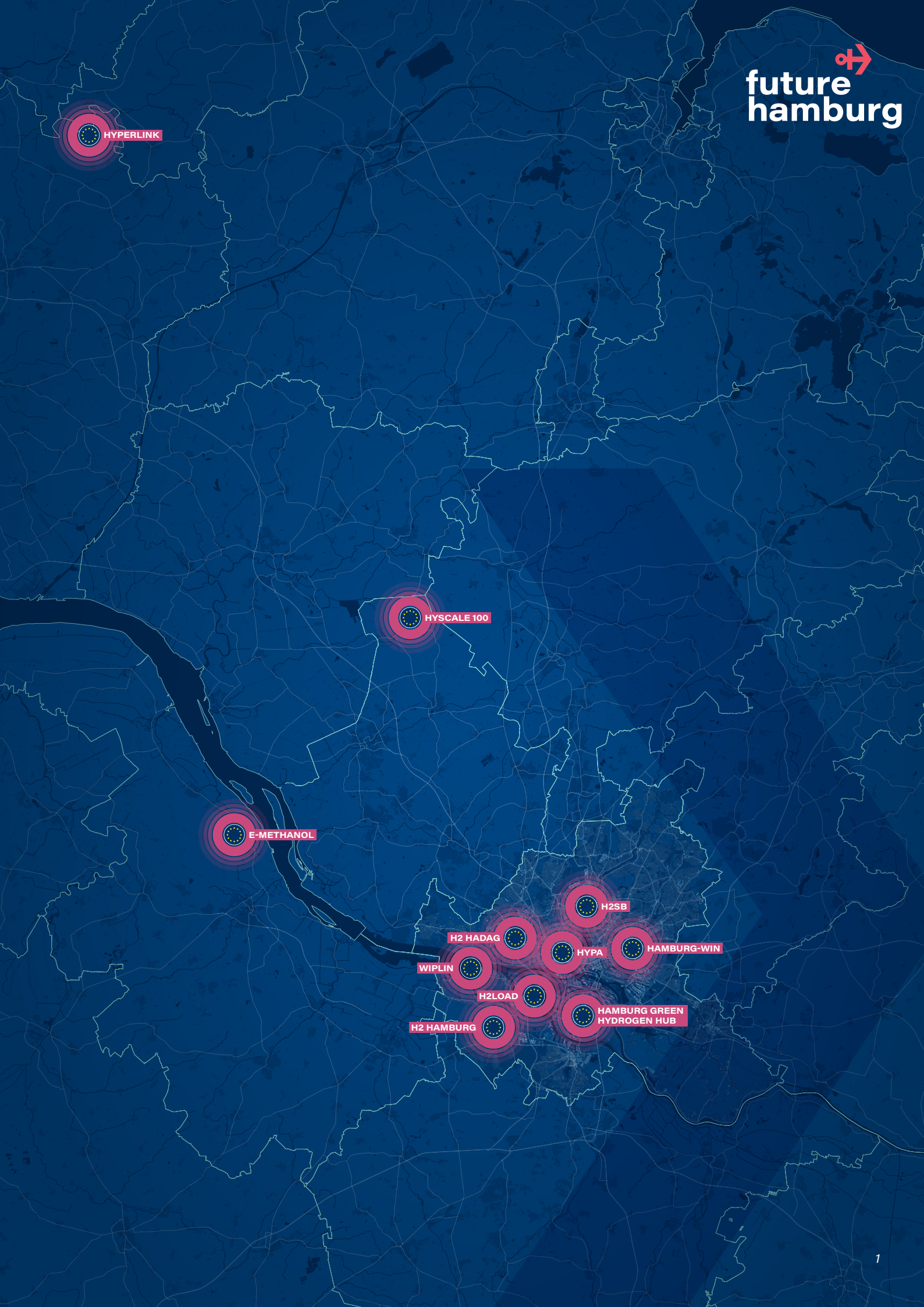
future hamburg

IPCEI – Important Projects of Common European Interest

Hamburg's green hydrogen eco-system – trailblazing the industrial decarbonisation

Hamburg


future hamburg
HYPERLINK
HYSCALE 100
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HAMBURG GREEN HYDROGEN HUB
H2 HAMBURG

Green Hydrogen: Future Made in Hamburg

According to the OECD, Northern Germany and the Hamburg Metropolitan Region are particularly suited for the successful establishment of a green hydrogen economy - and Hamburg is setting itself up for its economically viable implementation with competence and commitment.

