



# **Innovating as a leading hydrogen region – the green economy in Bremerhaven**





PIONEER



# The maritime city of Bremerhaven is paving the way for the future.

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This is where today's research becomes tomorrow's reality. It doesn't take long for innovation to get up and running in our maritime city. Bremerhaven is a city of short distances where everything is within easy reach.

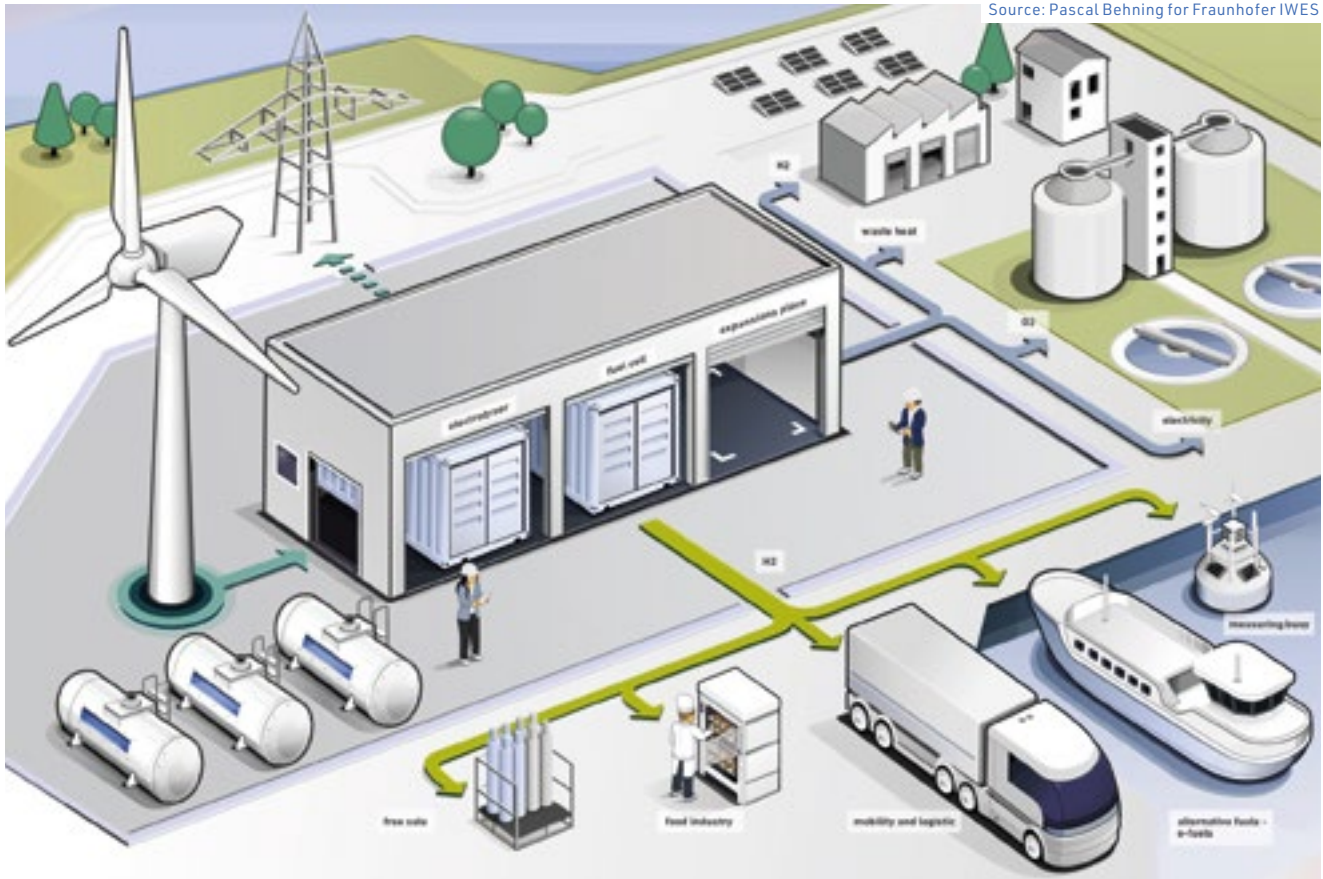
## **TAKE A SHORTCUT WITH US:**

Benefit from flexible solutions to your challenges. Choose hydrogen-based technologies that are already in use and which will be continuously expanded in the coming years. Enjoy a modern, high-performance port infrastructure and port logistics for your applications and export needs. Become part of a network that will support you, work alongside you and boost your strengths.

Bremerhaven offers you the spaces you need to get your business moving, including the LUNE DELTA business park and the Westlicher Fischereihafen commercial area on the site of the former Luneort airfield. You'll find the ideal conditions with outstanding test infrastructure, pooled competencies and a dense network of collaboration partners and funding opportunities. Get in touch and we will be happy to show you the perfect space to suit your needs.

**We'll do everything we can to help you make hydrogen the fuel of the future.**





Source: Pascal Behning for Fraunhofer IWES

# One location – many advantages

Green hydrogen produced only with renewable energy is taking on a key role in the energy transition. A totally new sector is emerging around this. Bremerhaven offers excellent opportunities for you to position your business at the very forefront of the market:

