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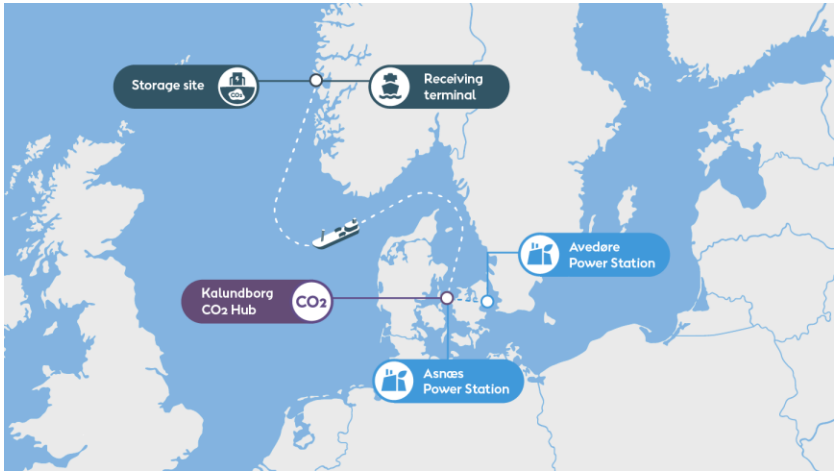
Ørsted Kalundborg CO_2 Hub

Project Presentation

2025

The Ørsted Kalundborg CO_2 Hub establishes a key starting point for CO_2 infrastructure centrally in Denmark

Location of assets



Key facts on Ørsted Kalundborg CO_2 Hub

Project Scope

- Ørsted Kalundborg CO_2 Hub will have a central role in the import and export biogenic CO_2
- Project is based on a portfolio of two-point sources to deliver the contracted CO_2 quantity of 430,000 tonnes annually:
  1. Asnæs Power Station with ~280,000 tonnes/annually
  2. Avedøre Power Station with ~150,000 tonnes/annually
- The project establishes first-of-kind, large scale agreement with Microsoft for the offtake of carbon removal credits
- Subsidy contract with the Danish Energy Agency is for a 20-year period.

Technical Scope

- Key technology provider: SLIB Capturi will deliver five Just Catch™ units to the CHP plants. The Just Catch™ standardised concept is a modular and configurable technical solution
- Reliable and cost-effective CO_2 streams from sustainable biomass-fired CHP plants
- Transportation of CO_2 from Avedøre to Asnæs via trucks. Truck solution offers cost and emission efficient solution, and built-in flexibility to change to pipeline
- Transport and permanent offshore geological storage of CO_2 is performed by Northern Lights.

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Project maturity and shared risk taking has been key to establishing project within timeline for the tender

The Danish Energy Agency publishes CCS tender

- Tender framework sets strict boundary conditions and requirements for solution design
- Total funding pool of ~8 bn DKK

Ørsted awarded subsidy contract for Capture & Storage of CO_2

- 20-year commitment to capture & permanently store 430,000 tonnes of CO_2 annually
- Capture of biogenic CO_2 from Ørsted sites; Asnæs Power Station and Avedøre Power Station

Project execution initiated

- Construction at sites initiated

Commercial Operation Date (COD)

- Requirements to meet COD: Full value chain integration

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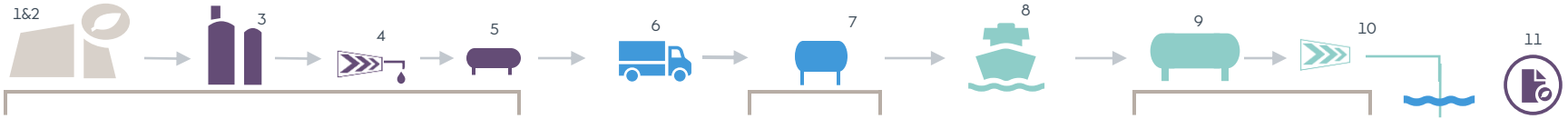
Our key partners in Ørsted Kalundborg CO_2 Hub



Description

The solution is based on a concept with the two -point sources:

(1) Asnæs Power Station, wood chips boiler

(2) Avedøre Power Station, Straw Boiler

CO_2 is captured from five carbon capture modules (3) before it is liquefied by compression and cooling (4). The liquid CO_2 streams are joined in the shared intermediate storage and shipping terminal, awaiting transport (5)

Transportation of captured CO_2 from Avedøre to Asnæs via truck (6)

At the Asnæs terminal, the CO_2 is loaded to intermediate storage tanks (7)

Transport is performed by ship (8), at a rate consistent to the operation of the two CC units. Liquid CO_2 is delivered to onshore intermediate storage terminal (9) ahead of transfer and injection into offshore permanent geological reservoir (10)

Carbon removal credits (11) from BECCS at Asnæs and Avedøre can be sold through bilateral offtake agreements and commodity trading platforms

Ørsted slb Capturi DSV Northern Lights Microsoft

Asnæs Power Station – project layout

1. Wood chips boiler
2. Existing stack
3. Flue gas duct routing
4. Cooling water system
5. Electrical building B1
6. CO_2 capture (3 units)
7. Compression & Liquefaction plant (3 units)
8. Existing ASV2 stack
9. CO_2 storage (tank farm)
10. Liquid CO_2 import terminal (trucks)
11. Liquid CO_2 filling line
12. CO_2 ship loading terminal on pier