The city of Hamburg is the most important trade and economic centre in Northern Europe. In order to lead the metropolis on the Elbe into a sustainably successful future, the city is driving the decarbonisation of industry and the development of a green hydrogen economy forward together with its partners. And it brings ideal conditions to the table.

In addition to unique locational advantages for the generation and storage of renewable energies, the metropolitan region also offers great potential for the purchase of hydrogen - especially by local industrial companies. The powerful port of Hamburg plays a central role as a future-proof site. It is not only an optimal logistics hub for import and distribution, but also one of the largest industrial areas in Europe. A variety of innovation-driven industrial partners are located here, including some of the world's largest companies in the basic materials processing industry. To supply them and others with green hydrogen, one of the world's largest electrolysers with a planned capacity of 100 megawatts is being built by 2025 in the port area on the site of the former Moorburg power plant.

In addition to this so-called "Green Hydrogen Hub", numerous other initiatives and alliances are involved in the development of a green hydrogen economy in the metropolitan region. These include twelve well-known companies that have joined forces to form the Hydrogen Alliance Hamburg. An efficient network of pilot projects and from research and development shows how green hydrogen can already be used successfully. For example, a total of twelve projects in the greater metropolitan region, covering different areas within a future hydrogen value chain, have recently been selected to be subsidised by state funds within the framework of the so-called IPCEI Hydrogen (Important Projects of Common European Interest) - making Hamburg the most powerful cluster for green hydrogen in Germany, well on its way to a top European position.

More information at: http://hydrogenhub.hamburg

Important Projects of Common European Interest

AQUADUCTUS

Transport pipeline for green hydrogen from the North Sea

In the future, the offshore AquaDuctus pipeline will transport green hydrogen from the North Sea directly to the mainland. It is part of the AquaVentus initiative, which plans to install 10 gigawatts of electrolysis capacity for hydrogen production from offshore wind power between Helgoland and Doggerbank.

The AquaDuctus pipeline is the vision for the first German offshore hydrogen pipeline. Once the construction of the production plants is fully completed, AquaDuctus shall transport up to one million tonnes of green hydrogen annually from 2035 onwards, thus contributing towards the decarbonisation of energy supply in Germany and Europe.

