The sector network for future energies



RENEWABLE ENERGY HAMBURG AGENCY

Annual report 2023



RENEWABLE ENERGY HAMBURG AGENCY

Annual report 2023



Vorwort

Foreword by managing director Jan Rispens



The North German Living Lab

Progress in the sub-projects



Media

Impressive EEHH media presence



Contakt

Contact person and further information



Forums

At the heart of our network: the REH forums



Solar Segment

REH published the Solar Potential Study in March 2023



Internationales Cluster Relations

Around the world with EEHH



Hydrogen Segment

Hydrogen projects are gaining momentum in Hamburg



German Renewables Award

REH Cluster Agency held the 12th German Renewables Awards



Outlook

Outlook for the year 2024

RENEWABLE ENERGY HAMBURG AGENCY

Foreword

2023 was defined by a gradual calming of the energy markets after the outbreak of war in Ukraine in February 2022. In addition, the end of the COVID 19 pandemic was declared. Public debate centred on numerous issues related to the future of energy supply. Renewable energies accounted for 50% of the electricity supply for the first time in 2023.

For the Renewable Energy Hamburg Cluster Agency, the year was shaped by significant progress in the implementation of Cluster Strategy 2025 by late 2023 which marked almost the halfway point in the project term. After strong growth in 2021 and 2022, membership continued to increase with no signs of slowing down. There were around 265

members at the start of 2024. The new hydrogen economy segment continued its growth trajectory as well while new members also flocked to the areas of digitalisation, sector coupling and solar energy.

2023 was certainly a positive year for the expansion of renewable energy, which we noticed in our members' network, too. Expansion in the area of solar energy reached an all-time high in 2023, while onshore wind energy experienced a significant boost and has clearly passed its nadir. Two tendering rounds for sites with a capacity of around 8 gigawatts created an important basis for offshore wind energy. Following protracted deliberations,



Oben: Evening Reception of the North German networks at Husum Wind 2023 / Photo: EEHH GmbH, l.u.: Summer party of Renewable Energy HH / Photo: EEHH GmbH, r.u.: Hamburg delegation in Washington with Hamburg's Minister of Economics and Innovation Dr Melanie Leonhard / Photo: EEHH GmbH the Building Energy Act (Gebäude-Energie-Gesetz) was finally passed in the area of heat supply.

The network of companies and universities that are seeking to collaborate on developing new value chains continued to evolve in the Hydrogen Economy segment. Moreover, important elements of the necessary hydrogen regulations were presented in 2023, after delays lasting multiple years in some cases. Among them was the EU Delegated Act, which outlined a clear – if albeit restrictive – definition of green hydrogen. It has been ratified in Germany in the Federal Emission Control Act, and a plan for a hydrogen core grid was also presented. These steps mark considerable progress in the regulatory sector, even if gaps continue to exist.

For Renewable Energy Hamburg, 2023 was therefore defined by important and substantial developments which will place a more climatefriendly energy supply increasingly within reach for the Hamburg metropolitan region. Now that significant regulatory improvements have been chalked up in 2023, we look forward to collaborating with our members in 2024 to put them into practice across the widest selection of projects and even outside the Hamburg metropolitan region.



Jan Rispens Managing Director REH GmbH



INTERACTIVE, RESPONSIVE AND ECO-FRIENDLY:

Read the EEHH annual report 2021 online on your smartphone, tablet or computer. Just scan the QR-code or enter the link in the

https://content.erneuerbare-energienhamburg.de/en/annualreport-2023/fore-



FOREN

Experts share experience in the Renewable Energies Hamburg (REH) technical forums

Exchange on current issues, establishing contacts - the EEHH forums offer the ideal framework for networking in the EEHH cluster. There are currently six EEHH forums on the topics of: Financing & Law, Human Resources, Sector Coupling, Solar, Heat and Wind. The Human Resources forum celebrated its premiere in 2023.