- up to 2 tonnes/day hydrogen production from 4 MW electrolyser capacity
- electrolyser test facility for up to 10 MW, electrolyser capacity for manufacturer-independent system tests
- test centre for hydrogen-based vehicles on roads and water
- scientific expertise, including in the production of synthetic natural gas and e-fuels, converting incinerators to hydrogen and hydrogen-based mobility
- academic and scientific institutions with hydrogen expertise, including Bremerhaven University of Applied Sciences, Fraunhofer IWES and ttz Bremerhaven (Technologie-Transfer-Zentrum)
- wind energy expertise and infrastructure
- prototype test region with 24 onshore and offshore wind turbines with a total of 80 MW
- the Klimahaus museum and the German Climate Foundation are right in the centre of the city and provide a communication and education platform for the energy transition
- Institute of Shipping Economics and Logistics (ISL)



Find out more here:  
[www.youtube.com/watch?v=k8Zxg0sV1ac](https://www.youtube.com/watch?v=k8Zxg0sV1ac)

**Find out more about the Bremerhaven hydrogen region.**



Photo: GfG/Michel Iffländer



# Test region and competence centre for hydrogen.

Sustainable growth is happening in Bremerhaven every day – with ever more expertise, experience and innovative ideas. Some hydrogen projects are already up and running and many more will follow in the coming years. **The foundations have been laid and future progress will be driven with these key elements:**

- sea port as a crucial hub for importing and exporting technologies
- industry with a need for green hydrogen and sustainable technologies
- scientific, technical and maritime expertise side by side

