Ørsted CCS business

Carbon Capture and Storage

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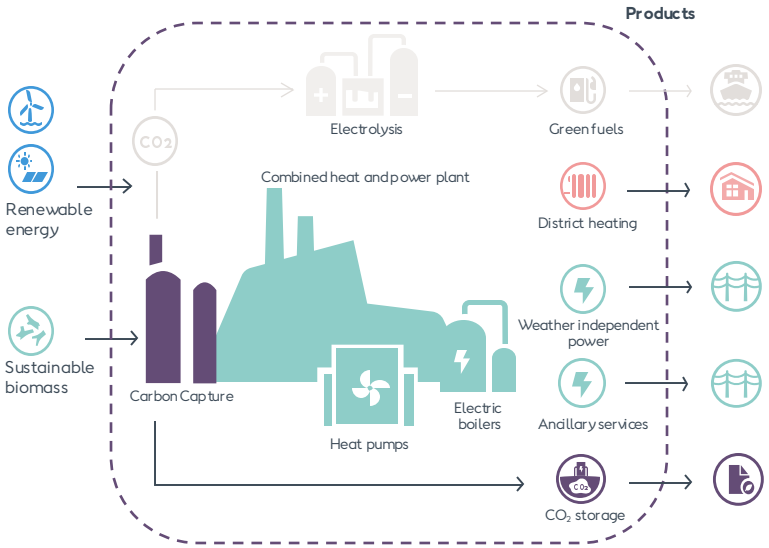
WPAC conference, 24 September 2025

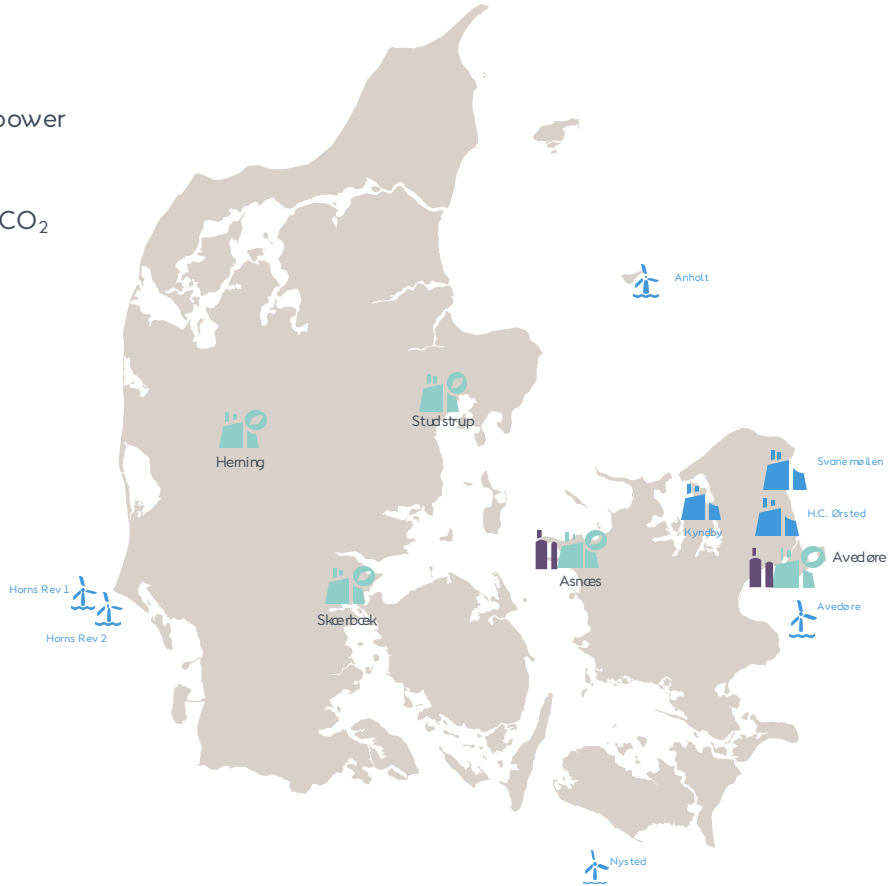



2025

Going forward, biomass enables Ørsted to remove CO_2 from the atmosphere

- Ørsted has five sites in Denmark with biomass-fired combined heat and power plants
- Ørsted uses 100% certified sustainable biomass
- In total, the CHP plants emit approximately 3 million tonnes of biogenic CO_2