PARTNERS

GASCADE | Gasunie | RWE | Equinor | Shell

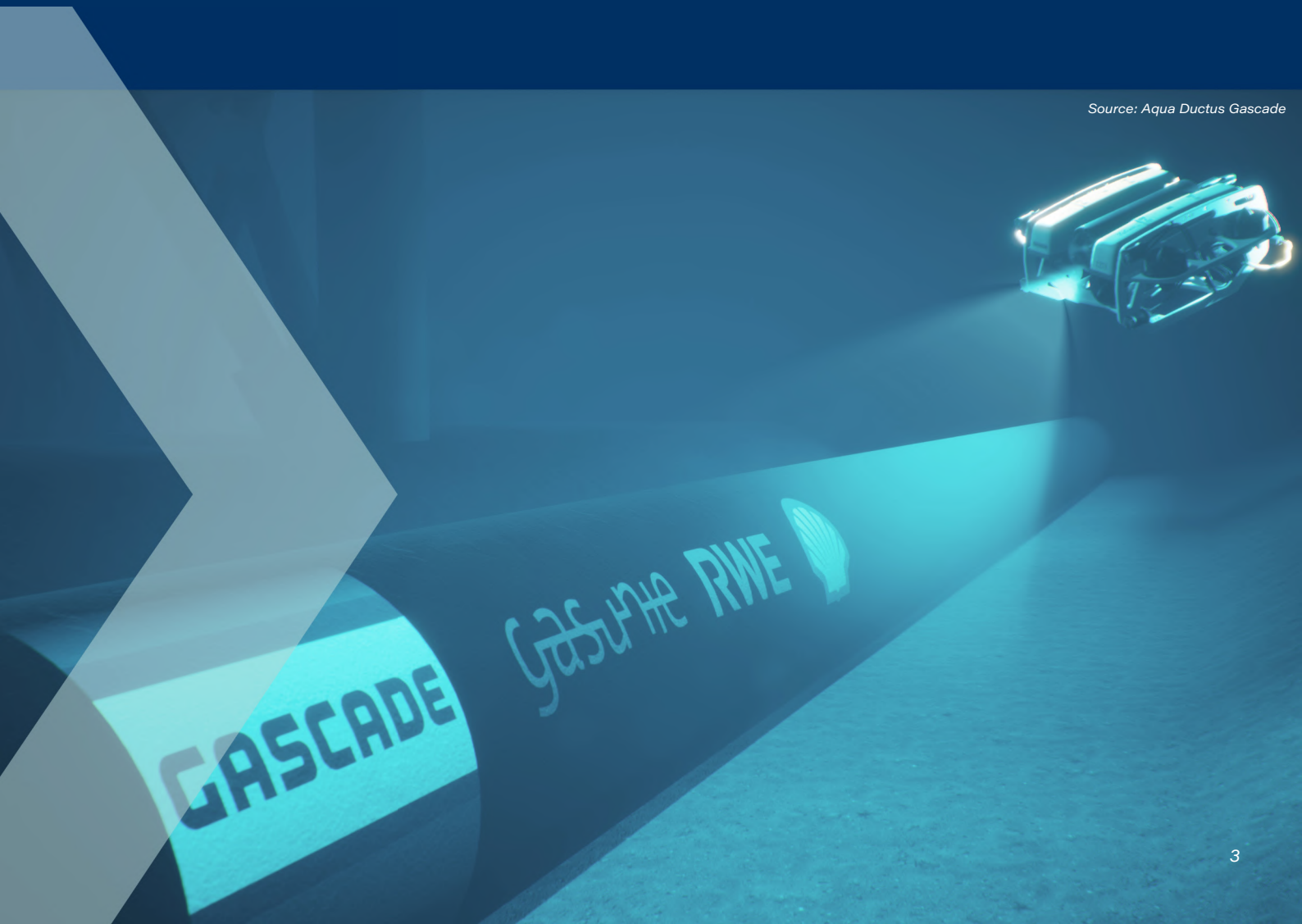
LOCATION
Helgoland, North Sea (Schleswig-Holstein)

RUNTIME
2021–2025

DISTANCE
400 kilometers – by far the most cost-effective option for transporting large volumes of energy

APPLICATION
Transport

Source: Aqua Ductus Gascade



Important Projects of Common European Interest

AQUA PRIMUS 2

Green hydrogen from the North Sea (part of the AquaVentus initiative)

As part of the AquaVentus initiative, the AquaPrimus 2 project aims to erect two 14MW offshore wind turbines with integrated water electrolysis off the coast of Helgoland by 2025 under the leadership of RWE. The plants shall be connected to Helgoland by pipeline. For this RWE is working in close collaboration with multiple partners on the project, including Shell and the technology providers Siemens Gamesa and Siemens Energy.

AquaPrimus 2 is part of the AquaVentus initiative, which intends to use electricity from offshore wind turbines in combination with offshore electrolysis on an industrial scale. Electrolysis plants in the North Sea with a total volume of 10 gigawatts (GW) are planned for 2035. From Helgoland, the hydrogen is to be transported onshore via a collection pipeline.

PARTNERS

Shell | Siemens Gamesa | Siemens Energy | et al.

LOCATION
Helgoland, North Sea (Schleswig-Holstein)

RUNTIME
2021–2025

TOTAL VOLUME
14 MW offshore wind turbines + electrolysis plant in the North Sea (10 GW by 2035)

APPLICATION
Production

Source: Mediaserver Hamburg, Kurverwaltung Helgoland

Important Projects of Common European Interest

E-METHANOL DOW

Making the chemicals industry carbon-neutral

The chemical park in Stade in the Hamburg Metropolitan Region is Germany's largest electricity consumer after Deutsche Bahn. The company wants to become a climate-neutral site – and has its sights set on green hydrogen and green methanol, among other things. As part of the Green MeOH project, in the future, CO2 is filtered out of the emissions from the gas-fired power plant in Stade and converted into methanol by adding hydrogen.