Financing & Law Forum

There were two sessions of the Financing & Law Forum last year, both of them held in combination with other forums. The sessions addressed the Building Energy Act (see the Heat Forum) and the issue of large-scale battery storage systems (see the Sector Coupling Forum).



Solar Forum

What is Hamburg's potential in the area of photovoltaic systems? The Solar Form drew on its **Solar**

Potential Study (Scan QR-code)

to answer this question. The findings of the study were presented during the forum's first session of the year at the Patriotic Society in



late March. The study also identified significant potential for the agrivoltaics sector in Hamburg. REH organised a bicycle tour to an agrivoltaics pilot system in the Altes Land region in late summer. This was followed in October by a session on the issue of tenant electricity in the Housing Industry and Industry & Commerce working groups. The key findings of the Solar Potential Study were presented at the Expert Group for Logistics Properties in November. Going forward, there are plans to initiate closer cooperation between the Solar Forum

and the Expert Group for Logistics Properties.



Learn more

Human Resources Forum

Following a longer hiatus, the Human Resources

Forum was reconvened in 2023 to assist members

in finding, retaining and developing employees

and specialists. First up was a kick-off forum on Gen Y/Young Professionals with a detailed workshop component. A second session was then or-

Sector Coupling Forum

The Sector Coupling Forum used its first session of 2023 to address the issue of digital solutions for the planning and maintenance of energy infrastructures. Speakers presented applications from the areas of artificial intelligence, virtual reality and 5G campus networks. The second session together with the Financing & Law Forum was dedicated to large-scale battery storage systems, which can fulfil numerous important functions in the energy system. Aside from an elaboration of legal classifications and a presentation on the financing process for these storage facilities, the session also featured a presentation on business optimisation based on artificial intelligence. The last session focused on the potential for flexible control of electric vehicles and heat pumps, which can reduce the need for investment in the electricity grid.



Learn more

media recruitment. Accompanying the forum was a job fair in October, which was held in coope-

a cross-cluster BarCamp with three Hamburg cluster agency affiliates.



Learn more

Heat Forum

In 2023, the heating transition finally gained traction in society as a whole thanks to the debate on the Building Energy Act. Fully aware that this would likely lead to a shift in priorities, interests of members are moving away from technical issues to energy industry and regulatory matters. There were a number of importyear progressed, which members had identified as priority issues during the workshop. The

purpose of these decision was to define the framework conditions for the heating transition. In response, **Dr Dirk Legler** held a webinar in October to outline the hotly debated Building cused on municipal heat planning.



Learn more

Wind Forum

The first session of the Wind Forum was held in April on the topic of energy islands in Denmark and was organised as a combined event with the International Forum. Next up was a webinar session on the offshore wind sector that addressed the Site Development Plan (SDP) in the German Exclusive Economic Zone. The speakers were **Dr Stoeve**sandt, Fraunhofer IWES, and Karina Würtz, Offshore Wind Energy Foundation. The second session on the onshore wind sector dealt with wind in industrial and commercial areas. Speakers at the event were **Nikolas Cromm**, TÜV Nord, and Oliver Augustin, Planungsbüro Dr. Augustin Umwelttechnik.