ROADMAP

End of 2022

Stage 1

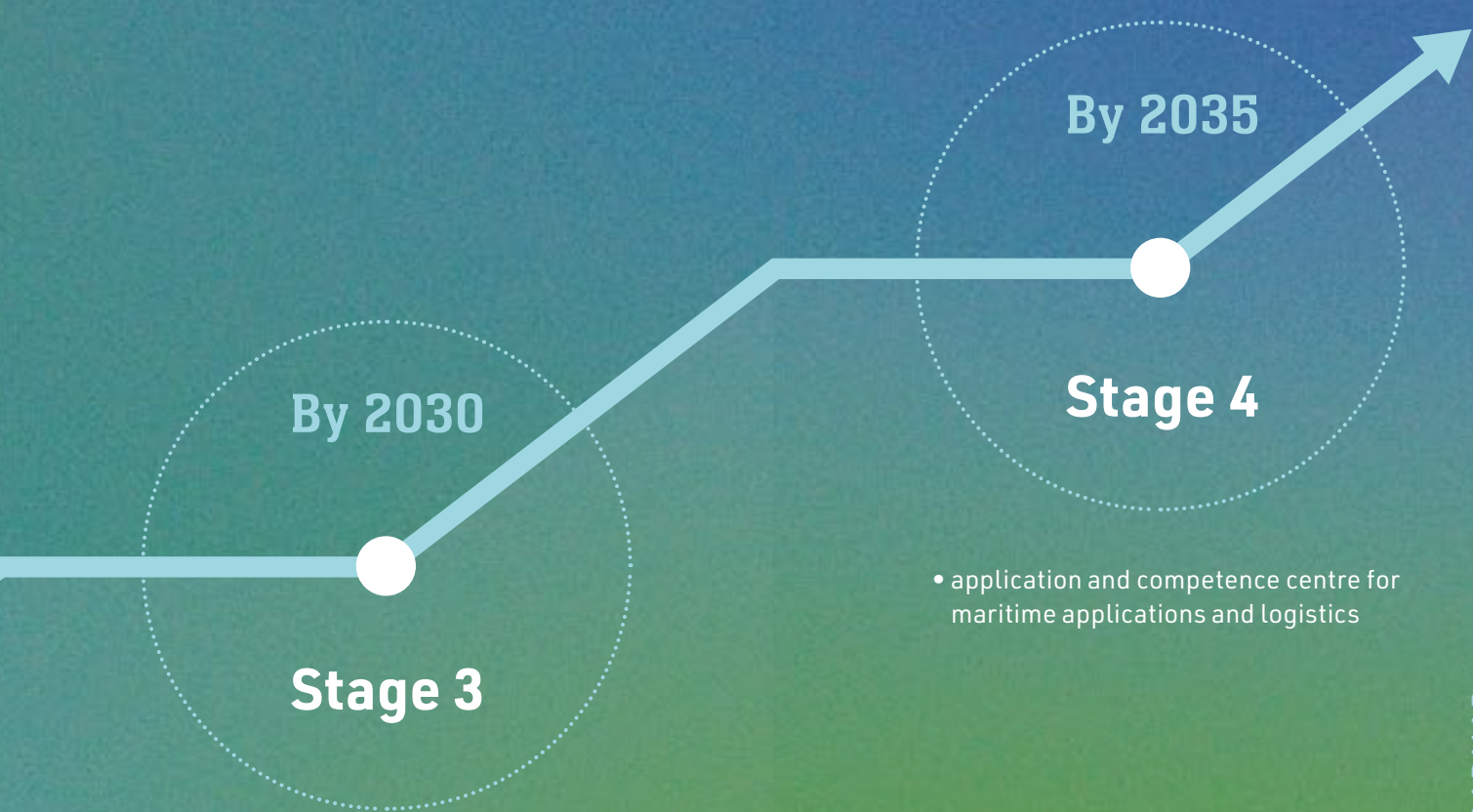
- 4 MW electrolyser (max. 1,600 kg/day) and hydrogen filling station
- technical centre for mobile hydrogen applications
- development of the INNOSegler vessel as a technology showcase to demonstrate the potential for CO<sub>2</sub> savings in freight and passenger shipping in Bremerhaven

By 2025

Stage 2

- hydrogen test centre for mobile hydrogen applications
- vehicles in use in municipal transport and at the port; multi-modal hydrogen filling station to enter operation
- construction and entry into service of the INNOSegler technology showcase and demonstration vessel, plus ships with reduced emissions





**By 2030**

**Stage 3**

- 1 MW seawater electrolyser at the port
- hydrogen-powered port vehicles and synthetic methanol

**By 2035**

**Stage 4**

- application and competence centre for maritime applications and logistics



# The perfect match of visionaries and collaborators.

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We have paved the way for the future as a leading hydrogen region. We have science and business on our team, with researchers, practitioners and the students who will be the specialists of the future. Together we are working to drive the energy transition with the help of hydrogen. Take a look at the following selection of projects and facilities. Please get in touch if you have any questions or are interested in collaborating.



