



Hydrogen
Hamburg

Renewable Energy Hamburg

Hydrogen economy in the Hamburg Metropolitan Region

Projects and stakeholders





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Foreword

DEAR READER,

we observe that the acceleration of the hydrogen economy has further consolidated. Regardless of initial overly optimistic forecasts and several project cancellations, regional production and consumption centres are now forming around the major IPCEI projects. Hamburg is one of these hubs, retaining the “Hamburg Green Hydrogen Hub – HGHH” and the “Hamburg Hydrogen Industry Network – HH-WIN” as two core components of its future hydrogen ecosystem. These projects are on schedule and will, from 2027 onwards, lay the foundations for an expanding value-chain capable of supplying large and small industrial and logistics customers in the port area with green hydrogen.

The first offtaker has already been secured with tesa SE, which intends to supply its Hamburg plant with green hydrogen by 2030 and thereby achieve annual CO₂ savings of 6,000 tonnes. Additionally, the planned connection to the regional core network via the Hyperlink system and early milestones for sea-side import terminals at the Port of Hamburg have been reached. MB Energy has obtained permission to install an ammonia tank on the Blumensand site, enabling the import and storage of green ammonia. In addition, conversion of existing storage tanks for green methanol bunkering has begun, with the aim of refuelling cruise and container ships within a few years. Closeby, the Evos Hamburg GmbH site, in partnership with the Lothar Group, will store e-methanol, e-fuels, HVO, SAF and other hydrogen derivatives, thereby helping to establish Hamburg as a central distribution centre in Europe.

For the decarbonisation of Hamburg’s industry, logistics and other key sectors, companies are working closely with the Free and Hanseatic City of Hamburg, whether in securing permits, locating sites, building infrastructure or arranging project finance. For instance, Hamburg’s IPCEI projects receive state funding of approximately €250 million, split into a two-thirds share of federal subsidies and one third of Hamburg’s state funding.

In the coming years, the hydrogen economy will continue to gain momentum in pursuit of complete industrial decarbonisation – a marathon rather than a sprint. This is reflected in legislation: many stakeholders are calling for improvements to the legal framework in order to provide planning certainty for capital-intensive infrastructure projects. The European Commission has announced a review – and possible revision – of the stringent criteria for green hydrogen. The new Hydro-

gen Acceleration Act (WasserstoffBG) is set to accelerate the development and deployment of hydrogen across Germany through an overarching public interest mandate, shortened timelines in water and energy law, and fully digital procedures. The federal government has reaffirmed its commitment to building the hydrogen economy and has initiated the process for a hydrogen roadmap. The core network also represents critical infrastructure with a set financing scheme including grid charges, which will play a significant role in the convergence of various hydrogen hubs. Green hydrogen remains indispensable for climate neutrality.

Yours sincerely, **Jan Rispens**
Managing Director Renewable Energy Hamburg Cluster
Agency GmbH



Welcoming address



»Hydrogen is a key energy source for the future and the key to a successful energy transition. Politicians and business leaders are working together to give the production, trade and use of hydrogen a boost. Hamburg is consistently pursuing this course, because decarbonisation and modernisation go hand in hand with climate protection and economic competitiveness.«

Dr. Peter Tschentscher
First Mayor, President of the Senate of the Free and Hanseatic City of Hamburg



»Hydrogen, the lightest element, is becoming a heavyweight in the fight against global climate change. In Hamburg and northern Germany, we are pooling our expertise and resources to build a green hydrogen economy. Stakeholders from business, industry, politics and science are working hand in hand to find solutions to the ecological and economic challenges for Northern Germany. I am very confident that Hamburg, with its hydrogen projects, will become a leading European metropolis for hydrogen, with positive effects for the economic strength and competitiveness of Europe as a whole.«

Senator Dr. Melanie Leonhard
Minister of Economy, Labour and Innovation of the Free and Hanseatic City of Hamburg



»Hamburg will push forward with its ambitious climate-protection and energy-transition agenda in 2026: the first half of our hydrogen network HH-WIN is complete, and the Hamburg Green Hydrogen Hub in Moorburg is fully on schedule. 2027 will be Hamburg’s year of hydrogen! The infrastructure is ready – now it depends on forging a partnership with industry: together with our Hamburg companies as strong allies, we will turn the network into the engine that drives a climate-neutral and future-proof industrial hub.«

Katharina Fegebank
Second Mayor of the Free and Hanseatic City of Hamburg and Minister for Environment, Climate, Energy and Agriculture

The Staff Section Hydrogen Economy is the central administrative unit of the Hamburg Senate, responsible for setting up a competitive and self-sustaining green hydrogen economy. The Senate’s objective is to future-proof and decarbonise the industrial base through the production, import, infrastructure, distribution and application of green hydrogen. The significance of this initiative is underscored by the Staff Section’s inclusion in the Hamburg coalition agreement. The Staff Section connects national and international actors from politics, business and academia. It supports strategic infrastructure and transformation projects including import structures via the Port of Hamburg. Furthermore, it advises on legislative initiatives and regulatory developments at both federal and EU levels. It serves as the primary administrative point of contact for companies, authorities, associations and other partners.