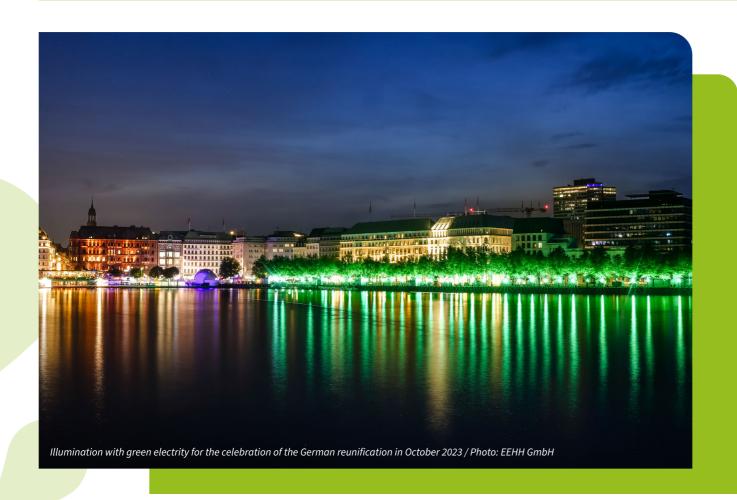
Learn more



Renewable Energy Hamburg Agency **ANNUAL REPORT 2023**

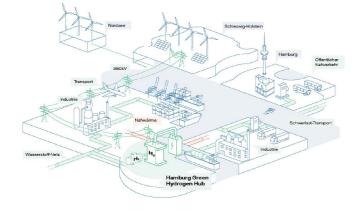
HYDROGEN SEGMENT

Hydrogen projects are gaining momentum in Hamburg



Hydrogen – still one of the dominant issues at Renewable Energy Hamburg in 2023. The significant interest among members in events on this topic has continued unabated. The Hydrogen Forum met nine times over 2023, while the Green Hydrogen Sofa was held six times. The forum was divided into the categories of Technology and Projects. It also organised an excursion to GP Joule's eFarm as a Hydrogen Forum "Projects on Tour".

Hamburg Green Hydrogen Hub



Green Hydrogen Hub / Graphic: Hamburger Energiewerke

Hydrogen highlights in 2023

"Projects"
on 31. January

concerning hydrogen in shipping, which discussed the issue of how specifically to implement projects in the area of dual fuels. The Hydrogen Forum "Hydrogen & Transportation Projects" on 5. July

at ContiTech AG with simultaneous inauguration of the Hydrogen Technology Center.

The Hydrogen Form
"Import Terminals
and Logistics Projects"
on 25. September

with Uniper, which focused on supply chains.

EEHH collaborated with its affiliate cluster agencies of Hamburg Aviation, Logistics Initiative Hamburg, North German Maritime Cluster and Hamburg Cruise Net to organise a cross-cluster conference with a focus on applications in the three mobility sectors.



Networking event "Green hydrogen sofa" / Photo: EEHH GmbH

Inaugural North German Hydrogen Conference

The North German Hydrogen Conference, organised by the networks from the five northern German states, was held for the first time on 15 November.

Speakers addressed the political and economic ports, offshore hydrogen and green energy for green hydrogen. Over 200 guests from all North German parliaments attended the event.

plans and challenges in building the regional hydrogen economy, while also emphasising the advantages of northern Germany as a hydrogen region: ports, offshore hydrogen and green energy for green hydrogen. Over 200 guests from all North German parliaments attended the event.



Brasilian delegation at the booth of Renewable Energy HH at the Husum Wind 2023 / Photo: EEHH GmbH

Civic festival marking German Unity Day

Hamburg's civic festival marking German Unity Day on 2 and 3 October was a truly memorable event. Renewable Energy Hamburg took part with an information booth and a light installation that used green hydrogen and a fuel cell to bathe the Neuer Jungfernstieg on the Binnenalster in green light. But the REH network was not alone in highlighting the issue of hydrogen: several major projects have now been initiated in Hamburg. They include the commissioning of fuel cell system production at Still AG, project design for the Hamburg Blue Hub e-fuels import terminal and the ground-breaking ceremony for the production facility for PEM electrolysis stacks at H-TEC Systems in Hamburg-Rahlstedt.

