

Press release

Green steel: Partners to build pioneering direct reduction test plant with hydrogen in Lingen

- **Government of Lower Saxony confirms funding for research project**
- **RWE, CO2GRAB, LSF and BENTELER Steel/Tube to test technologies for CO₂-free steel production**
- **Direct reduction test plant to be commissioned in 2022**

Lingen/Essen, 18 November 2021

Hydrogen will play a key role on the path towards decarbonising the steel industry. But how can the energy source of the future be used to produce climate-neutral steel in a cost-effective manner? Over the next three years the companies RWE, CO2GRAB, LSF and BENTELER Steel/Tube will conduct research in this area. Today, Olaf Lies, Minister for Environment, Energy, Building and Climate Protection in Lower Saxony announced the state's commitment to providing €3 million of funding to the CO2GRAB start-up. In 2022, the pioneering demonstration project for a green hydrogen direct reduction plant is to be built on RWE's Lingen power plant site.

Olaf Lies: "Only a few years ago, a lot of people would not have taken it seriously at all, but now it is becoming a reality: the defossilisation of Germany's steel industry. This is an essential component for the energy transition to succeed. And it sends another message to the world, that with expertise, determination and conviction we are bringing together objectives that would have been considered incompatible not too long ago. It is of vital importance to support: climate protection and energy transition whilst future-proofing Germany as a home for industry. I am therefore delighted to support this project in contributing towards solving this mammoth task."

Lingen's Lord Mayor Dieter Krone points out: "This collaboration shows the clear commitment of everyone involved in the project to innovation and climate protection. Once again Lingen will become a centre for research and development and one of Germany's most important hydrogen locations.

In green direct reduction, iron ore is reduced using hydrogen. The hydrogen reacts with the oxygen in the iron ore (iron oxide) and transforms it into sponge iron, also known as "direct reduced iron" (DRI). Unlike in traditional furnaces, steam rather than carbon dioxide is produced

using this technology. The sponge iron is then melted down with steel scrap and further processed to make steel. BENTELER Steel/Tube will in future use this type of steel to produce low-carbon seamless and welded tube solutions. During the first stage of the research project, over 1 ton/hour of green iron (sponge iron) will be produced using green hydrogen. Green hydrogen is to be produced in electrolyzers on the power plant site and fed into the DRI plant.

“This DRI technology has enormous potential in terms of decarbonising the steel industry. The technical expertise of the CO2GRAB start-up, which will build and operate the plant, ideally complements RWE’s knowledge along the entire green hydrogen value chain. LSF will optimise electrolyser operation for fluctuating wind and solar power generation. BENTELER Steel/Tube will then process the reduced sponge iron further to green steel and climate-neutral quality tubes. With this project we can thus make a significant contribution towards becoming climate-neutral,” the partners said in a joint statement. Commissioning of the demonstration plant is planned for the middle of 2022.

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(Credit: BENTELER Steel/Tube)

RWE Generation SE

With its power plants in Germany, the UK and the Netherlands, the approximately 3,000 employees of RWE Generation produce electricity primarily from gas, hydropower and biomass. The company ranks second in Europe with its gas-fired power plants. The RWE Group bundles its hydrogen activities in RWE Generation. RWE is driving forward more than 30 projects in the field of hydrogen with partners from industry and science.

CO2GRAB GmbH

The CO2GRAB GmbH, with sites in Aachen and Paderborn, was founded as a start-up in 2020 by Christoph Sonntag and Stephan Köhne with the objective to develop and bring to market efficient technologies for preventing new carbon emissions. Their timely scalability and economic feasibility are the key benchmarks for these technologies. Currently, CO2GRAB GmbH is predominantly engaged in the areas of direct air carbon capturing, including the use of CO2 in power-to-X processes, carbon-neutral concrete products as well as carbon-neutral iron production. The latter includes developing technologies for using the iron for long-term and cost-efficient energy storage and/or as transport medium, in particular for hydrogen. Due to its enormous potential in terms of carbon reduction, viability and technical feasibility, CO2GRAB GmbH has set itself the target of demonstrating the possibility of carbon-neutral iron reduction and bringing the technology to maturity in the near future.

LSF GmbH & Co. KG

The company focuses on planning, building and operating plants for generating electricity from renewables, in particular wind energy. As of now, the LSF & Partner group of companies has constructed approximately 100 wind turbines. In addition, the group is increasingly implementing international wind energy and photovoltaics projects. LSF’s expertise includes the evaluation of technical and commercial viability of projects, project planning and management of application processes, site management as well as technical and commercial management of the plants. The company puts particular emphasis on public participation models and measures to improve acceptance for expanding generation from renewables.

BENTELER

BENTELER is a global, family-owned company for customers from the automotive, energy and engineering sectors. As metal-processing specialists BENTELER develops, produces and sells safety-relevant products, systems and services worldwide. In the 2020 financial year the company made 6.358 billion euros in sales revenue. The BENTELER Automotive and BENTELER Steel/Tube divisions operate under the roof of strategic management holding company BENTELER International AG, based in Salzburg,

Austria. Around 27,000 employees at 98 sites in 28 countries provide first-class production and sales skills – with passion and close to the customer. BENTELER. The family of driven professionals. Since 1876. www.benteler.com

BENTELER Steel/Tube

BENTELER Steel/Tube develops and produces steel as well as seamless and welded quality steel tubes. As a leading producer BENTELER offers their customers around the world solutions all along the value chain – from material development to tube applications. In this way BENTELER delivers tailored tube products for the automotive, energy and industry markets. The BENTELER Steel/Tube division operates seven plants in total, five of which are located in Germany: Paderborn, Schloss Neuhaus, Lingen, Bottrop and Dinslaken. <https://www.benteler-steeltube.com/en>

Forward-looking statements

This press release contains forward-looking statements. These statements reflect the current views, expectations and assumptions of management, and are based on information currently available to management. Forward-looking statements do not guarantee the occurrence of future results and developments and are subject to known and unknown risks and uncertainties. Actual future results and developments may deviate materially from the expectations and assumptions expressed in this document due to various factors. These factors primarily include changes in the general economic and competitive environment. Furthermore, developments on financial markets and changes in currency exchange rates as well as changes in national and international laws, in particular in respect of fiscal regulation, and other factors influence the company's future results and developments. Neither the company nor any of its affiliates undertakes to update the statements contained in this press release.

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