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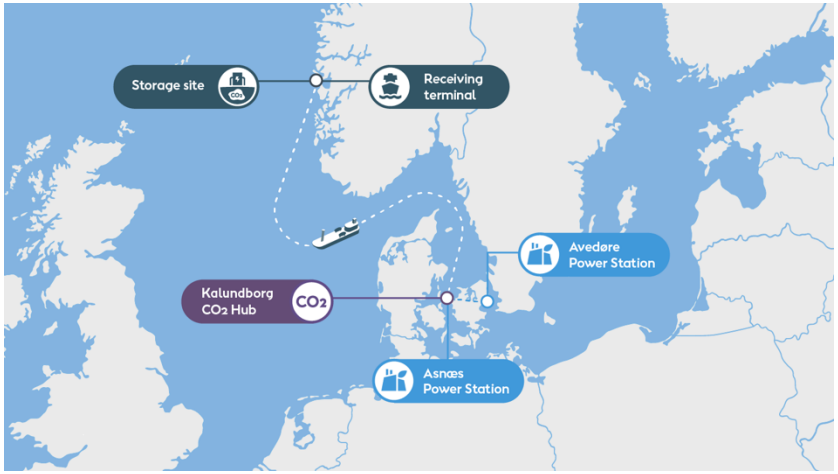
The Ørsted Kalundborg CO_2 Hub establishes a key starting point for CO_2 infrastructure centrally in Denmark

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: SLB 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.

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

Full operation

- Full value chain integration

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Carbon credits makes up more than half of the project funding

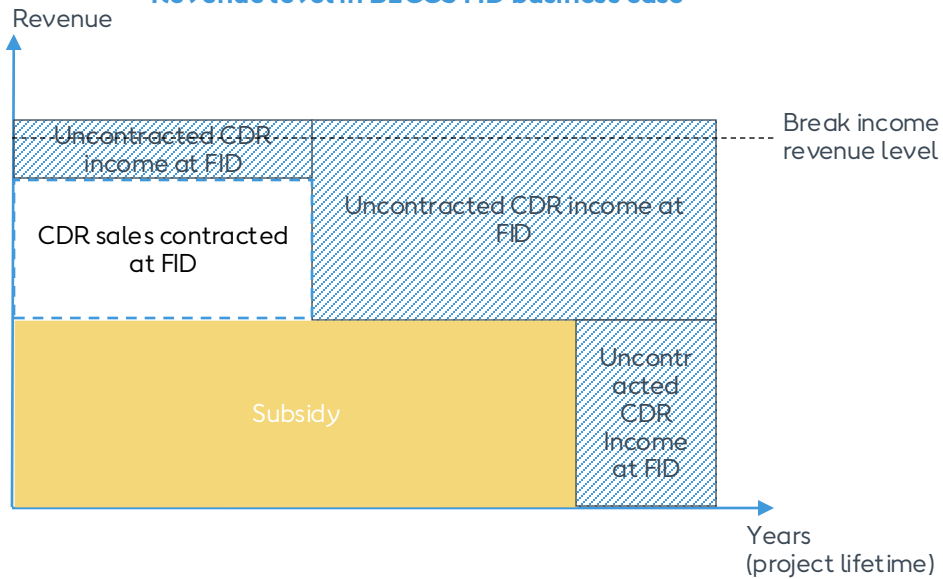
Public funding

- Financing is achieved from **the Danish CCUS funds**, where **Ørsted was awarded a 20 years contract** with the Danish government
- The CCUS funds are **part of a portfolio of Danish climate mitigation funds** currently ranging until 2049
- The **CCUS funds covers less than half** of the necessary revenue in the business case

Voluntary Carbon Market

- Since governmental funds only cover part of the case, it is **necessary to find additional financing from the private sector**
- **The Voluntary Carbon Market offers the opportunity** to achieve further financing by selling Carbon Credits to purchasers who are looking to contribute to climate change mitigation and to offset own emissions
- **10-year contracts with Microsoft** for more than 3.6 Mtons of Carbon Removals have been agreed as part of this project.