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Overview of Measures of the Senat and Ministries

FOREIGN TRADE CONCEPT

The Hamburg Foreign Trade Concept embeds hydrogen as a strategic future field for Hamburg’s foreign trade. According to its economic, geographic and infrastructural strengths, Hamburg positions itself as a landing point for hydrogen imports and a reliable partner for potential producing countries. The city aims to become a hydrogen hub for Germany and Europe by creating essential conditions for the import, distribution and utilisation of hydrogen and its derivatives, thereby strengthening Hamburg’s international position.

PORT DEVELOPMENT PLAN 2040

The Port Development Plan 2040 positions the Port of Hamburg as a key driver of the energy transition, with the aim of making port operations carbon-neutral by 2040. Cargo handling and transport will be progressively decarbonised, and increasingly climate-friendly energy carriers will be adopted. In addition to electrification and the expansion of on-shore power supply, the groundwork will be laid for alternative propulsion systems and fuels.

CLIMATE PROTECTION REINFORCEMENT ACT

Hamburg’s Climate Protection Act was amended following the 2025 referendum when the people of Hamburg voted for a reduction of CO₂ emissions by at least 70 % relative to 1990 levels by 2030, and for net-zero CO₂ emissions by 2040 at the latest. The development, construction and operation of hydrogen network infrastructure are recognised as being of overriding public interest due to their critical importance for achieving climate-protection targets, and they serve to enhance energy security and resilience.

IMPORT STUDY by Fraunhofer CML on behalf of the Ministry of Economic Affairs, Labour and Innovation

The results show that Hamburg can play a central role as Germany’s hydrogen hub by 2045, with projected annual production capacities of hydrogen and its derivatives of up to 9.2 TWh and seaborne import of up to 89 TWh. Production and seaborne imports into and via Hamburg could cover 10–18% of Germany’s total demand in 2045. This corresponds to an annual volume of 98.2 TWh from 2045 onwards, or 23% of Germany’s total projected import demand and 47% of Germany’s total seaborne import demand of hydrogen and its derivatives. The Free and Hanseatic City of Hamburg offers sufficient space in the Sustainable Energy Hub (SEH) of the Port of Hamburg for import, storage and onward transport infrastructure which can be used to distribute the forecast quantities from Hamburg’s production and seaborne imports into Hamburg and to the German hinterland.

Northern German Hydrogen Strategy

The Northern German states of Bremen, Hamburg, Mecklenburg-Vorpommern, Lower Saxony and Schleswig-Holstein are promoting the hydrogen acceleration in Northern Germany through the North German Hydrogen Strategy (NdWS) and are voicing their common interests at both the national and European levels.

Northern Germany offers the most favourable conditions for building a selfsustaining hydrogen economy. With optimal renewableenergy generation conditions and strong industrial demand, the region possesses a unique potential for the production and utilisation of green hydrogen.

In 2026, the North German federal states extended the Northern German Hydrogen Strategy to 2032. The Northern German states thus respond to the delayed hydrogen market ramp up and shift focus from the initial pure political strategy to hands-on collaboration. This entails strong crossstate exchange, elaborating common positions more rapidly, and effectively representing Northern Germany’s interests at the federal and EU level. New dialogue formats, topicspecific position papers and public communication will enhance

KEYFACTS:

5
Bundesländer

60+
Wasserstoffprojekte

2.100+ km
H₂-Kernnetz

6
Import Hubs

engagement with stakeholders from business, science, administration and politics.

More information under:

<https://norddeutschewasserstoffstrategie.de>



Expansion of renewable energies
(onshore/offshore)



Grid-friendly expansion of large-scale
electrolyzers



Grid infrastructure with large-scale
storage facilities and gas distribution
networks



Import opportunities through ports and the
European Hydrogen Backbone



Major customers through industrial trans-
formation



Representatives of the NdWS at the North German Hydrogen Conference (NDWK) 2025 in Rostock, from left to right: Tim Zeige, EEHH (HH); Ulrike Kramm, Ministerium für Wirtschaft, Infrastruktur, Tourismus und Arbeit Mecklenburg-Vorpommern (MV); Julian Thiele, Freie Hansestadt Bremen Die Senatorin für Wirtschaft, Häfen und Transformation (HB); Martin Schmidt und Anna Hückel, beide: Freie und Hansestadt Hamburg, Behörde für Wirtschaft, Arbeit und Innovation

Hydrogen-specific events

Our industry network comprises of over 300 member companies and institutions, many of them global players. More than a third of these companies had ongoing business or concrete ambitions in the field of hydrogen in 2026. From the outset, the transport sectors of logistics, shipping and aviation were included alongside the energy industry and the basic and raw materials industry. A variety of formats has been created to facilitate exchange at all the necessary levels, enabling experts to engage in intensive dialogue on

technical, regulatory and economic issues. These formats continue to this day, with demand remaining high. If you are in need of direct contacts and assistance for matchmaking, feel free to approach us.



The Hydrogen Technology World Expo made its debut in Hamburg in 2024. EEHH has been organising the Hamburg Pavilion annually since then. Other event formats and working groups focussing on regional and national aspects of the hydrogen market ramp-up are being held on a regular basis.



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On the next page, you will find statements from individuals who are particularly active in our network. If you are interested in participating in our events, please contact us.

Voices of the hydrogen economy

To expand the hydrogen economy, various stakeholders are cooperating at the political, scientific and economic levels. While the EEHH Cluster Agency offers support in subject-related questions and a platform for dialogue, concrete projects are implemented within the companies. Four active

members talk about their experiences and the benefits of their membership.



