



# Northern Lights

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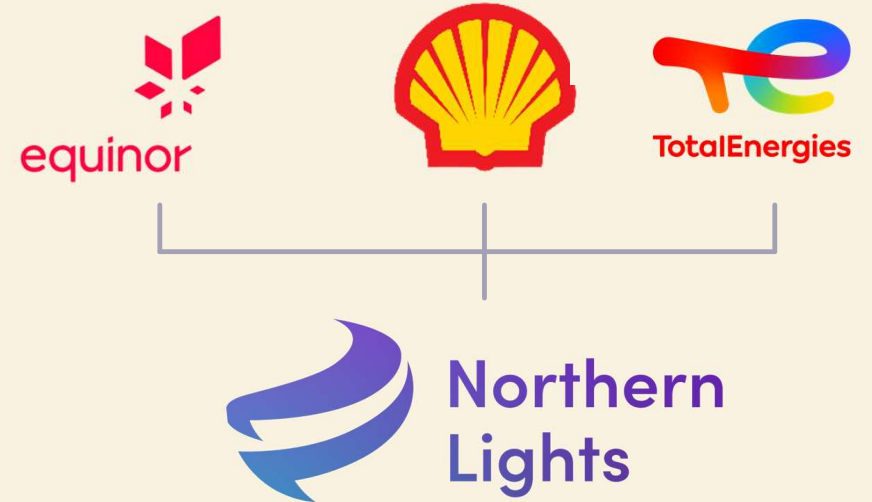
**Ragni Rørtveit**

