News from Ørsted

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Ørsted awarded contract – will capture and store 430,000 tonnes of biogenic CO_2

The Danish Energy Agency (DEA) has awarded Ørsted a 20-year contract for its carbon capture and storage (CCS) project 'Ørsted Kalundborg Hub'. The project entails that Ørsted will establish carbon capture at its wood chip-fired Asnæs Power Station in Kalundborg in western Zealand and at the Avedøre Power Station's straw-fired boiler in the Greater Copenhagen area.

"We're incredibly pleased with the outcome of the tender process, and we look forward to initiating the work of establishing a carbon capture facility at two of our combined heat and power plants running on sustainable straw and wood chips. According to the UN's Intergovernmental Panel on Climate Change (IPCC), capture and storage of biogenic CO_2 is one of the tools we must use to fight climate change, and our CCS project will contribute significantly to realising the politically decided Danish climate targets for 2025 and 2030," says Ole Thomsen, Senior Vice President and Head of Ørsted's Bioenergy business.

During 2025, the Asnæs and Avedøre combined heat and power plants will begin to capture and store biogenic carbon, and at the beginning of 2026, the two units will capture and store approx. 430,000 tonnes of biogenic CO_2 every year. The realisation of the project will be the first step in establishing a large-scale CO_2 infrastructure across Denmark as the Asnæs Power Station will not only serve as hub for the capture and shipping of Ørsted's own biogenic CO_2, but potentially also for shipping CO_2 produced by other emitters.

Ørsted has teamed up with Aker Carbon Capture, the Norwegian frontrunner in carbon capture technology and developer of a field-proven and proprietary carbon capture technology. As carbon capture provider, Aker Carbon Capture will deliver five Just Catch™ units to the CHP plants. The Just Catch™ standardised concept is a modular and configurable offering, which enables efficient production and deployment of carbon capture units.

"We're proud of our partnership with Ørsted and see this project as a milestone for our standardised Just Catch offering to the mid-scale emitter market. We look forward to working with Ørsted and to contributing to their decarbonisation journey and to Denmark's CCUS ambitions," said Valborg Lundegaard, CEO at Aker Carbon Capture.

The 430,000 tonnes of biogenic CO_2 from the Asnæs and Avedøre combined heat and power stations will be shipped to the Northern Lights storage reservoir in the Norwegian part of the North Sea. Ørsted has entered a contract with Northern Lights, who is developing a CO_2 transport and storage infrastructure. Phase one of the Northern Lights project will be completed in 2024 and is the most mature carbon storage site in the North Sea.

"We're very pleased that Ørsted has selected Northern Lights as CO_2 storage provider. This agreement confirms the commercial potential for CCS and demonstrates that the market for transport and storage of CO_2 is evolving rapidly," says Børre Jacobsen, Managing Director of Northern Lights.

By capturing the biogenic carbon from biomass-fired combined heat and power plants and storing it underground, it is possible to not only reduce, but also remove CO_2 from the atmosphere, as biogenic carbon from sustainable biomass is part of a natural biogenic carbon cycle. Thereby, you create negative emissions.

Carbon removal
In March 2021, Ørsted, Aker Carbon Capture, and Microsoft signed an agreement to, among other things, drive forward the process of reaching actual operation of a commercial and technical setup that combines carbon capture and clean energy production via biomass-fired combined heat and power plants.

In direct support of this new project, Microsoft has agreed to purchase 2.76 million tonnes of high-quality, durable carbon removal over 11 years from the capture and storage of biogenic carbon from the Asnæs Power Station. This represents one of the world's largest carbon removal offtake agreements by volume, to date.

"Our landmark long-term agreement with Ørsted for high-quality carbon removal supports Microsoft's commitment to become carbon-negative by 2030, sends a strong demand signal to scale the market, and showcases the power of partnership and the technological innovation needed to help the world make the clean energy transition," said Melanie Nakagawa, Chief Sustainability Officer at Microsoft.

The agreement between Ørsted and Microsoft also demonstrates the commercial value associated with carbon capture and removal. Given the nascent state of bioenergy-based CCS, Danish state subsidies and Microsoft's contract were both necessary to make this project viable.

This partnership demonstrates how decarbonised solutions can mature and scale when offtakers, operators, technology providers, and policy makers collaborate closely. By creating a commercial setup of negative emissions that provides transparency and lowers the cost and time to market for carbon offsets, CCS can move from relying on subsidies to operating on market terms. This is similar to the development of other renewable energy solutions, such as solar PV and wind energy.

Surplus heat
The carbon capture process will be heat-integrated with the combined heat and power plants, enabling district heating to be supplied both in Kalundborg and the Greater Copenhagen area.

The carbon capture process at Avedøre Power Station's straw-fired boiler has the potential to regenerate approximately 35 MW of surplus heat, and the carbon capture process at Asnæs Power Station has the potential

to regenerate approximately 50 MW of surplus heat, corresponding to the annual district heating consumption of approx. 11,000 and 20,000 Danish households, respectively.

The tender procedure is fully completed when the contract has been signed by Ørsted and the DEA. Signing is expected to take place shortly after expiry of the mandatory standstill period. Ørsted expects to begin the construction of carbon capture units at Asnæs and Avedøre combined heat and power stations in June 2023.

Facts about 'Ørsted Kalundborg Hub':

- Ørsted will establish carbon capture at its wood chip-fired Asnæs Power Station in Kalundborg in western Zealand and at the Avedøre Power Station's straw-fired boiler in the Greater Copenhagen area.
- Ørsted will capture 150,000 tonnes of biogenic CO_2 per year from the straw-fired unit at Avedøre Power Station. The CO_2 will initially be transported by lorry to Asnæs Power Station until a shared pipeline infrastructure across Zealand has been established.
- The straw-fired unit at Avedøre Power Station converts approximately 145,000 tonnes of locally sourced straw into electricity and district heating annually. The straw is a by-product of agriculture.
- Ørsted will capture 280,000 tonnes of biogenic CO_2 per year from the wood chip-fired unit at Asnæs Power Station, which will also function as a CO_2 hub, handling and shipping biogenic carbon from both the Avedøre and Asnæs combined heat and power stations to the Northern Lights storage reservoir in the Norwegian part of the North Sea.
- The wood chip-fired unit at Asnæs Power Station converts approximately 380,000 tonnes of wood chips from primarily the Baltics into electricity, district heating, and process steam for the local industry. The wood chips come from sustainably managed production forests and consists of residues from trimming or crooked trees.
- The wood chip-fired unit at Asnæs Power Station works in interaction with Asnæs Power Station's electric boiler and Kalundborg Utility's heat pump. Thus, green power is utilised when it is available at competitive prices, while wood chips from sustainably managed forests ensure that Kalundborg's need for process steam for the industry, district heating for homes, and power for Denmark is covered completely without the use of fossil fuels.

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About Ørsted
The Ørsted vision is a world that runs entirely on green energy. Ørsted develops, constructs, and operates offshore and onshore wind farms, solar farms, energy storage facilities, renewable hydrogen and green fuels facilities, and bioenergy plants. Ørsted is recognised on the CDP Climate Change A List as a global leader on climate action and was the first energy company in the world to have its science-based net-zero emissions target validated by the Science Based Targets initiative (SBTi). Headquartered in Denmark, Ørsted employs approx. 8,000 people. Ørsted's shares are listed on Nasdaq Copenhagen (Orsted). In 2022, the group's revenue was DKK 132.3 billion (EUR 17.8 billion). Visit orsted.com or follow us on Facebook, LinkedIn, Instagram, and Twitter.