»The Port of Hamburg offers the opportunity to map out the whole hydrogen value chain, thus becoming a pioneer of the energy transformation: provision through electrolysis and import – application by major consumers in industry – application in road, rail and maritime transport – research and development – further processing. Numerous projects in the Port of Hamburg have been launched that show how the Hamburg energy port is becoming a Sustainable Energy Hub (SEH)«

Ingo Fehrs
Port Energy Solutions, Lead New Energy and Hydrogen, Hamburg Port Authority AöR



»The energy transition requires more than technological innovations. What is decisive is the interplay of infrastructure, industry, energy supply, and regulatory frameworks. The EEHH network connects these perspectives and brings the relevant actors together into conversation. For us as engineering partners, this dialogue is especially valuable because it brings together diverse experiences and viewpoints. Thus a common basis is created for thinking about challenges holistically and for further developing sustainable solutions.«

Dipl.-Ing. André Herbst
Branch Manager Hamburg
ILF Consulting Engineers Germany GmbH



»What connects HYDAC with Renewable Energy Hamburg is curiosity: we want to discover new technologies so we can drive forward the whole hydrogen theme. The EEHH Cluster Agency offers us the opportunity to shape projects (technology and industry) together for the ramp-up of renewable energies and the hydrogen economy through collaboration with business, research and development, science and government«

Andreas Börgmann
Manager, Hydac Hamburg / Bremen field office



»I appreciate the valuable specialist and interdisciplinary dialogue between the EEHH members in an atmosphere that's always friendly. The formats it offers, for example the 'Green Hydrogen Sofa', provide an outstanding platform for things like dialogue around the hydrogen theme with other members from our corporate environment, for enhancing our administration and research and for networking.«

Thomas Schmeding
LL.M., lawyer, Becker Büttner Held

Support for research and innovation projects

One of the main tasks of the EEHH Cluster Agency is enabling contact between business, science and local and national government. This applies in particular to cooperation projects between research and business partners aiming to transfer research results into practice and to create real innovations on an industrial scale out of innovative ideas and approaches, including also a European or international perspective.

Partner search: Do you need support in finding partners from Hamburg for international cooperation projects? We can help you to get in touch with partners for projects and calls for proposals.

EEHH as a project partner: We can participate in various roles as project partners: in advisory boards, as a networking enabler, as stakeholder working between different worlds, in marketing activities.

Platform: Launched in 2026, we support the platform-based exchange between hydrogen producers and consumers via Localiser's hydrogen marketplace. Join free of charge and get directly in contact with off-takers and suppliers.

Further information can be found here:



Feel free to get in touch with us to discuss your project, needed partner profile and innovation plans. We are always keen to hear from you.



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The Cross-Cluster Hydrogen Conference and the Future Conference for Industry, Logistics and Ports have been held together since 2025.



Driving force and innovation manager for industry, energy and the mobility of the future

For over two decades, hySOLUTIONS has been initiating and driving the development and implementation of forward-looking concepts for emission-free mobility and sustainable energy supply. As one of the key players in Hamburg and with a strong network at national and international level, a highly professional interdisciplinary team has specialised in the diverse issues surrounding the market ramp-up of electromobility and the use of green hydrogen and its derivatives. As the consortium leader of numerous R&D projects, the company is driving forward innovative solutions together with partners from industry and research. The aim is to actively and effectively shape industrial transformation and the mobility transition in urban areas.

Our range of services – Competent. Networked. Future-oriented.

As an interface between business, science and the public sector, hySOLUTIONS offers a wide range of services to promote innovative mobility and energy solutions:

Consulting and project development

hySOLUTIONS supports local authorities, companies and research institutions in the concept development and project planning of innovative mobility or energy projects, from the initial planning phase through to successful implementation. Our analyses of technologies, markets and regulatory frameworks create a solid basis for decision-making in strategic developments.

Know-how and knowledge transfer

Through our close cooperation with expert committees, research institutions and industry partners, we promote the exchange of know-how and the development of joint solutions. We provide support for the planning and implementation of projects with guidelines, information sheets and studies. Our publications are often produced in close cooperation with federal ministries, state authorities and municipal partners.

Networking in industry, research and politics

Through active participation in national and international expert committees, hySOLUTIONS has direct access to discussion forums and decision-makers. This close networking enables us to identify relevant developments at an early stage and integrate them into ongoing coordination services. This forms the basis for well-founded decisions by our shareholders, partners and clients.

Coordination of funding projects

Another focus is on acquiring and coordinating funding at EU, federal and state level. Thanks to our close cooperation with funding institutions, we evaluate the potential of new ideas at an early stage and provide professional support with the application process. In short, we develop and manage innovation projects – from the initial idea to successful implementation.

Dissemination and communication

We provide support for the strategic communication of projects and initiatives – tailored to the target group, transparent and effective.

www.hysolutions.de



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International Cooperation

To support and expand the cluster’s—and thus our members’—contacts worldwide, as well as to raise the global profile of Hamburg as a hydrogen hub, we carry out a wide range of activities:

SUPPORTED DELEGATIONS

Inbound: We introduce delegations from around the world to Hamburg as a hydrogen hub. We provide an overview of ongoing and planned H2 projects and organize contacts, site visits, and other opportunities for direct exchange with relevant companies, public stakeholders, and research institutions in the metropolitan region. During delegation visits to Hamburg, we serve as the primary point of contact for organizations such as the Foreign German Chamber of Commerce and Industry (AHK), the German Society for International Cooperation (GIZ), service providers of the Federal Ministry for Economic Affairs and Energy (BMWE), and other international partner organisations.