Illustrative figure:
Revenue level in BECCS FID business case



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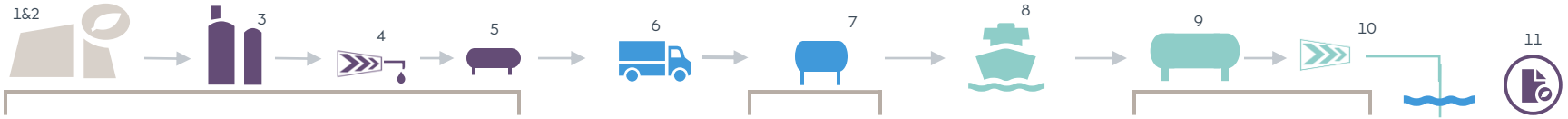
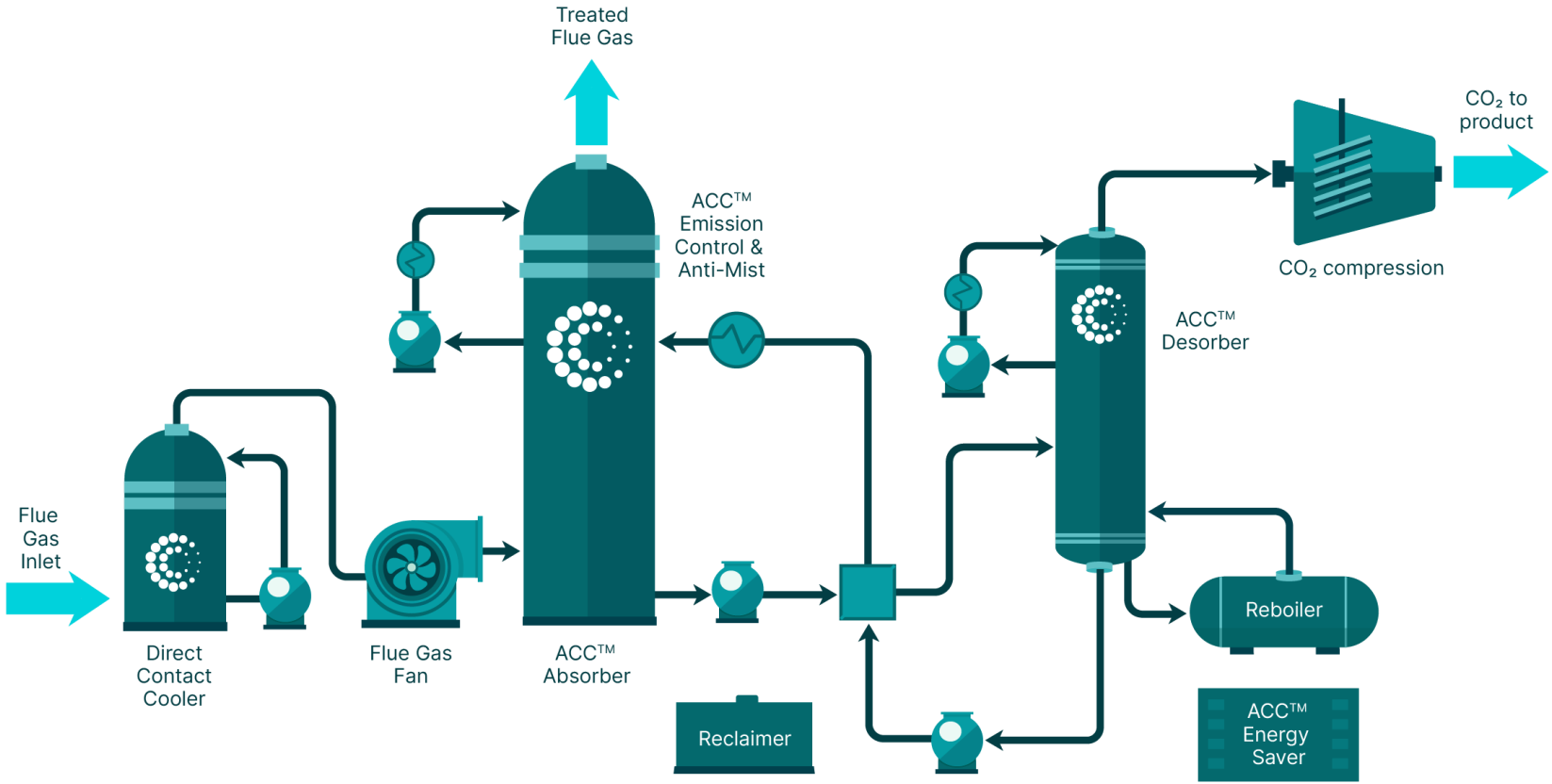
Our key partners in Ørsted Kalundborg CO_2 Hub