The objective is to produce 200,000 metric tons of methanol per year, which will be used in other chemical processes as well as in shipping traffic and heavy-duty transport. Compared to hydrogen, methanol is easier to transport, making it ideal for use in heavy-duty transport or the propulsion of ships. But it is also gaining significance as a renewable energy source, for example in fuel cells or for the production of biodiesel. The green hydrogen required for methanol production will also be produced on-site in Stade.

PARTNERS

DOW

LOCATION
Stade (Hamburg Metropolitan Region)

CAPACITY
Hydrogen production of 50,000 metric tons of hydrogen per year

APPLICATION
Industrial Usage | Sector Coupling Hydrogen Production

Source: Dow/Hager Press

Source: Mediaserver Hamburg, Konstantin Beck

Important Projects of Common European Interest

HAMBURG GREEN HYDROGEN HUB

The Hamburg Green Hydrogen Hub is one of the first projects worldwide to decarbonise an entire port economy. At the Moorburg power plant site, we use wind and solar power to split water into hydrogen and oxygen in a large electrolyser. Industry and transport in particular have a high demand for zero-carbon hydrogen energy. If all permits are granted on time, hydrogen production can start in 2025.

In addition to the construction of an electrolyser with a capacity of 100 megawatts and the potential for further expansion, the project also aims to investigate how the existing infrastructure at the site can be used in the future to generate energy based on renewable energies.

PARTNERS

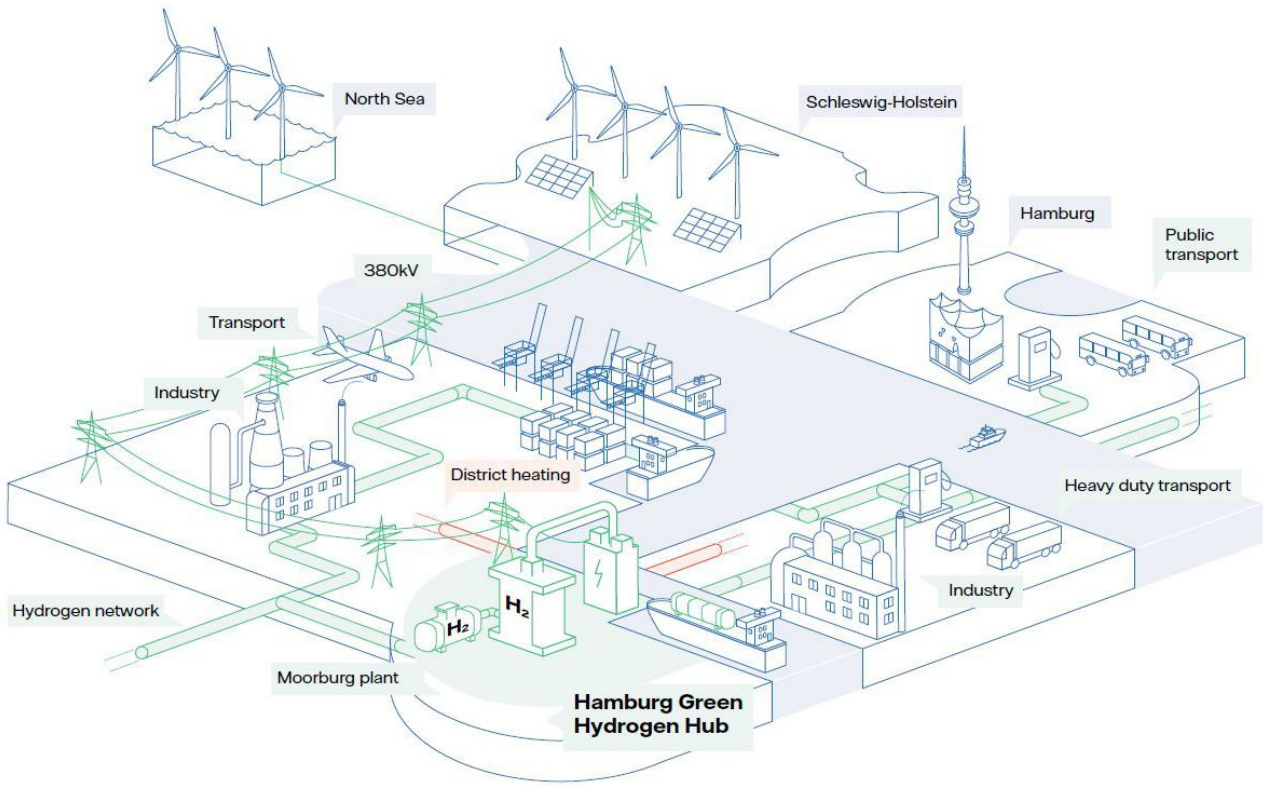
Shell | Mitsubishi Heavy Industries (MHI) | Vattenfall | Wärme Hamburg