Outbound: We carry out several activities abroad. For our members, we organize our own delegation trips to other European countries to facilitate exchanges with companies in other hydrogen hubs. In addition, we provide input on the program for energy- and hydrogen-related trips organized by political decision-makers from the Free and Hanseatic City of Hamburg and participate in these trips. We also promote international delegation trips organized by the BMWE—for example, as part of the Energy Export Initiative—as well as those organized by other relevant stakeholders.

INTERNATIONAL TRADE FAIRS WITH A PHYSICAL PRESENCE (DOMESTIC/INTERNATIONAL)

At international H2 trade fairs, many visitors show a keen interest in the hydrogen economy in the Hamburg metropolitan region. We have an annual presence with a joint stand of regional stakeholders at the Hydrogen Technology World Expo in Hamburg, where we showcase Hamburg as a hydrogen hub to interested partners. At other trade fairs, we attend as visitors and build our network of contacts. Examples of trade fairs where EEHH is present include the World Hydrogen Summit in Rotterdam, Hyvolution in Paris and Smart Energy Week in Tokyo.

COUNTRY SEMINARS AND THE INTERNATIONAL FORUM

To provide our members with up-to-date information on key international markets in a concise format, we organise country seminars several times a year. As part of the Forum Internationales, these take place in Hamburg at our premises and in collaboration with partners, to provide opportunities for

participants to network in person; in other cases, they are online seminars. We focus not only on European partner countries, but also aim to provide early information on developments in new markets worldwide. At these events, we collaborate with partners such as consulates-general, German Chambers of Commerce Abroad (AHKs), other clusters, and various organisations and associations.

TAILORED SUPPORT FOR BUSINESSES

We regularly receive enquiries from individual foreign companies seeking an overview of and connections with key players in Hamburg’s hydrogen sector and/or wishing to establish a presence in Hamburg. Depending on their specific needs, we advise these companies, often in collaboration with Hamburg Invest. We also support our member companies seeking contacts in specific foreign regions, working alongside our local partners to facilitate new business opportunities.

EUROPE-WIDE EXCHANGE

Early access to information on European developments, legislation and activities is important for ensuring that Hamburg’s perspective is taken into account. To this end, we network across Europe with other partners, for example from the North Sea region, and make use of our membership in key European associations such as Hydrogen Europe.

INTERNATIONAL COOPERATION

From the perspective of the EEHH and the City of Hamburg, several countries and regions play a key role in the import of hydrogen and its derivatives into Germany. Cooperation agreements can provide a specific framework for international collaboration with these partners, with a view to promoting exchange, joint projects and activities between businesses, academic institutions and the city, and their foreign partners. The following are examples of important partner regions:



EEHH on a delegation trip to southern Denmark in 2025

DENMARK	Hamburg will soon be connected to Denmark via the EHB Hyperlink III hydrogen pipeline. This will enable Denmark, with its significant offshore wind potential, to supply large quantities of green hydrogen to northern Germany and Hamburg at a favourable cost. Furthermore, the topic of CCUS is becoming increasingly important.	
SCOTLAND / UK	Scotland is one of the most important European countries for the production and export of green hydrogen. Due to its geographical and political proximity, it is a key partner for Hamburg in scaling up the hydrogen economy.	
THE NETHERLANDS	Hydrogen in the Netherlands also plays a major role for Hamburg – for example, through import infrastructure via Rotterdam and Amsterdam, and offshore projects near Groningen.	
NORWAY	Norway is one of Germany’s leading energy suppliers. In addition to future pipeline-based hydrogen supplies to northern Germany, the country is also an important partner in the field of CCUS.	
CANADA	The Canadian east coast (‘Atlantic Canada’), with its enormous potential for onshore wind energy and hydrogen production and the shortest distance from the American continent to Europe, is building its future as a leading supplier of H ₂ to Hamburg through diverse cooperation with politicians, ports and companies in Hamburg.	
CHILE	Thanks to outstanding wind and solar conditions, Chile is emerging as a pioneer in renewable energy generation in South America. It is set to become one of the most important partners for the supply of green H ₂ and its derivatives.	

Contact for political cooperation:

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Hydrogen projects in the Hamburg Metropolitan Region

In addition to the IPCEI-funded projects, local companies are showing a strong commitment to the Hamburg location. A selection of projects is presented here.

HAMBURG GREEN HYDROGEN HUB (HGHH)

On the site of the former Hamburg-Moorburg power station, green hydrogen will be produced from regenerative energies and used in the primary and raw materials industry in the Port of Hamburg. In addition to the construction of a scalable electrolyser with an output of 100 megawatts, there are plans to further develop the site into a 'Green Energy Hub'. This is one of the first projects in the world to aim to decarbonise a whole port economy.

