DUAL-PRESSURE HYDROGEN TANK SYSTEM

BACKGROUND

German and Dutch companies cooperate to build the hydrogen value chain

The use of hydrogen (H_2) is considered a key building block in shaping the energy transition. Especially in the north of the Netherlands and Germany, where renewable energy is increasingly being produced, the use of hydrogen as an energy carrier is gaining in importance. H2Watt provided the platform for the realisation of numerous implementation projects. The focus was on processes and systems for the efficient production, storage, transport and use of hydrogen. The innovation projects were mainly implemented on the islands of Borkum and Ameland. The natural characteristics in the Wadden Sea provide optimal conditions for the production of "green" hydrogen, e.g. with the help of wind and solar power plants as well as wave and tidal power plants. Another advantage is that a self-sufficient consideration of the supply system could be made.

OBJECTIVES

Borkum 2030: Hydrogen as a building block of the energy transition on the Wadden Sea island

Nordseeheilbad Borkum has the goal of becoming an emission-free North Sea island by 2030. The foundation for this was laid by a city council resolution in 2018 regarding the creation of an integrated urban development concept, which was followed by the development of an energetic neighbourhood concept in accordance with "KfW 432". The concept developed for the CO_2-free district of Borkum Reede was to serve as a blueprint for the entire island. The use of regeneratively generated electricity was at the centre of the

BORKUM

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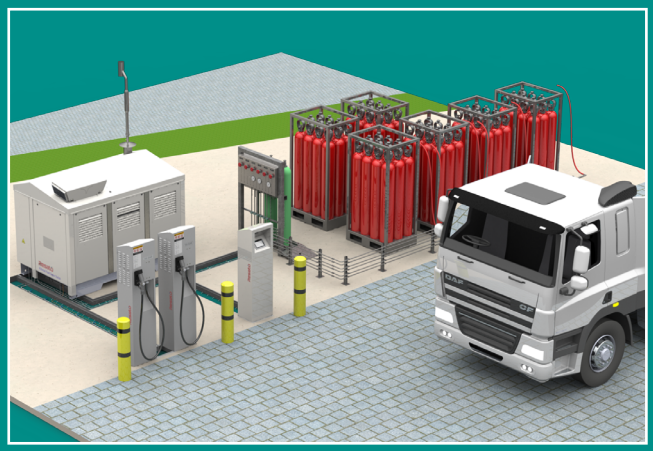

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considerations. On the one hand, this was used in heat pumps that supplied low-temperature environmental heat from the North Sea to cover the district's heating needs as far as possible. Preliminary studies on the use of environmental heat from the North Sea confirmed the enormous potential and technical feasibility of this approach. On the other hand, renewable electricity was used in electrolysers to produce hydrogen. The hydrogen infrastructure was used to supply energy to buildings by extracting process heat and directly for mobile applications in cars, lorries and local passenger transport, and is also to be used in maritime applications in the future. Through the partnership in the H2Watt project, the installation of a refuelling infrastructure enabled the refuelling of vehicles with hydrogen.

RESULTS

Hydrogen infrastructure on Borkum: The fleet-owner-station

On the site of Energiezentrale Juister Strate, Nordseeheilbad Borkum GmbH, segment Stadtwerke, realised the construction and operation of a hydrogen refuelling system.The hydrogen was initially supplied in exchangeable hydrogen gas cylinder bundles with a refuelling capacity of up to 4 kg/h of hydrogen.

A bus or truck filling station as well as a car filling station was planned. The system covers all currently used pressure ranges (350 and 700 bar) for vehicles. Due to the low investment costs, the system offers an ideal start-up model for mobility applications. Furthermore, it is designed as a research and demonstration model.

JOIN IN!

The hydrogen tank infrastructure is designed as a research and demonstration model. With pleasure we would also like to offer external institutions, municipalities and companies the opportunity to use the infrastructure.

So if you have research questions or want to use the facility for demonstrations, testing and training purposes, please contact us.

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