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

Carbon capture unit – process walkthrough



Source: SLB Capturi

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Trucks will annually transport 150,000 tonnes of CO2 between the two power plants

Facts about the truck solution

Concept description

Scope:

Ørsted has chosen DSV to transport CO2 efficiently and safely between Avedøre Power Station to Asnæs Power Station with lorries (trucks and CO2 trailers) making continuous round trips over the 100 KM distance. The CO2 trailers are specially designed for high capacity and fast loading/unloading.

Key facts:

- A trailer roundtrip transfers approx. 34 tonnes of CO2 from the Avedøre site to the Asnæs site
- 150,000 tons of CO2 transported annually between the two sites.
- One round trip (Avedøre - Asnæs - Avedøre) takes approx. 6 hours (including loading and unloading time).
- Up to 6 DSV CO2 trucks operate continuously around the clock between the two sites, completing an estimated 14-17 round trips per day.

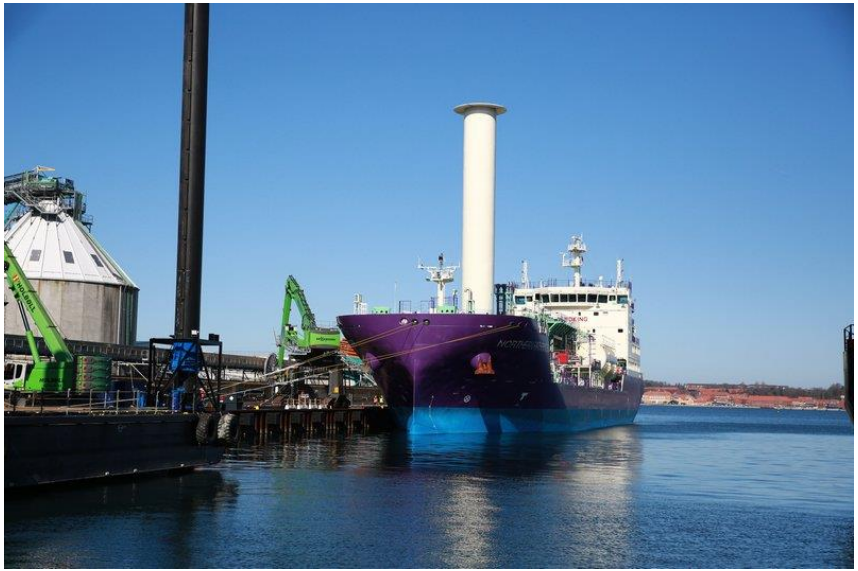
Why we've chosen a truck solution

- Due to the considerably shorter transport distance, truck transport emits significantly less CO2 compared to shipping. Trucks emit less than 1,000 tonnes of CO2 annually, which is 0.7% of the 150,000 tonnes of CO2 transported.
- Truck transport offers greater flexibility, enabling a transition to a more permanent solution, such as underground pipelines, in the future.