Companies involved:
Hamburger Energiewerke, Luxcara

Planned start of operations:
2027



HAMBURG HYDROGEN INDUSTRIAL GRID (HH-WIN)

A completely new hydrogen distribution network south of the river Elbe, which will initially be around 40 kilometres long, shall supply a large number of manufacturing companies with green hydrogen. In the next phases, the hydrogen network will expand to industrial centres in the north-west, the south and east of Hamburg. HH-WIN also offers ideal options for H2 mobility: fuel stations for heavy goods traffic and for vehicles and ships in port logistics can be connected to the hydrogen infrastructure.

Companies involved:
Hamburger Energienetze

Planned start of operations:
2027



FUEL CELL SYSTEM PRODUCTION FOR INDUSTRIAL TRUCKS

At the Hamburg plant, high-performance fuel cell systems for warehouse handling equipment are produced in series – from the manufacture of individual components in the mechatronics centre, through the production of the fuel cell systems on the production line, to the final quality check on a specially designed test bench.

Companies involved:
Still

Commissioned:
2023



THE USE OF HYDROGEN IN THE PRODUCTION OF INDUSTRIAL ADHESIVE SOLUTIONS

The tesa plant in Hamburg will be the first major industrial customer to be connected to the HH-WIN network. The aim is to reduce CO₂ emissions by switching steam generation to renewable energy and green hydrogen. Full electrification is not entirely possible due to limited connection capacity. Around 100 GWh of fossil fuels are still being used, which are to be replaced in future primarily by green electricity and green hydrogen (target mix 80/20).

Companies involved
tesa SE

Scheduled commissioning:
2028



MANUFACTURING FACILITY FOR PEM ELECTROLYSIS STACKS

Quest One's Gigahub brings together stack development, manufacturing, testing and servicing under one roof. The stacks form the heart of the PEM electrolyzers, which are built at the company's headquarters in Augsburg.

Companies involved:
Quest One

Commissioned:
2024



HAMBURG BLUE HUB

The Hamburg Blue Hub is a planned site for the development of infrastructure and logistics solutions in the field of climate-friendly energy sources and industrial decarbonisation. The focus is on concepts for the storage, handling and distribution of energy sources such as e-methanol, e-fuels, hydrogenated vegetable oil (HVO) and, in the future, hydrogen and selected hydrogen derivatives.

A key component of the site is the DACMA Competence Centre. There, technologies for the direct capture of CO₂ from the atmosphere (Direct Air Capture, DAC) will be demonstrated, and their potential integration into industrial carbon cycles and PtX value chains will be illustrated.

Participating companies:
Evos Hamburg, LOTHER GRUPPE

Planmäßige Inbetriebnahme:
2027



AMMONIA IMPORT TERMINAL

The intention is to receive green ammonia from around the world at the New Energy Gate and convert some of it into green hydrogen before it is distributed to buyers locally and throughout northern Germany.