Business Development Advisor

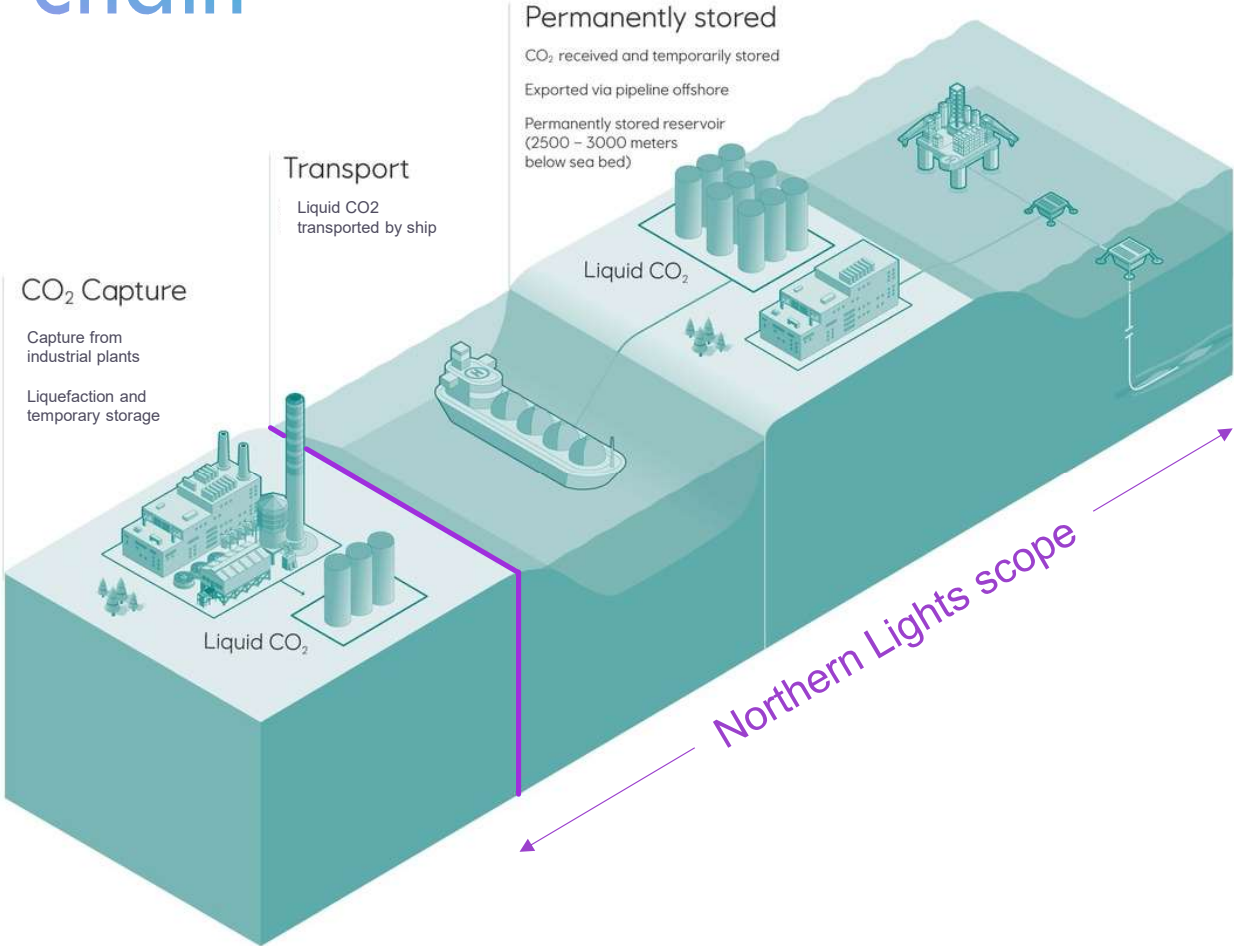
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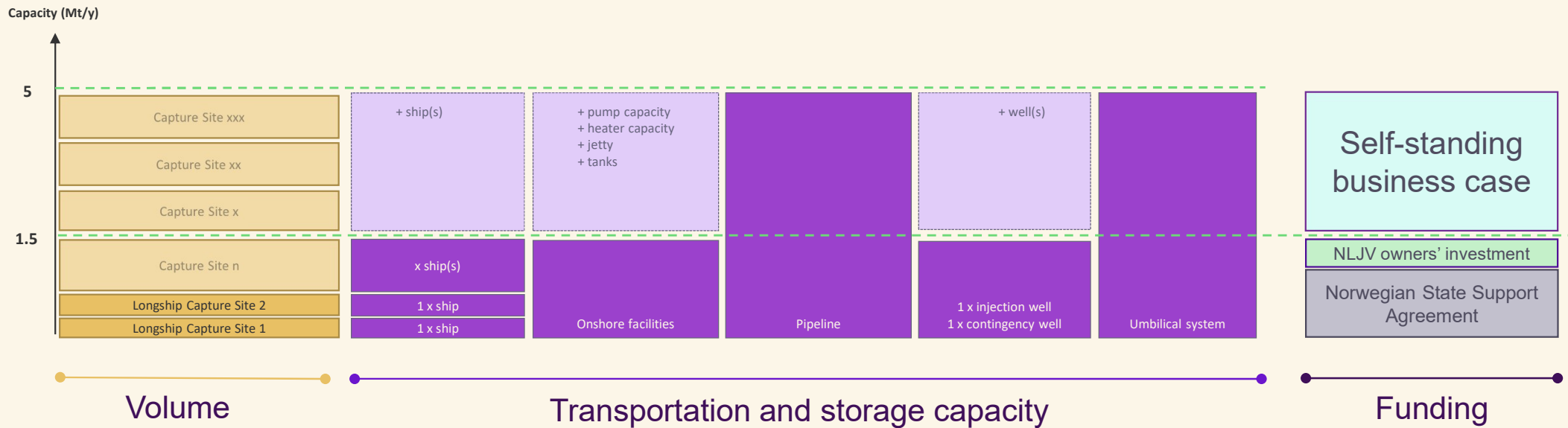
- The Northern Lights project passed FID 1,5 years ago
- Since then, we have started construction as the world's first open-source CCS project
- In June 2021 the Northern Lights JV was formally established
  - Owned by Equinor, Shell and TotalEnergies
- The Norwegian state contributes with considerable funding for first phase



# CCS value chain



# Volume and future ramp-up



→ **Demand and funding capabilities** will bring the 5 MTPA and potential future phases forward in time

