

bp and Ørsted to create renewable hydrogen partnership in Germany

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- Plan to jointly develop industrial-scale electrolyser project for green hydrogen production
- Powered by Ørsted offshore wind, project will initially replace 20% of natural gas-based hydrogen used at bp's Lingen refinery
- Scale of project will support future reduction in green hydrogen costs
- bp's first full-scale green hydrogen project, a significant step in strategic development of new hydrogen business aligned with German and EU hydrogen strategies

bp and Ørsted have today signed a Letter of Intent (LOI) to work together to develop a project for industrial-scale production of green hydrogen – a significant step in developing bp's hydrogen business. Green hydrogen is made by the electrolysis of water using renewable power, producing zero emissions.

In their proposed Lingen Green Hydrogen project, the two firms intend to build an initial 50 megawatt (MW) electrolyser and associated infrastructure at bp's Lingen Refinery in north-west Germany. This will be powered by renewable energy generated by an Ørsted offshore wind farm in the North Sea and the hydrogen produced will be used in the refinery.

Under their LOI, bp and Ørsted will now work together to further define the project, agree definitive documents and plan to make a final investment decision (FID) early 2022, subject to appropriate enabling policies being in place. The companies anticipate the project could be operational by 2024.

Electrolysis splits water into hydrogen and oxygen gases. When powered by renewable energy, this produces 'green' hydrogen, without generating direct carbon emissions. Hydrogen is widely used in refinery processes where – as in Lingen – it is now typically produced by reforming natural gas, which does result in CO₂ emissions. This is also known as 'grey' hydrogen.

The 50 MW electrolyser project is expected to produce one tonne an hour of green hydrogen or almost 9,000 tonnes a year. This would be sufficient to replace around 20% of the refinery's current grey hydrogen consumption, avoiding around 80,000 tonnes of CO₂ equivalent emissions a year – equivalent to the emissions from around 45,000 cars in Germany.

Dev Sanyal, bp's executive vice president for gas and low carbon, said: "Hydrogen will have an increasing role to play in meeting the energy demands of a decarbonizing world. And we are determined to build a leading position in this emerging industry. Bringing together Ørsted and bp, Lingen Green Hydrogen offers the opportunity both to accelerate significant emissions reduction in our refinery and build experience of large-scale green hydrogen production and deployment. This has

the potential to play an important role in the development of a hydrogen economy, in Germany and beyond.”

Martin Neubert, executive vice president and CEO of offshore wind for Ørsted, added: “Heavy industries such as refineries use large quantities of hydrogen in their manufacturing processes. They will continue to need hydrogen, but replacing the current fossil-based hydrogen with hydrogen produced from renewable energy can help these industries dramatically lower their CO₂ footprint. But first, renewable hydrogen has to become cost competitive with fossil-based hydrogen, and for that we need projects such as this with bp’s Lingen refinery which will demonstrate the electrolyser technology at large scale and showcase real-life application of hydrogen based on offshore wind.”

In the coming decades, hydrogen is expected to play a critical role in decarbonising the power, industry and transport sectors, especially those that are hard-to-electrify or expensive-to-electrify. The development of businesses in emerging technologies such as hydrogen and carbon capture use and storage (CCUS) is an integral part of bp’s strategy of transforming to an integrated energy company.

In addition to green hydrogen production, bp and Ørsted intend to focus on maximising the efficiency of the project’s electrolysis system, including assessing sustainable uses for the main by-products of the process, primarily oxygen and low-grade excess heat.

The project is also intended to support a longer-term ambition to build more than 500MW of renewable-powered electrolysis capacity at Lingen. This could provide green hydrogen to both meet all the refinery’s hydrogen demand and provide feedstock for potential future synthetic fuel production.

bp and Ørsted have together applied for funding for the Lingen Green Hydrogen project from the EU Innovation Fund – one of the largest funding programmes for innovative low carbon technologies, focusing particularly on energy intensive industries.

The Lingen Refinery processes about five million tonnes of crude oil a year (c 100,000 barrels a day), producing fuels, heating oil and chemical feedstocks. In 2018 Lingen conducted the world’s first trial of green hydrogen in a fuels refinery.

Further information

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Notes to editors

About bp

bp’s purpose is to reimagine energy for people and our planet. It has set out an ambition to be a net zero company by 2050, or sooner, and help the world get to net zero, and recently announced its strategy for delivering on that ambition. For more information visit [bp.com](https://www.bp.com).

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, and bioenergy plants, and provides energy products to its customers. Ørsted ranks #1 in Corporate Knights' 2020 index of the Global 100 most sustainable corporations in the world and is recognized on the CDP Climate Change A List as a global leader on climate action. Headquartered in Denmark, Ørsted employs 6,120 people. Ørsted's shares are listed on Nasdaq Copenhagen (Orsted). In 2019, the group's revenue was DKK 67.8 billion (EUR 9.1 billion).