HUBS IN ACTION – LESSONS FROM OGCI'S KICKSTARTER HUBS

NORTHERN LIGHTS

This pioneering public-private partnership in Norway uses ships to transport carbon dioxide from around Europe and store it in a collective reservoir under the North Sea.

Location
Norway

Potential impact by 2030
well over 5 $MtCO_2$/year

Hub developer
Gassnova (phase 1); Northern Lights JV (phase 2)

Initial CO_2 sources
cement, waste incineration

Potential CO_2 sources
hydrogen, biomass, steel, refineries

T&S company
Northern Lights JV (Equinor, Shell, TotalEnergies)

Transport
ships

Storage site
Aurora reservoir

Status
under construction

In operation
2024

Website
https://northernlightsccs.com/

Northern Lights is not a physically localized hub, but a distributed one. While other hubs are based on compact industrial clusters linked by pipeline, this Norwegian hub will use ships to connect geographically distant carbon dioxide sources from around Europe. The investment was approved in late 2020 and the facilities are now under construction.

In its first phase, 80% subsidized by the Norwegian government and known as Longship, the project aims to store emissions from two sites in eastern Norway: the Fortum waste-to energy plant in Oslo and the Norcem cement factory in Brevik. Between them, they will capture about 800,000 tonnes of carbon dioxide per year. Norcem is under construction; Fortum is seeking full financing.

The captured carbon dioxide will be compressed and liquefied at each site. Specially designed ships will then take it to a temporary storage site in Øygarden in western Norway, from where it will be piped for permanent storage to the Aurora reservoir, a saline aquifer about 110 km from shore and 2.6 km under the seabed. Its storage capacity is expected to be at least 100 million tonnes.

Transport and storage will be handled by the Northern Lights joint venture, owned by three OGCI members: Equinor, Shell and TotalEnergies. Gassnova is overseeing the project for the government, ensuring that the value chain from emitters to storage is properly regulated and managed.

For the second phase, Northern Lights is offering commercial carbon storage services to companies across Europe. The receiving terminal, offshore pipeline and injection infrastructure are designed to be extended to accommodate over 5 million tonnes of carbon dioxide per year, depending on demand. Northern Lights has identified over 90 suitable capture sites, and there is already interest from industrial sites in eight countries, in sectors including steel, biomass and hydrogen. Four of these sites – a hydrogen refinery in Finland, hydrogen and chemicals manufacturers in Antwerp, a cement plant in France and a biomass with CCS plant in Sweden – have received investment from the EU's Innovation Fund to support large-scale capture of carbon dioxide. Northern Lights is also collaborating with Swiss direct air capture company Climeworks to look at the potential of storing carbon dioxide captured directly from the atmosphere.

The project's construction phase will bring between 1,500 and 3,000 jobs, with around 170 jobs created directly during operation, alongside many thousands of jobs created and safeguarded in industries that decarbonize through CCS or participate in carbon removals.