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 the 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

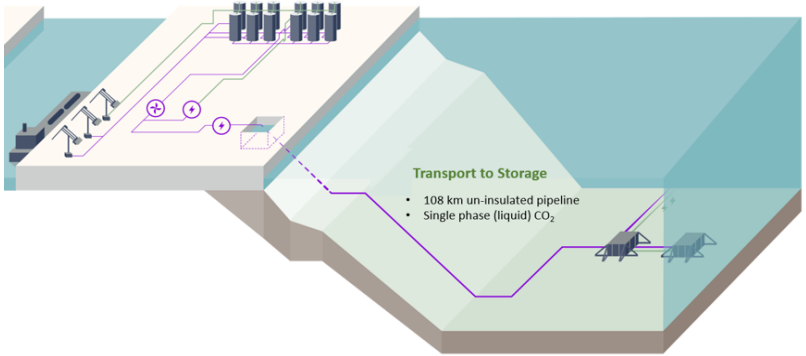
Northern Lights' onshore terminal & offshore permanent storage

Northern Lights technical scope

- The CO_2 will be stored in Northern Lights' reservoir, a saline aquifer about 110 km from shore and 2,600m under the seabed, total capacity of ~125-175 MT.
- Saline aquifers are defined as porous and permeable reservoir rocks that contain saline fluid in the pore spaces between the rock grains, this is a type of formation deemed highly suitable for large-scale CO_2 storage and already demonstrated through the Sleipner field in Norway. Here, the CO_2 is trapped in rock pores and will dissolve and mineralize over time.
- Northern Lights onshore terminal in Øygarden, Norway, will receive and temporarily store the CO_2 transported. From the onshore storage facilities, the CO_2 will be pumped through a ~100 km long subsea pipeline to a subsurface reservoir via injection wells, for permanent storage.
- Extensive facility and subsurface monitoring of the CO_2 during injection period and post-injection period will ensure the CO_2 is conformed and contained.

Northern Lights onshore terminal

Northern Lights infrastructure



Source: Northern Lights

Bioenergy is building an attractive CCx pipeline to expand and reap commercial synergies and expand the market for biogenic CO_2

FID'ed

Kalundborg CO_2 Hub

What: Carbon capture on biogenic flue gas at Asnæs & Avedøre CHPs, export CO_2 via ship to permanent storage in Norway

How: Funded by state subsidy & carbon removal certificate agreements

Volume: 430,000 tonnes/y

FID & Award 2023 | COD 2025

License awarded

CO_2 Storage Kalundborg

What: Onshore permanent geological storage near Kalundborg CO2 Hub. Ørsted to receive CO_2 at Asnæs CHP terminal, strategic partner Equinor to store CO_2

Potential volumes: 3-12 MT/y, total capacity estimated +250 MT

License Awarded June 2024 | COD 2030

Stopped until further notice

Skærbæk Carbon Capture

What: Carbon capture on biogenic flue gas at Skærbæk CHP, export CO_2 to onshore/ offshore storage

How: Potential subsidized through DEA 2024 CCS tender and through carbon removal certificate agreements

Volume: 350–500,000 tonnes/y

FID Q4 2025 | COD 2029

Scaling of Kalundborg CO_2 Hub

What: Kalundborg Hub is well fitted to export CO2 from pointsouces in South Denmark to permanent storage in the North Sea. Dialogue with a number of customers that aim to participate coming Danish CCS tender

How: Third party volume through Kalundborg Hub

Volume: up to 1 – 2 MTA

COD 2029

Increasing synergies across sites and increased access to revenue streams from biogenic CO2