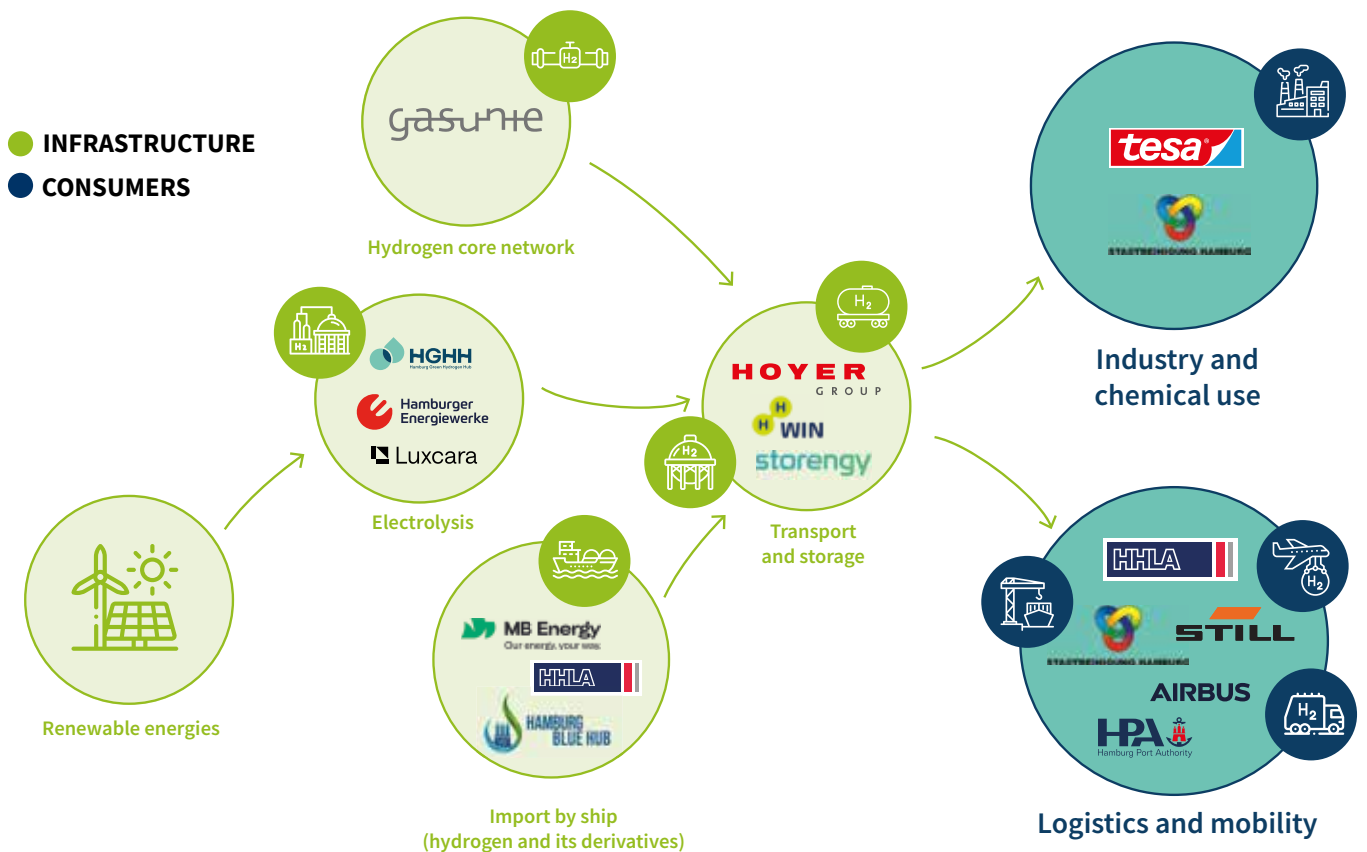
Companies involved:
MB Energy

Planned commissioning:
2029



H2 supply chain in the Hamburg Metropolitan Region

Selected stakeholders:





Hamburg Hydrogen Industrial Network. New H2 distribution network in the Port of Hamburg: 40 km by 2027, 60 km by 2031



1

Hamburger Energiewerke and Luxcara: Hamburg Green Hydrogen Hub with 100 MW electrolyser



2

Hamburg Blue Hub with storage, handling, import and distribution of e-methanol, e-fuels, HVO and H2



4

Clean Port & Logistics (CPL): HHLA test field for hydrogen-powered heavy-duty vehicles and terminal equipment



5

MB Energy: Ammonia import terminal



6

tesa: Future use of hydrogen at the tesa plant in Hamburg



7

Still: Production of fuel cell systems for industrial trucks



8

Quest One: Production facility for PEM electrolysis stacks in Hamburg-Rahlstedt



9

ContiTech: TechCenter Hydrogen Technologies in Hamburg-Harburg

Selected research institutes

For years there has been world-class research in the universities and institutes of the Hamburg Metropolitan Region – in both fundamental and applied research. In addition, teaching in Hamburg's four biggest universities is in-

creasingly including the subject of hydrogen, which ensures the next generation of professionals is starting from an ideal place.



» Over the past few years, we've started four larger research projects around hydrogen, for example the BMDV-funded joint project with Airbus, ZAL and DLR 'Fuel cell system development for technical aviation' (BETA) and the BMWI-funded project 'Hydrogen-based emergency power supply with integrated regulating power plant via flexible sector coupling and metal hydride storage systems' (HyReflexS) in partnership with Hamburger Hochbahn, Gasnetz Hamburg GmbH, Stromnetz Hamburg GmbH and Capgemini Engineering GmbH Hamburg. At the Centre for Digitalisation and Technology Research of the German Federal Armed Forces (dtec.bw), as part of the programme 'NextGenerationEU in the EU-funded project 'CoupleIT! – Digitalised coupling of the electricity and gas grids', we research the requirements of future digitalisation of hydrogen plants.

The theme is becoming ever more important in teaching for example, in a new course called 'climate-friendly energy and mobility', a module on 'electromobility and hydrogen plants' is being offered, starting this year. It teaches students about the various technologies and their operation on the grid. We're also increasingly seeing that students want to complete their dissertations on hydrogen technologies. «

Professor Detlef Schulz

Helmut Schmidt University | University of the Federal Armed Forces Hamburg



»Helmholtz-Zentrum Hereon has been placing a strong emphasis on hydrogen as a research area for many years now. This includes innovative processes for hydrogen production such as the artificial leaf, hydrogen storage with metal hydride powder and membranes for separating hydrogen and other gases. With our main site in Geesthacht (Schleswig-Holstein) right on Hamburg's doorstep, we can enjoy optimum networking with many partners from science and industry in Northern Germany, and this is in no small part thanks to our engagement in the EEHH Cluster Agency..«

Professor Julian Jepsen

Helmholtz-Zentrum Hereon in Geesthacht



»Our sector coupling and hydrogen competence team is conducting research in numerous projects on aspects such as grid serviceability and integration, energy storage and intelligent charging management, control and regulation concepts, alternative fuels and carbon management. Our own research laboratory, a grid-responsive building in Hamburg-Bergedorf, enables us to carry out practical tests. In the coming years, our infrastructure there will be expanded to include a demonstration centre for sector coupling in order to advance research technologies and topics in this field. We always work closely with our partners from science, industry and politics and are grateful to be able to exchange ideas on all these topics within the EEHH network.«

Professor Hans Schäfers

Competence Centre for Renewable Energies and Energy Efficiency (CC4E) at the Hamburg University of Applied Sciences



»At our institute, we are investigating various hydrogen supply chains, both within Germany and those in which hydrogen is produced, for example, in North Africa and exported from there to Europe. In this context, alongside technical requirements, legal and economic issues also play an important role. That is why we are also investigating the extent to which current EU legislation influences the suitability of sites for hydrogen production, as well as the resulting hydrogen costs. This issue is of particular importance for Hamburg and northern Germany, as the north, with its favourable wind conditions, offers great potential for local hydrogen production.«

Professor Arne Speerforck

Technical University of Hamburg (TUHH)



»Together with partners from Helmholtz-Zentrum Hereon in Geesthacht and the Technical University of Hamburg, we've been working for years on questions of chemical storage of hydrogen in various materials. Interim storage plays a central role here, in enabling production and usage of hydrogen to be connected in an efficient way. At the University of Hamburg, scientists have been working for some time now on foundational scientific questions along this process chain, as well as on the social-scientific and legal aspects that naturally also play a very important role in this transformation process and which must be included in any considerations if we are to be successful.«

Professor Michael Fröba

Universität Hamburg



Showcases of local research projects

Research is being conducted in Hamburg in all areas of the hydrogen value chain.