LOCATION
Port of Hamburg

RUNTIME
2021–2025 | start 2025

CAPACITY
100 megawatts

APPLICATION
Production | Logistics
Industry | Storage



Source: Vattenfall

Important Projects of Common European Interest

HH-WIN

Hydrogen grid for Hamburg's industry

To supply energy-intensive industries in Hamburg with hydrogen, Gasnetz Hamburg is building the Hamburg hydrogen industrial network HH-WIN in the city's harbour. The 60-kilometre infrastructure will initially connect the electrolysis plant of the Hamburg Green Hydrogen Hub at the former Moorburg power plant site with industrial users. By connecting it to the planned German/European long-distance hydrogen pipelines, HH-WIN will become the central link in Hamburg's hydrogen economy.

The grid will enable the substitution of natural gas with an annual energy volume of 6.4 terawatt-hours with green hydrogen. In the long term, this will allow a CO2 reduction of 1.2 million tons/ year.

PARTNERS

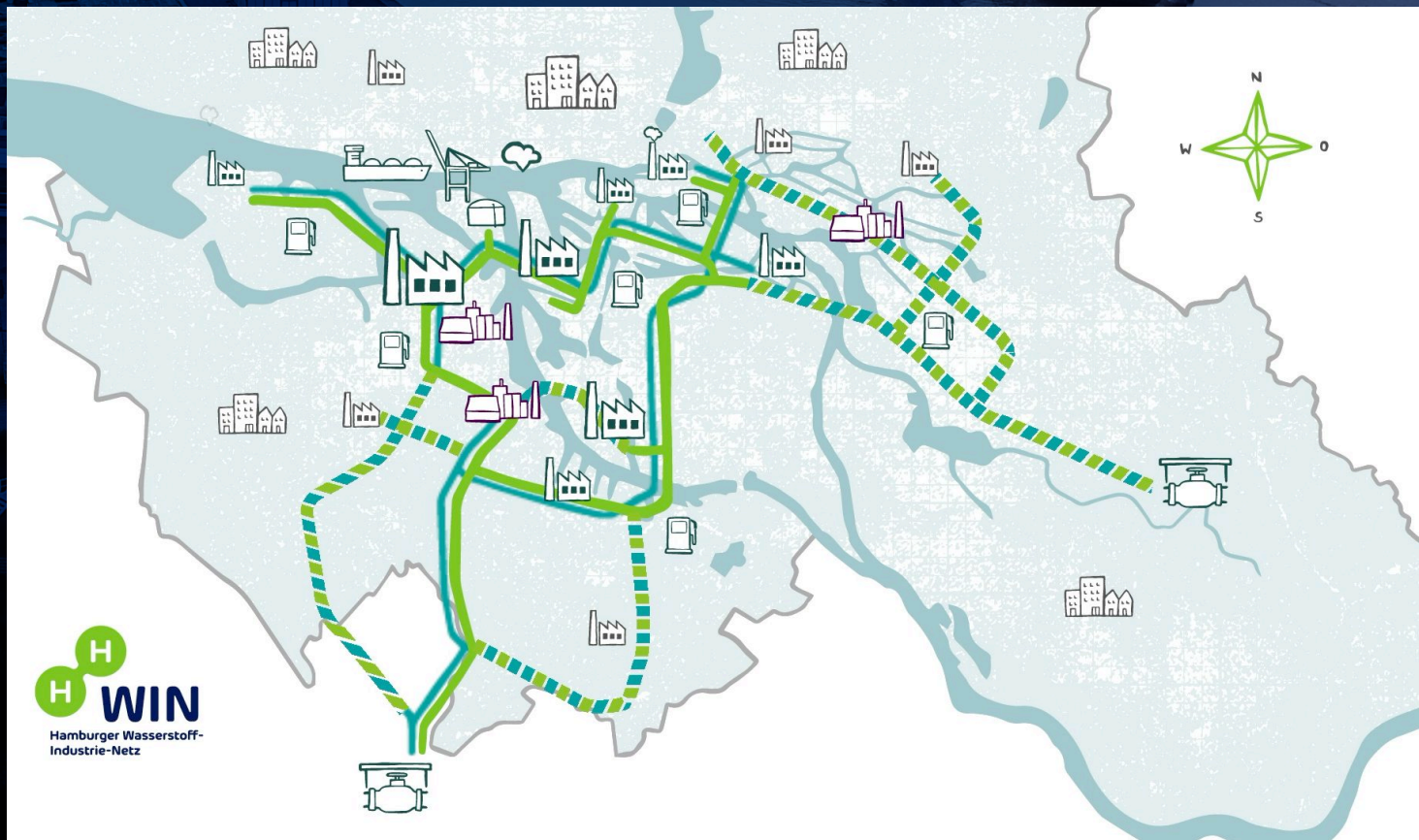
Gasnetz Hamburg | Hydrogen network Hamburg