2026 2028 2030

CHP: Combined Heat and Power Plant
FID: Final Investment Decision | COD: Commercial Operations Date
CCS: Carbon Capture and Storage | CCU: Carbon Capture and Utilization

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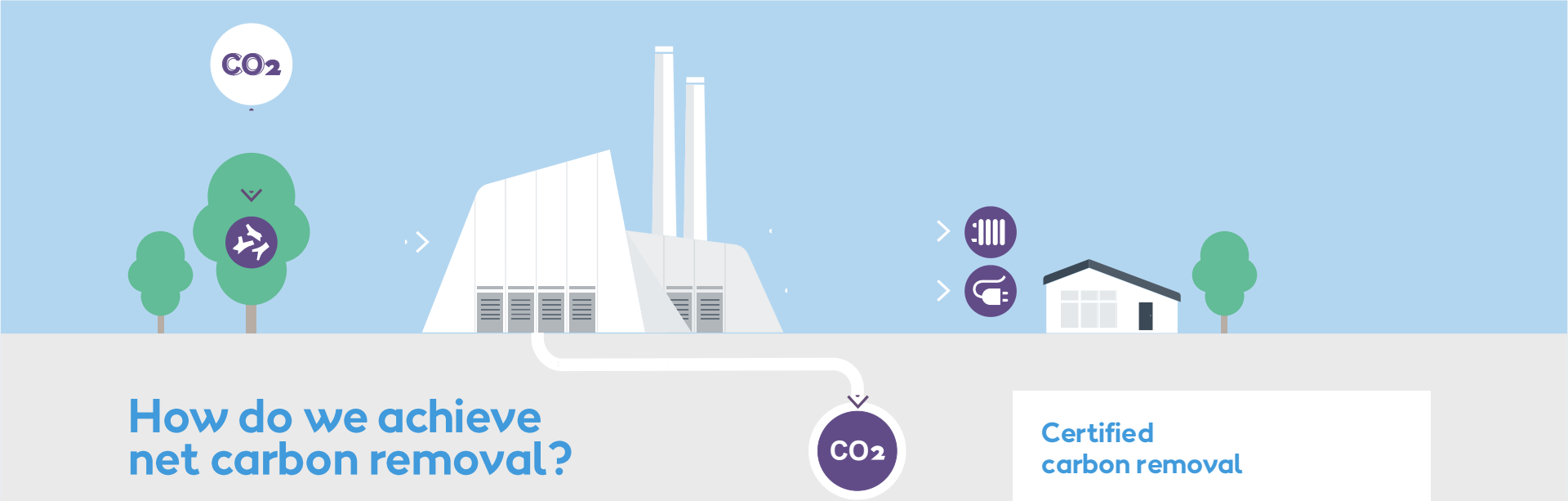

How do we achieve net carbon removal?

Our Danish combined heat and power plants use biomass, such as straw or wood chips, to provide heat and electricity to Danish households.

Bioenergy is renewable as the biomass comes from sustainably managed forests or agricultural areas that produce wood products or agricultural commodities for society. We use their waste and residues instead of fossil fuels at our combined heat and power plants.

The forest which produce the residues we use are replanted. This means the amount of CO_2 stored in the residues we take is matched by the CO_2 taken up by new trees during growth. As we also capture and permanently store the CO_2 emitted when burning the residues, the net amount of CO_2 in the air is lower than before.

Certified carbon removal

Our carbon removal is certified by an independent third party under the VERRA standard.

Selected companies purchase certified carbon removal from us. This not only helps finance the CCS project but also aids these companies in achieving their climate goals.

In 2023, Microsoft was the first company to purchase 2.67 million tonnes of carbon removal.

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Asnæs Power Station – CCS site

1. Smokestack
2. Three carbon capture units
3. Three compression and liquefaction units
4. CO_2 pipe bridge
5. CO_2 import truck terminal
6. Six intermediate CO_2 storage tanks
7. Liquid CO_2 filling line
8. CO_2 ship loading terminal on pier

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Photos from the Asnæs site

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