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Find out more here:  
[www.bis-bremerhaven.de/en/](http://www.bis-bremerhaven.de/en/)





## PROJECT

# Hydrogen – green gas for Bremerhaven.

Research and practice hand in hand.

Around € 20 million from the State of Bremen and the European Union is being invested to build a value chain from hydrogen production to storage and practical trials for mobility applications. The project forms the foundations for a hydrogen competence centre in Bremerhaven and brings together various sub-projects



You can find out more about the project here:  
[www.wind-wasserstoff-bremerhaven.de](http://www.wind-wasserstoff-bremerhaven.de)

with a range of priorities. The Fraunhofer Institute for Wind Energy Systems (IWES), Bremerhaven University of Applied Sciences and ttz Bremerhaven (Technologie-Transfer-Zentrum) are involved as cooperation partners.



European Union  
 Investment in Bremen's future  
 European regional  
 development fund



### Operation of a hybrid power plant and electrolyser test facility.

The first phase of the Hydrogen Lab Bremerhaven consists of a 2 x 1 MW electrolyser unit. When operating at full capacity it will be able to produce around 1 tonne of hydrogen per day. The power for the electrolysis will come from an 8 MW wind turbine. The plan is to use the green hydrogen produced at the site for other local projects in the city. A test facility for the hydrogen economy is also being built nearby. The Hydrogen Lab Bremerhaven will be operated by the Fraunhofer Institute for Wind Energy Systems (IWES).



### Construction of a microgrid test lab.

The focus here is on self-sufficient energy supply. The research is using a microgrid container to look at a self-sufficient power grid with green energy and green energy storage on a small scale. This includes renewable energy from solar and wind power, a small electrolyser to produce hydrogen, gas cylinder bundles for storage and a battery to store energy. Firstly, this enables the technical modules and their interfaces to be tested. Secondly, it also means that various application models with self-generation and external fuel supply can be investigated. The microgrid test lab is operated by Bremerhaven University of Applied Sciences.



### Applications for the mobility, transport and food sectors.

This project uses a lab-scale test unit to produce synthetic natural gas as an alternative fuel for the mobility and transport sector. There are plans to trial the use of hydrogen-powered forklift trucks in companies in the region. Food process technology is another key focus. For instance, a hydrogen-powered bakery oven has been developed for industrial requirements. ttz Bremerhaven (Technologie-Transfer-Zentrum) is responsible for the project.





## PROJECT

### **Plasmalysis process and seawater electrolyser.**

Focus on sustainable hydrogen production.

This project aims to take waste water containing ammonium from the flue gas cleaning process at the Bremerhaven waste-to-energy plant and use plasmalysis to split it into hydrogen and nitrogen. Compared to the classic electrolysis process, plasmalysis requires much less energy to produce hydrogen and it is therefore a significantly cheaper process. The project is a collaboration with the waste disposal company Bremerhavener Entsorgungsgesellschaft mbH.

Another project is using renewable power directly at sea to produce hydrogen and hydrogen derivatives. One goal is to integrate the water electrolyser directly in a wind turbine in order to generate offshore green hydrogen. The H2Mare pilot project is being conducted by the German Federal Ministry of Education and Research in collaboration with the IWES.



You can find out more about the project here:  
<https://www.iwes.fraunhofer.de/en/research-projects/current-projects/h2mare---offshore-technology.html>



Source: ttz Bremerhaven

## PROJECT

# Test rig for hydrogen components and complete systems.

Sea motion simulator for maritime applications.

This project consists of a unique test infrastructure that can be made available to the shipbuilding and maritime supply industries to test new technologies for use on maritime vessels. The test rig for trialling hydrogen components and complete systems in three-dimensional space – also known as the ‘Seegangssimulator’

or sea motion simulator – can simulate all six degrees of freedom in ship motion and accommodate payloads of up to 30,000 kg in a 40 foot container format in an ATEX Zone 2 environment. The project is being conducted by ttz Bremerhaven.