# CO<sub>2</sub> ship transport

## Cargo Systems for CO<sub>2</sub>

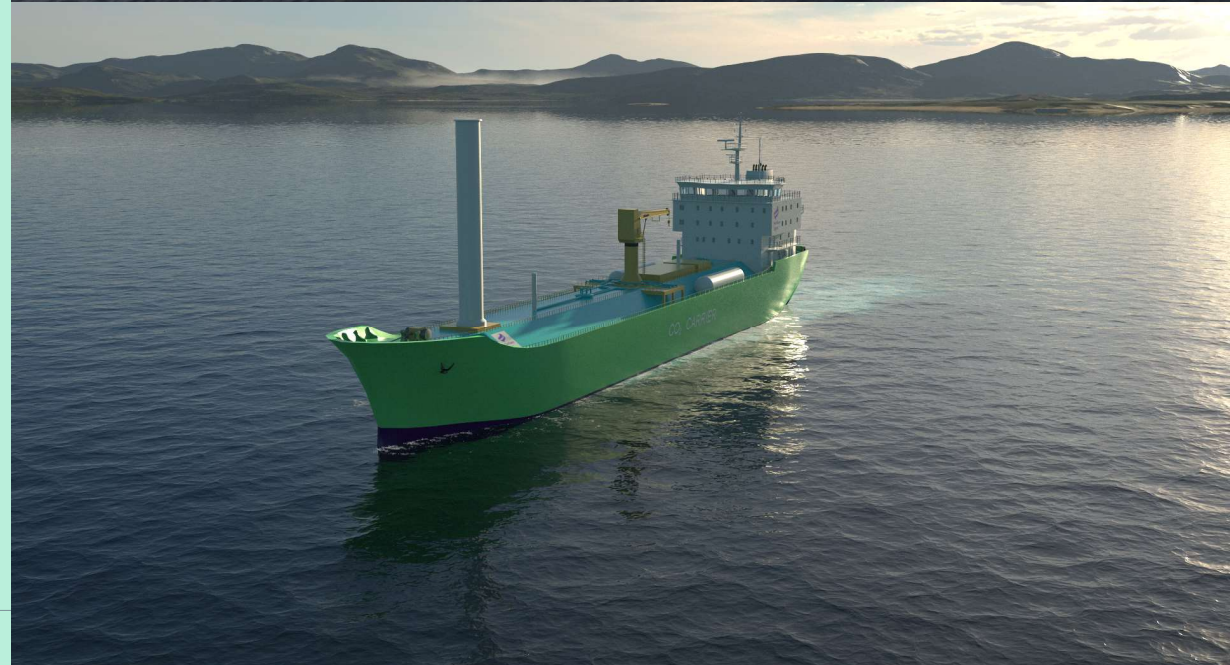
- 2 ships x 7500 m<sup>3</sup> capacity initially
- Cargo at 13-15 barg (approx. -26°C)
- Offloading @ max 800 m<sup>3</sup>/hr
- Evaluating future ship sizes up to 15 000 m<sup>3</sup>