Outstanding projects and institutions include:

BRIGHT LIGHT FOR THE LITTLE MATERIAL

At the X-ray source PETRA III, DESY offers industrial firms a range of options for carrying out hydrogen-related investigations and using high-intensity light for their own research questions. For example, analysis at DESY using X-ray light can deliver important insights into numerous processes at nanoparticle level: From the search for durable and more efficient catalysers for hydrogen production to optimisation of storage and transport of the gas to the question of how hydrogen reacts with various materials. The decoding of minute structures can make an important contribution to enhancing the role of hydrogen in the energy economy.



DESY staff support industrial customers from feasibility studies through the preparation and execution of measurements to targeted data analysis.

LH₂ DRONES: A TECHNOLOGICAL LEAP WITH MAXIMUM RANGE

Due to their power limitations, battery-powered drones can only fly for around 30 minutes. Hydrogen-powered drones, on the other hand, overcome this limitation, thereby opening up numerous new applications, ranging from the inspection of critical infrastructure and environmental monitoring to the transport of medical supplies to remote regions. The ZAL Fuel Cell Team is working to make hydrogen drones accessible even to users without in-depth fuel cell expertise. To this end, it is integrating hydrogen technologies into drone systems, with the aim of developing reliable and easy-to-use solutions for practical application. Depending on the design and the hydrogen storage system used, the drones can achieve flight times of several hours. One of the latest platforms, for example, is designed for flight times of up to 2.5 hours using compressed gaseous hydrogen (GH₂). However, H₂ drones only realise their full potential with liquid hydrogen (LH₂). This technological leap enables flight times of up to eight hours, thereby opening up further applications for unmanned aerial systems.

Following the successful maiden flight of an LH₂ drone in July 2026, ZAL is currently working on further reliability and endurance tests.



ZAL's LH₂ drone during its successful maiden flight in July 2026. Clearly visible: the cylindrical liquid hydrogen tank.

HANSEATIC HYDROGEN CENTER FOR AVIATION AND MARITIME (H2AM)

H2AM is part of the national Innovation and Technology Centre for Hydrogen Technologies (ITZ H2). The ITZ H2 facilities are service centres for SMEs and R&D projects, serving as a development hub for hydrogen applications in mobility. The entire value chain of hydrogen technologies is represented there, with a focus on corresponding components, the hybridisation of drives, refuelling concepts, logistics, the storage and processing of green hydrogen and hydrogen-based fuels, and the testing of components and systems. In the ITZ North, the focus is on aviation and shipping, and it is divided between the locations of Bremen/Bremerhaven, Hamburg and Stade. Hamburg is responsible for setting up a development and test centre for systems and refuelling.

The aviation sector, with a focus on fuel cell integration, fuel cell installation, ground operations/refuelling and maintenance based on liquid hydrogen, is managed by the Centre for Applied Aeronautical Research (ZAL). The maritime division conducts research and testing with a focus on system development and integration of fuel cells, multi-fuel refuelling, and the development of standards and regulations, and is based at Fraunhofer CML.

HYDROGEN AVIATION LAB

A decommissioned Airbus A320 has been given a new lease of life in the service of science. The German Aerospace Centre (DLR) is collaborating with Lufthansa Technik, the Centre for Applied Aviation Research (ZAL) and Hamburg Airport to conduct research into maintenance and ground handling processes for future hydrogen-powered aircraft. New aircraft with hydrogen technology require a new ground-based infrastructure, the development of which is now beginning in Hamburg: the project partners are jointly designing and testing comprehensive maintenance and ground handling processes in conjunction with hydrogen technology. With the Hydrogen Aviation Lab, the project partners in Hamburg aim, on the one hand, to prepare as effectively as possible today for the handling and maintenance of hydrogen-powered aircraft.

On the other hand, the real-world laboratory is also intended to provide valuable input to the developers of these future generations of aircraft, with a view to optimising procedures and safety standards in maintenance and handling for upcoming models.



Clean Port & Logistics (CPL)



Innovation cluster for decarbonising heavy-duty logistics

In practical tests, the cluster Clean Port & Logistics explores the dimension and restrictions of fuel cells in heavy-duty port equipment. The testing of prototypes and a hydrogen fuel station is taking place at HHLA Container Terminal Tollerort (CTT) in the Port of Hamburg. The Cluster will collect the data and share insights with companies in the transport and

logistics sector with the aim to gain knowledge for the next steps in decarbonising the future.



The purpose of the test field at CTT is the exploration of hydrogen-powered logistics equipment. The aim is to speed up the transition in heavy-duty logistics and port operations, by laying a robust foundation for decision-making, achieving rapid market maturity of the technologies and establishing a lively marketplace where solutions quickly find their users.