You can find out more about the project here:  
<https://ttz-bremerhaven.de/downloads/>





## PROJECT

# Biofuel processes for aviation and shipping.

Producing environmentally friendly, renewable fuels.

The Flexi-GreenFuels project aims to advance the production of next-generation biofuels for aviation and shipping by developing improved technologies for converting lignocellulosic biomass residues and the organic fraction of municipal waste. The project focuses on three methods of converting sugars into lipids. These lipids will be further converted for aviation fuels and/or bunker fuels. Bremerhaven University of Applied Sciences is the project coordinator and one of the 13

project partners from four European countries.

The MariSynFuels methanol production project is another that is researching alternative fuels for shipping and is being led by ttz Bremerhaven.



You can find out more about the project here:  
<https://www.hs-bremerhaven.de/de/forschung/projekte/flexi-green-fuels>







# A broad base in Bremerhaven. Powerful networks for hydrogen.

The maritime city is a place where synergies are unlocked. This is vital for the energy transition, which depends on joint efforts – with expertise from a huge range of areas, experience that has been cultivated over time and solutions that will future-proof our energy supply. Within this, a strong network provides mutual support. This includes the H2BX association for hydrogen in the Bremerhaven region, which is dedicated to information sharing, support for education and science, technology-focused research and applied development in and for the region. Its name combines

the city's past and future: H<sub>2</sub> represents hydrogen and BX was the former fishing boat registration code for Bremerhaven. WAB is also part of the network. This association represents the interests of the wind energy sector in north-west Germany and acts as a contact partner for the offshore wind industry.

Take advantage of the existing synergies for your company's future. Bremerhaven is ready to meet your challenges.



# Hydrogen – technology for the future. Research for the practice of today and tomorrow.

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Ships, trucks, buses and cars powered by hydrogen. Companies that have switched to climate-neutral production with the help of hydrogen. The energy transition is under way and hydrogen is driving the future.

The wide variety of possibilities that this element offers people and the economy can already be seen in Bremerhaven. As can the benefits for the planet. Hydrogen holds great potential across sectors – whether in the food industry, the maritime economy, the transport and logistics sector or the offshore industry.

**Get on board and let's drive the green future in Bremerhaven together.**



**Maritime economy**

Hydrogen is playing a central role in the maritime economy and in logistics.



**Looking to the future**

A large network is working to open up the potential of green hydrogen for all.



**Mobility is on the move**

The fuel is being used in a variety of ways in the competence centre and in the test region for maritime applications.

# Close ties between innovation and tradition.

LOCATION BREMERHAVEN

The gateway to the fishing port is nearby, the Weser River is on the doorstep and the Luneplate nature reserve is a stone's throw away. New roots are being put down here and existing ones are being firmly anchored. The two business parks of the Lune Delta and the Westlicher Fischereihafen offer a sound basis and great potential for successful growth.

Further commercial spaces are available across the city region to meet your requirements. We would be happy to provide you with all the important details.







WESTLICHER  
FISCHEREIHAFEN

FISCHEREIHAFEN

ALTE LUNE

NATURE RESERVE  
LUNEPLATE

# Sustainable development or growth in the LUNE DELTA.

The planned new LUNE DELTA business park is in close proximity to the Luneplate nature reserve in the south of Bremerhaven and has been awarded a platinum pre-certificate. The project represents quality of work and life, energy efficiency, conservation of resources, communication and flexibility. It provides the perfect conditions for companies from the environmental technology sector or businesses that want to operate sustainably.