THE NORTH GERMAN LIVING LAB (NRL)

Progress in the sub-projects



Marit Mohr at a seminar / Photo: NRL

Electrolysers in the project region

Electrolysis capacities are growing continuously in the project region of the North German Living Lab, for example at the site of the Bützberg biogas and composting plant run by the Hamburg municipal waste management organisation. The plan in this case is to use hydrogen for biowaste fermentation. A

licence application has now been submitted to operate a large-scale, 25 MW electrolyser from HAzwei GmbH at the Port of Hamburg. Also as part of the NRL, WEMAG, an energy provider from Schwerin, is building an electrolyser in Leizen near Plau am See. The Fraunhofer IWES electrolysis test field – the Hydrogen Lab Bremerhaven – went into operation at the beginning of November as well.

Other model projects

There is also movement on the hydrogen buyer side, where Aurubis, for example, is preparing to convert an anode furnace. Work will be completed over the year ahead and will enable this process step

to become climate-neutral. The Hamburg waste disposal organisation put two fuel cell waste collection vehicles into operation in summer 2023. All NRL reference systems will be up and running by 2026.



Flyers of NRL / Photo: NRI

Studies

he research projects on cross-cutting issues yielded important results as well. Among the main priorities was sub-project 5.1 with its study series on the potential, limits and priorities of green hydrogen. Important papers were also published in the areas of regulation and sustainable financing.





NRL project oordinator Mike Blicker / Photo: NRL

B2B communication

REH organised trade fair attendances for the NRL and other B2B events. International contacts were particularly drawn to the trade fair stands at HUSUM Wind 2023 and Hydrogen Technology Expo Europe in Bremen. The NRL representatives

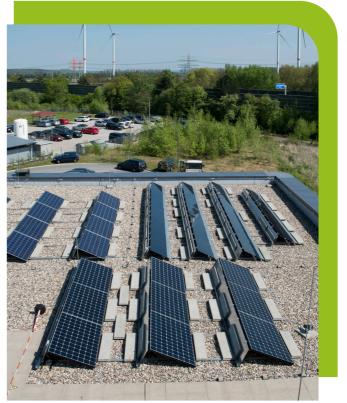
addressed important issues at the REH events entitled Gröönschnack un lopen - Science meets Economic Power, Energy Systems in Transition - Gas, Electricity, Transport, Heat, Hydrogen Forum, Green Hydrogen Workshop for the Energy Transition – Potentials, Limits, Priorities and the 2023 German Renewables Award. The NRL also passed the 1,000 followers mark on LinkedIn.

The North German Living Lab (NRL) is an innovative collaborative project that highlights new ways to achieve climate neutrality. Launched in April 2021, the project is backed by a burgeoning energy transition alliance with more than 50 partners from business, science and politics. The major project is scheduled to run for five years. Stakeholder part-

ners have invested €405 million in total. The NRL is part of the Regulatory Sandboxes for the Energy Transition funding initiative and receives around €55 million of funding from the Federal Ministry of Economic Affairs and Climate Action (BMWK); further funds will be provided by the Federal Ministry for Digital and Transport (BMDV).



REH published the Solar Potential Study in March 2023. The Cluster Agency prepared the study in cooperation with TU Hamburg and the Hamburg University of Applied Sciences to investigate the feasible solar potential in Hamburg's metropolitan region. The authors distinguished between various building categories such as private homes, apartment blocks, commercial roofs and public buildings. They also investigated the potential of open spaces, agrivoltaics and areas above car parks.



Energy campus in Bergedorf/Hamburg / Photo: EEHH GmbH / Jörg Böthling

The results confirm that up to 9.4 GWp could be mounted on the most suitable (roof) spaces in Hamburg, which would generate as much as 6.9 TWh of electricity. In purely accounting terms, this is equivalent to approx. two thirds of total electricity consumption in Hamburg. Another section of the study looked at use cases for 13 different building categories in total. It proved that a PV system could be run economically across all of these categories. Profitability is even higher in the use cases if the growing demand for electricity due to increasing electromobility is taken into account.