## 'LPG standard' design

Proven concept

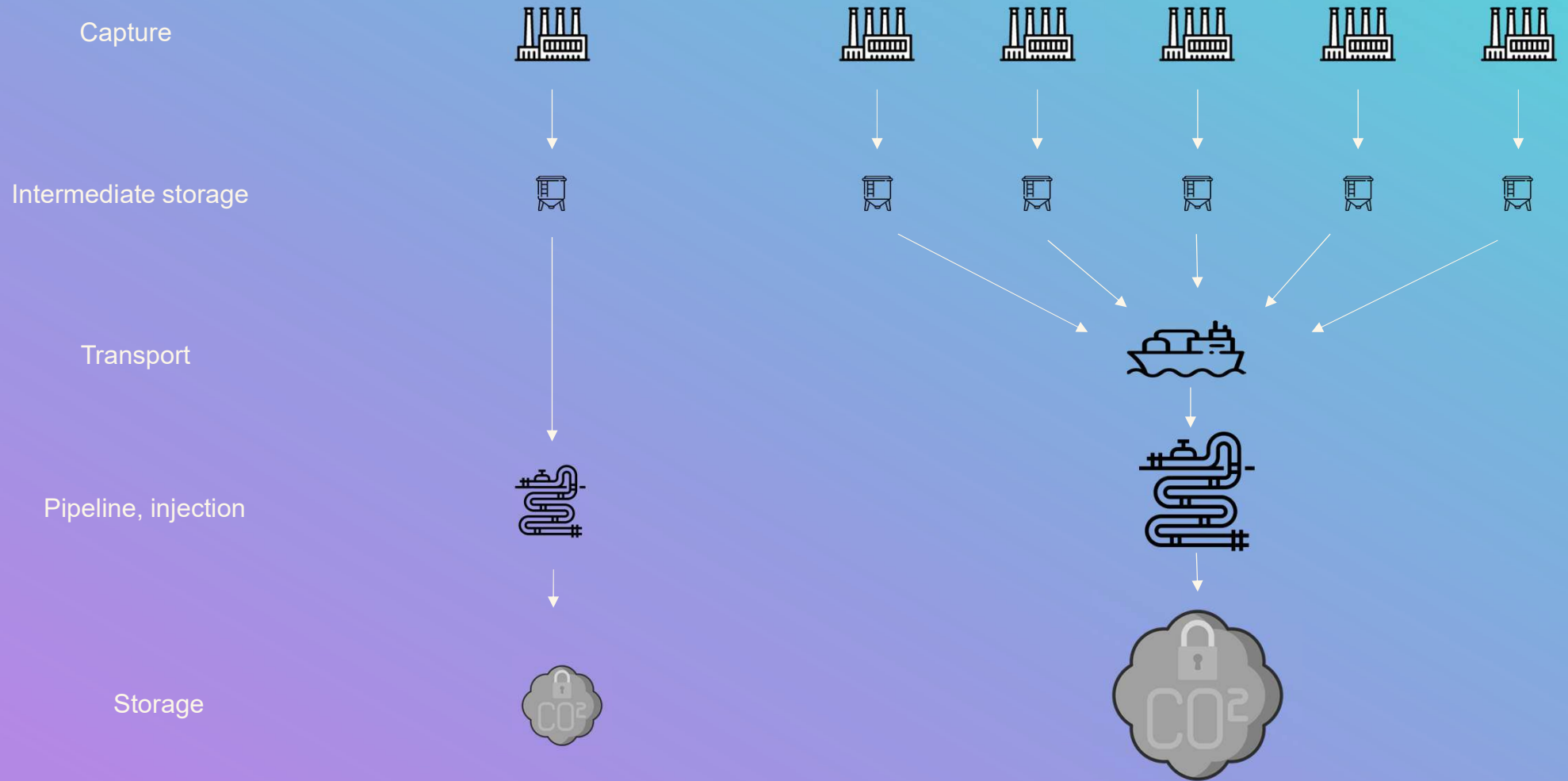
## Emission reduction measures

- LNG dual fuel combustion
- Air lubrication
- Rotor sails
- Shore power



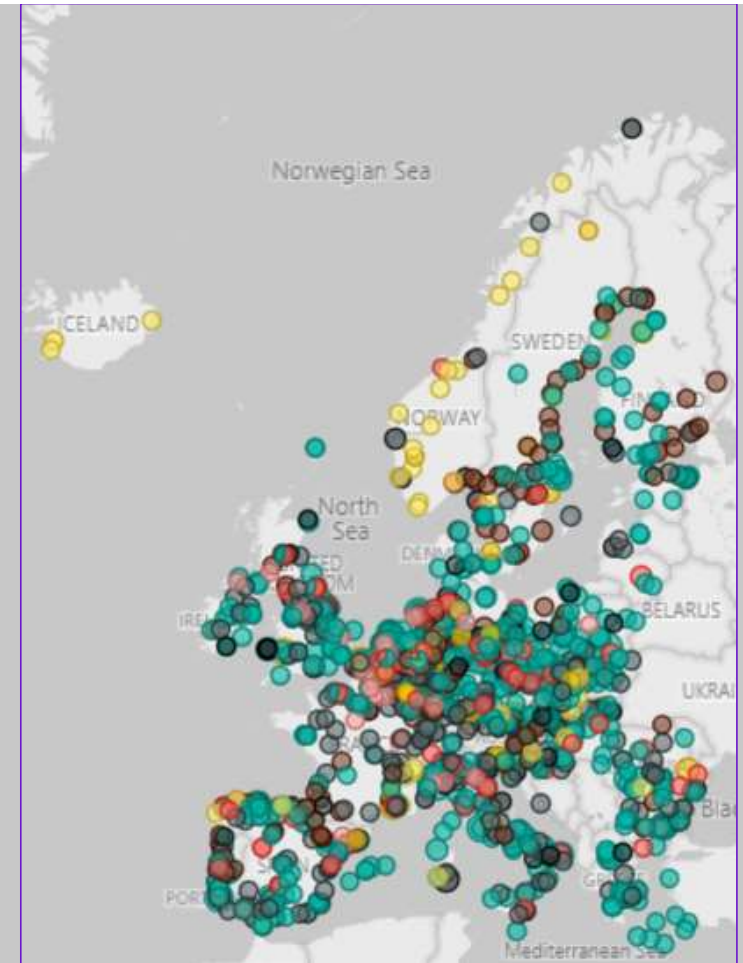
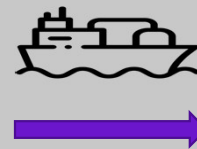
### Traditional