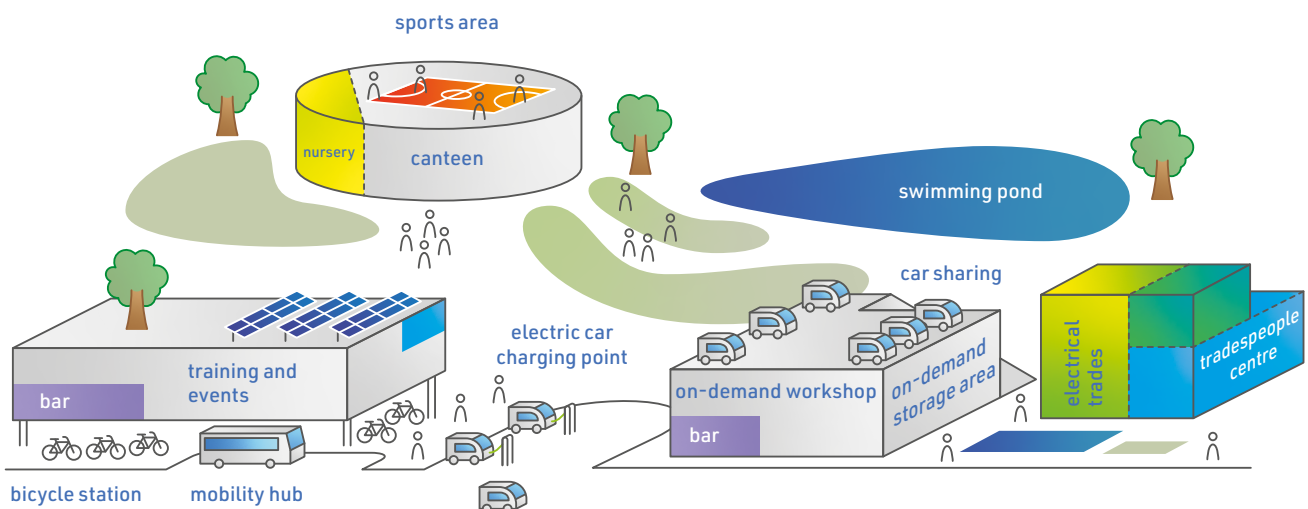
Source: urbanegestalt PartGmbH





# In harmony with nature, business and science.

- 150 ha of sustainable industrial and commercial space where you can achieve your business goals
- support and assistance for businesses on the road to sustainability
- flexible solutions for space and plot categories in sizes S, M and L
- production and use of renewable energy, plus biological water cycle (for example, all types of water – rainwater, service water from buildings and waste water from production – will be fed into a biological cycle and heavily contaminated waste water will be processed centrally in the nearby treatment plant)
- proximity to nature with pioneering infrastructure
- leisure facilities enhance the working environment
- commercial synergies and added social value through shared use of facilities
- start-up centre as a sustainable, innovative commercial centre and boost to the region





# Rethinking the future in the Westlicher Fischereihafen.

The Westlicher Fischereihafen business park is located on the site of the former Luneort airfield. The name, meaning western fishing port, hints at a key selling point of the site: where there's a port, there's also water. Businesses will benefit from the direct links to the Weser River and the North Sea here. The existing buildings on

the airfield can also be used. The infrastructure at the site offers companies a wide range of options for fast, practical and flexible business, as well as opportunities to share experience and build and consolidate networks.



# Inspiration and innovation at the water's edge.

- 61 ha of industrial and commercial space, some areas with existing development
- individually available solutions for space in various sizes
- test centre (test facility, test rig, sea motion simulator) within close proximity
- best opportunities to make efficient use of the business park's resources
- direct access to water, for example for safety training with rescue operations
- excellent links to high-performance port logistics
- a great neighbourhood: short distances and a diverse network are part of the concept





## We would be delighted to share our strengths with you!

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Benefit from outstanding infrastructure, pioneering logistics and mobility concepts, and a diverse network in Bremerhaven.

Share information. Share your ideas. Share in shaping the future.

**BIS Bremerhavener Gesellschaft  
für Investitionsförderung  
und Stadtentwicklung mbH**

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