LOCATION
Port of Hamburg

RUNTIME
2021–2030

PIPELINE
60 kilometres of hydrogen grid, connects hydrogen power station Moorburg with industrial users

APPLICATION
Infrastructure
Industrial Usage



Important Projects of Common European Interest

HYDROGEN PORT APPLICATIONS (HYPA)

Hydrogen fueling stations and hydrogen-powered vessels

With the Hydrogen Port Applications (HyPA) project, the Hamburg Port Authority (HPA) sets two different priorities as an infrastructure provider and enabler for roads, railways and waterways in the port of Hamburg. The transformation of mobility into the post-carbon era is aimed, on the one hand, at the provision of hydrogen fueling stations for locomotives, ships and trucks and, on the other, at the construction and use of innovative hydrogen-powered vessels.

"Hydrogen fuel tank infrastructure in the Hamburg port area allows emission-free traffic in the heavily used port area and is an essential step towards decarbonisation"
says Jens Meier, CEO of the Hamburg Port Authority.

PARTNERS

HPA Hamburg Port Authority

REGION
Port of Hamburg

START
2024

APPLICATION
Mobility | Infrastructure

Important Projects of Common European Interest

HYPERLINK

Hydrogen infrastructure for Northern Germany

HyPerLink creates a high-performance grid connection in Northern Germany between the import sources and production sites of hydrogen on the one hand and the large industrial consumption centres and underground storage facilities on the other hand. This will create a hydrogen backbone in Germany with a length of around 600 kilometres, mainly from existing gas pipelines in Northern Germany.

This backbone network will connect the Netherlands via Oldenburg and Bremen with a number of industrial cities such as Hamburg, Hannover and Wolfsburg, and with Denmark via Schleswig-Holstein.

PARTNERS

Gasunie | Energinet

REGION
Niedersachsen, Bremen, Hamburg, Schleswig-Holstein

RUNTIME
2021-2025/2030

APPLICATION
Infrastructure

Important Projects of Common European Interest

HYSCALE 100

Large-scale hydrogen production and decarbonisation

In the HySCALE100 project, numerous companies work together to implement hydrogen production on a large scale and to decarbonise two basic industries – petrochemicals and cement. Along an integrated value chain, renewable energies, petrochemicals and the cement industry will in future be connected in an overall systemic way.
The idea is to produce green hydrogen and convert it into synthetic basic materials using CO2, creating a broad product range of eFuels, eChemicals and eMethanol in combination with sustainably produced cement.