### Northern Lights open-source infrastructure





Oil and gas operators with potential access to reservoirs  
 135 facilities  
 149MTPA



Industrial emissions less than 300km from port  
 2200 facilities  
 1 687MTPA

# Future European CCS

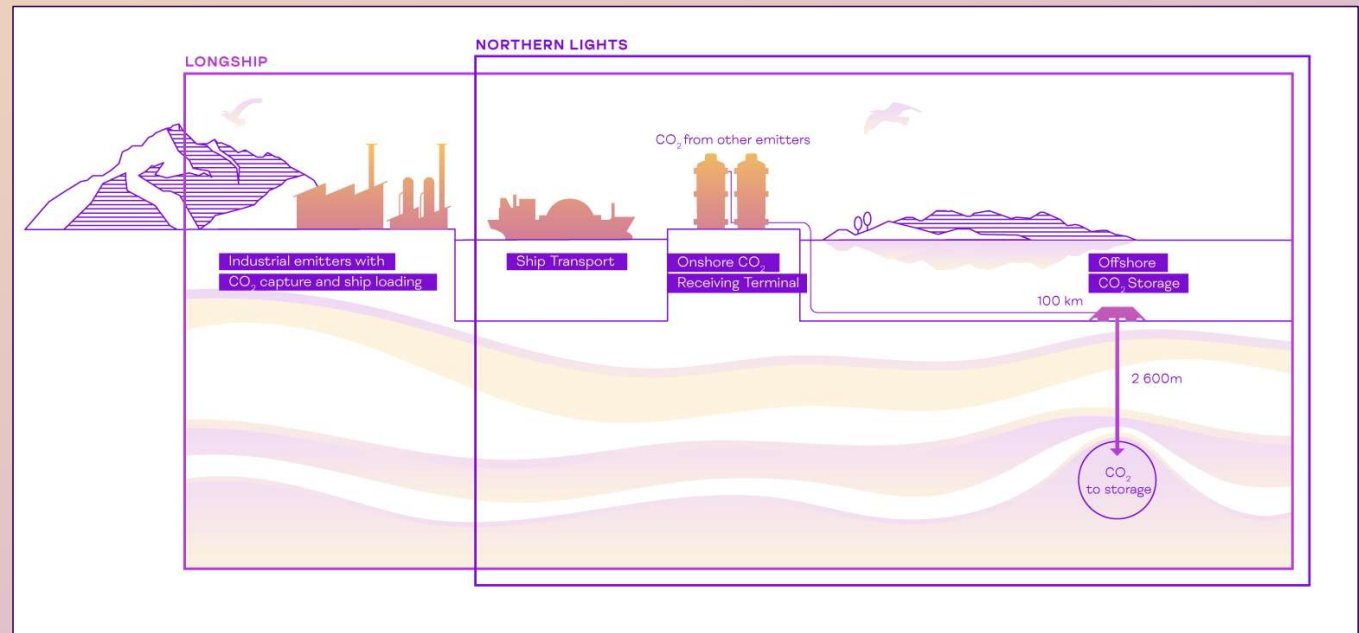
- CO<sub>2</sub> from many industries and countries
- Logistics optimized through hubs, intermediate storage, small ships, large ships, pipelines, train, etc
- Multiple storages – providing reciprocity, standardization and increased learning
- Primary markets
  - **Hard to abate industry**
  - **Enabling new industry**
    - Large scale, clean hydrogen
    - Negative emissions through BECCS and DAC





# Longship

- Norwegian government's demonstration project of full-scale CCS value chain by 2024
- Full support to Norcem cement factory, and partial support to Fortum Oslo Varme waste to energy facility – both on the Norwegian east coast
- Includes CAPEX and OPEX support for the first 10 years



“ Longship is a milestone in the Government’s industry and climate efforts. The project will lead to emission cuts, and facilitate development of new technology and thus new jobs ”

- Prime Minister Erna Solberg.