Learn more about the innovation cluster.



Developing a value chain for climate-neutral energy carriers based on green hydrogen



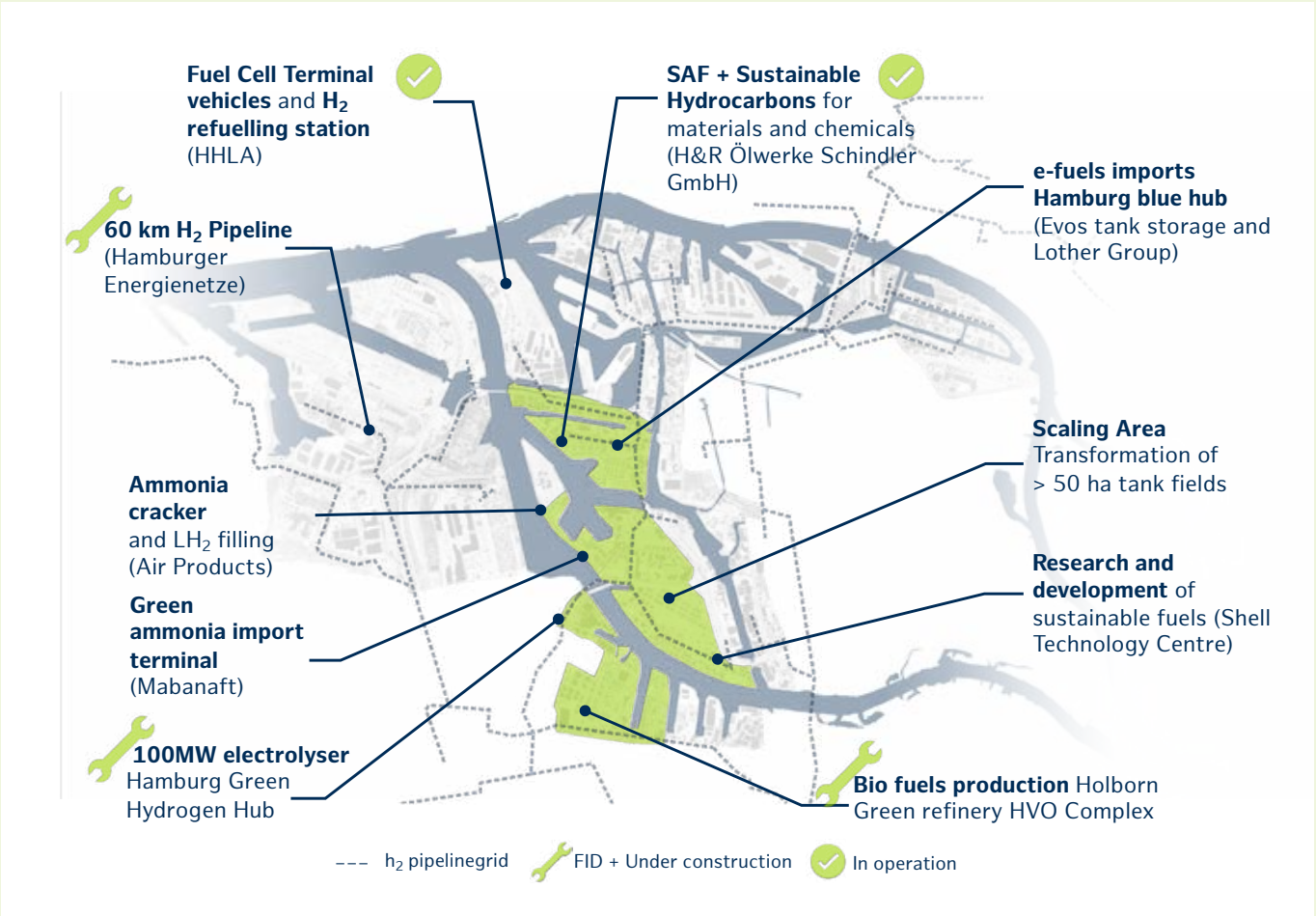
The Port of Hamburg is a driving force in the energy transition and is positioning itself as a sustainable energy hub. The transshipment, manufacture, distribution and use of sustainable fuels and energy sources represent a growth market and a major economic opportunity for the port.

In October 2023, the Hamburg Ministry of Economic Affairs and Innovation gave the Hamburg Port Authority (HPA) the green light for the Sustainable Energy Hub Hamburg (SHE) initiative to ensure this development proceeds as efficiently as possible.

The aim of the initiative is to improve collaboration between port companies to create an ecosystem for sustainable energy sources. It also aims to raise public awareness of the importance of the Port of Hamburg as an energy port, as the transition to sustainable energy will be the dominant topic in the coming years and decades.

Germany’s hydrogen demand is projected to increase steeply up to 2030 and beyond. The Port of Hamburg has the ideal conditions to play a decisive role in this development. Berts, tank storage, an efficient railway network – a large part of the infrastructure is already in place.

A former tank storage site on Hohe Schaar that was acquired by HPA provides the starting point for implementing this project. This area is destined for storage, processing and refining, and will also be a base for relevant suppliers, service providers and manufacturing companies of plants and technical equipment for sustainable energy sources.



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