PARTNERS

Holcim Deutschland GmbH | Hynamics Deutschland GmbH
Ørsted Wind Power Germany GmbH | Raffinerie Heide GmbH

REGION
Heide, Hemmingstedt, Lägerdorf (Schleswig-Holstein)

RUNTIME
2021–2025/2027

APPLICATION
Production | Industrial Usage

Source: Raffinerie Heide

Important Projects of Common European Interest

H2HADAG

Emission-free shipping

As the operator of public passenger ferries in the port of Hamburg, the the public company of the Freie und Hansestadt Hamburg plans the use of emission-free vessels in its fleet from 2022. The H2HADAG project envisages the conversion of three new ships from diesel-hybrid to hydrogen-hybrid as well as the addition of two completely new ships (hydrogen-hybrid).

"In close coordination with our partners, we count on the establishment of the necessary fueling infrastructure and will thus successfully gear our fleet towards the future," says Dr. Tobias Haack, CEO of HADAG.

BY NUMBERS

- 3 ships (coverted from diesel to hydrogen hybrids)
- 2 hydrogen ships

PARTNERS

HADAG Seetouristik und Fährdienst AG

REGION
Port of Hamburg

START
2022

APPLICATION
Mobility | Public transportation

Important Projects of Common European Interest

H2LOAD

Hydrogen application in port & heavy cargo logistics

Phase 1:
Hamburger Hafen und Logistik AG (HHLA) intends to decarbonise its operations in Hamburg by using heavy-duty vehicles with hydrogen fuel cells at its terminals and on the last mile of container transport. The H2LOAD (Hydrogen Logistics Applications and Distribution) project involves the running of more than 100 fuel cell vehicles (e. g. trucks, van carriers, or empty container stackers), the provision of infrastructure for hydrogen refuelling at the terminals and the connection of the HHLA terminals to the future Hamburg hydrogen network.

Phase 2:
Rollout of the fuel cell equipment to further HHLA locations in southern and central Germany as well as to Estonia, Italy, the Czech Republic, Slovakia, Hungary, Poland, and Austria to systematically make the knowledge gained available to other companies.

KEYFACTS

- Operation of more than 100 fuel cell vehicles: Trucks, Straddle Carriers, Empty Container Handler
- providing a hydrogen refueling infrastructure on various terminals
- Connection of the HHLA Terminals to the future Hamburg hydrogen grid

PARTNERS

HHLA Hamburger Hafen und Logistik AG

CITIES
Hamburg

RUNTIME
2021–2027

APPLICATION
Mobility & Logistics | Industrial Usage

Important Projects of Common European Interest

H2 PUSH BOAT (H2SB)

Large-scale hydrogen production and decarbonisation

GOALS
Reduce CO2, NOx, PM in the port
Build a fleet of 10 push boats

TIMELINE
Secure IPCEI funding and start in 2022
2025: first ship
2026: three ships
2027: six ships

PARTNERS
GreenPlug: builds and leases ships
Eckelmann / Hans Wolkau: Ship operators
ILF: Energy system design

REGION
Port of Hamburg

APPLICATION
Mobility | Shipping

Important Projects of Common European Interest

WIPLIN

Hydrogen in the aviation industry – key technology of the future

For Airbus, hydrogen is a key technology for the aviation of the future. With its aircraft concept ZEROe, it intends to sustainably reduce the emissions caused by aviation.

ZEROe stands for a hydrogen-powered commercial aircraft. The concept "Hydrogen for the Infrastructure and Production of Aviation in Northern Germany" (WIPLiN) focuses, among other things, on the expansion of the corresponding hydrogen infrastructure. In the long run, Airbus is not only targeting the propulsion of aircraft but also the use of hydrogen in industrial production at its manufacturing sites in Bremen, Hamburg, and Stade.

PARTNERS

Airbus Operations

CITIES
Bremen, Hamburg, Stade

RUNTIME
2021–2035

APPLICATION
Aviation | Industrial Usage

Source: Airbus

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