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Photos from the Asnæs site

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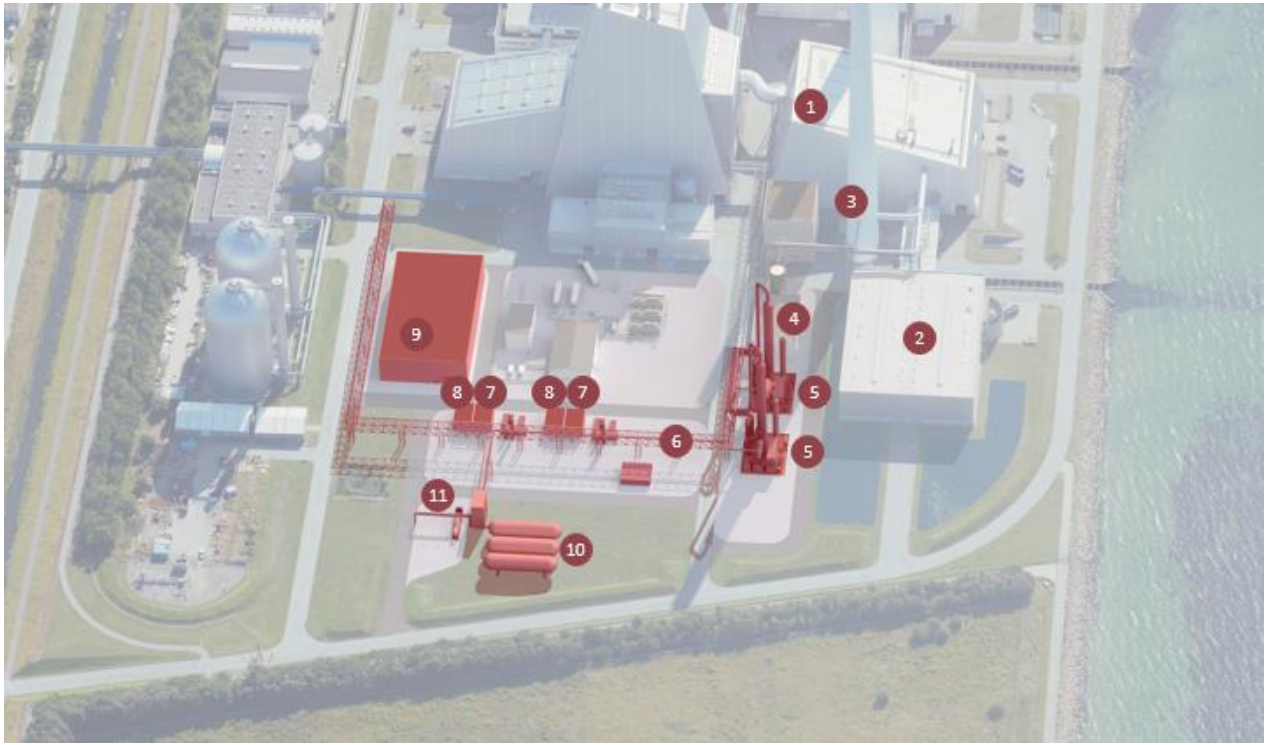
Avedøre Power Station – project layout



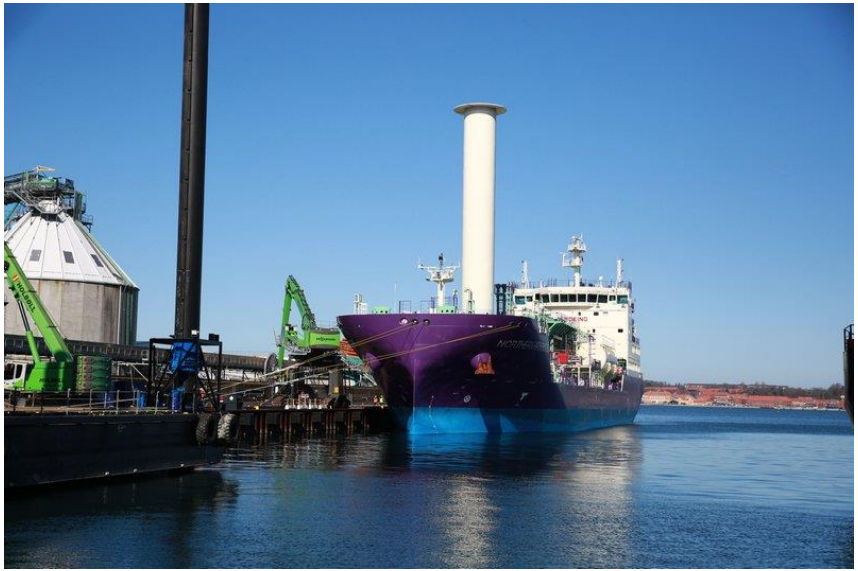
1. Straw boiler
2. Straw storage and preparation building
3. Existing stack
4. Flue gas condenser
5. CO_2 capture
6. CO_2 pipe bridge
7. Compression plant
8. CO_2 purification and liquefaction plant
9. CW, district heating, heat pump
10. CO_2 storage (tank farm)
11. Liquid CO_2 filling station for truck trailers

Photos from the Avedøre site

Northern Lights' transportation and storage concept

Northern Lights' concept

- The CO_2 shipping and storage will be operated by the Northern Lights Joint Venture launched in 2021 to offer safe and permanent underground storage to industries from across Europe.
- Northern Lights is the transport and storage component of Longship project, the Norwegian Government's full-scale carbon capture and storage project launched in 2020.
- Northern Lights' ships have a capacity of 7,200 tonnes CO_2 per trip, where a round trip from ASV to storage and back to ASV takes approximately 5 days.
- The onshore terminal receives liquid CO_2 from multiple sources in North-western Europe.



Source: Northern Lights