in 2024.
- Northern Lights has entered into transport and storage agreement with Ørsted to store 430,000 tonnes biogenic CO_2 per year from two power plants in Denmark from 2026. Northern Lights is labelling this as an essential step for creating a commercial market for CCS

in Europe. In August 2022, Yara and Northern Lights agreed on the main commercial terms on cross border CO_2 transport and storage. From early 2025, up to 800,000 tonnes of CO_2 will, according to plan, be captured from Yara's ammonia and fertiliser plant in Sluiskil in the Netherlands and transported and stored by Northern Lights.

- Northern Lights plan to increase storage capacity to 5 million tonnes per year through an additional development phase (Phase 2) and an increasing customer base. The phase 2 development plan is subject to a final investment decision. FEED studies for phase 2 have been completed.

Northern Lights' CO_2 receiving terminal in Øygarden.

Status Heidelberg Materials

- Overall accumulated actual progress is **60,4%** for the Brevik CCS Project (2023.05.31).
- Generally, Brevik CCS is progressing well, but the project organisation expresses some concern about delays from subcontractors due to the global disturbances in crucial supply chains caused by war in Ukraine and covid-19, leading to major uncertainties in supply of critical materials, equipment, and logistics.
- Heidelberg Materials and the Norwegian state have, in accordance with the state aid agreement, negotiated over financing the communicated cost overrun in the project. A proposed solution is agreed upon and awaits approval from ESA. In the meantime, the project is progressing as planned.
- Brevik CCS has experienced vast interest internally and externally. Heidelberg Materials now has several emerging projects in other countries, mainly in Europe and North America. Brevik CCS is the frontrunner both within the company and within the industry.

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

Status Celsio

- In April an updated cost estimate from Hafslund Oslo Celsio showed that the carbon capture project at their waste incineration plant at Klemetsrud would exceed the maximum budget stipulated in its government funding agreement. Celsio decided to introduce a twelve-month cost reduction phase and place the construction on hold. During this phase, Celsio aims to identify possible cost reduction areas, then narrow down and prioritize areas to be investigated before reaching a new decision in the fall of 2024.
- Celsio's carbon capture project started the civil works, blasting and ground works on site in August 2022.
- There is still a clear ambition for Celsio's carbon capture project to become the world's first carbon capture plant on waste incineration in a full value chain with transport and permanent storage of CO_2. Celsio is owned by Hafslund, Infranode and HitecVision.
- The changes to Celsio's project will not have any impact on the completion of Longship as a whole chain for capture, transportation and storage of CO_2. The Heidelberg Materials and Northern Lights projects have both passed the halfway point in their construction process and will be in a position to capture and store CO_2 from 2025.

Ground works on site at Hafslund Oslo Celsio's waste incineration plant in Oslo. Construction of the CO_2 capture plant is placed on hold.

CO_2 storage in Norway

- In total, five exploration licenses to store CO_2 on the Norwegian Continental Shelf have so far been awarded pursuant to the CO_2 Storage Regulation, in addition to Northern Lights' exploitation permit.
    - In March, two exploration licenses for CO_2 storage in the southern part of the North Sea were awarded. Aker BP ASA and OMV (Norge) AS was awarded the eastern CO_2 storage acreage. Wintershall Dea Norge AS and Altera 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 CO_2 storage in an acreage in the Norwegian part of the North Sea.
    - In April 2022, three companies were offered exploration licenses to store CO_2 in two areas on the Norwegian Continental Shelf. The area in the North Sea was offered to Equinor ASA, and the area in Barents Sea was offered to a group including Equinor ASA, Horisont Energi AS and Vår Energi AS.
    - Northern Lights was awarded an exploration permit for the storage part of Longship in 2019.

Resources

- Spørsmål og svar om Langskip-prosjektet - regjeringen.no
- Tidslinje for Langskip (CCS) - regjeringen.no
- Full-scale CCS project in Norway - Longship | Reaching the climate goals (ccsnorway.com)
- Northern Lights (norlights.com)
- Time-lapse video: Time-lapse construction of the Northern Lights CO2 transport and storage infrastructure 2021 - YouTube
- Norcem og karbonfangst | Norcem
- https://www.celsio.no/karbonfangst-ccs/

Contact info for further information:

- Ministry of Petroleum and Energy

Katrine Haukenes, +47 95 13 89 67, Katrine.Haukenes@oed.dep.no

- Ministry of Foreign Affairs

Trond Gabrielsen, +47 41 75 18 97, Trond.Gabrielsen@mfa.no

- Gassnova SF

Camilla Bergsli, +47 90 69 11 85, cb@gassnova.no