Building on the findings of the study, the Ministry of Environment, Climate, Energy and

Agriculture (BUKEA) entered into talks with the REH Cluster Agency. The network will support the Free and Hanseatic City of Hamburg in the implementation of a PV strategy going forward. Initially, the focus will be on exploiting the spaces on commercial and logistics facilities. According to the study, the realisable potential in this segment is around 1.9 GWp.

The REH Cluster Agency will attend the Intersolar trade fair in Munich for the first time with its own booth in 2024.



Forum Solar on tour visiting a agri pv plant close to Hamburg / Photo: EEHH GmbH

PRESENTATION OF THE GERMAN RENEWABLES AWARDS 2023 IN SIX CATEGORIES

Outstanding innovations at the 2023 German Renewables Awards



Winning team of SGRE in the category "Project of the Year" around Martin Gerhardt / Photo: EEHH GmbH

50 applicants, six categories and one central issue: the energy transition. The REH Cluster Agency held the 12th German Renewables Awards ceremony on 21 November and presented awards for six categories.

Project of the Year category

"This topic is definitely one for the future, as it provides a simple way for winegrowers to generate additional income. And it helps to make viticulture possible in our regions here in southern Germany – despite climate change", says Edgar Gimbel to describe his winning Vino PV project with 300 kWp. He developed new system technologies in the groundmounted PV segment and is bringing them to market maturity. Five companies submitted entries in the Project of the Year category.



Product Innovation of the Year category

"We are thrilled to have won the prize for the Recycling Template. Recycling is an innovation that changes markets. And it changes the market in our sector as well. But it is also an innovation that helps



Winners and laudators of the German Renewables Award 2023 / Photo: EEHH GmbH

to drive change even outside the wind sector" says serving power-to-hydrogen plant based on water Dr Maximilian Schnippering, Siemens Gamesa Renewable Energy. The RecyclableBlade uses a new the end of its service life. In total, six companies entered the competition in the Product Innovation of the Student Thesis of the Year category. the Year category.

electrolysis. This hydrogen application is intended to decarbonise a sub-process at Aurubis AG in Hamtype of resin that can be dissolved in a mild acid at burg as part of the North German Living Lab (NRL) research project. The authors of five theses entered

Student Thesis of the Year category

"What makes my paper unique is that I was able to test it on a real-life use case. I developed scenarios in collaboration with the copper producer Aurubis", Hamburg University of Applied Sciences. Entitled

Hydrogen Innovation of the Year category

"We are thrilled that our work has been recognised, which presents for the first time a practical set of criteria for the green properties of hydrogen. By doing so, we have laid the first foundation to establish explains **Nicolas Neubauer**, the winner from the an international trading system and a standard", explains Mario Spitzmüller from the victorious TÜV 'Model-Based Techno-Economic Optimisation of Nord Group. His team submitted its entry with an a Grid-Serving Electrolyzer on an Industrial Scale', expert opinion on 'Certification and Proof of Origin his master's thesis investigated the use of a grid- for Imported Green Hydrogen and PtX Products', choice of five projects in the Hydrogen Innovation of the Year category.

Lifetime Achievement category

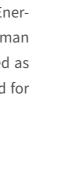
Professor Dr Hans Schäfers, Director of the Competence Centre for Renewable Energy and Energy Efficiency (CC4E) at the Hamburg University of Applied Sciences: "The name Werner Beba remains indelibly linked to the energy transition in northern Germany: as a driving force and pioneer of numerous research projects in northern Germany, he will always be a major role model for us at CC4E. I would like to thank EEHH, also on behalf of the entire team at CC4E, for this award. It motivates and inspires us to continue our work in the spirit of **Werner** Beba." Professor Dr Werner Beba, founder of the Competence Centre for Renewable Energies and Energy Efficiency (CC4E) at the Hamburg University of Applied Sciences, was posthumously presented the German Renewables Award in the Lifetime – an absolute record!

which was prepared for H2 Global. There was a Achievement category. Professor Beba was behind revolutionary projects such as North German Energy Transition 4.0 (NEW 4.0) and the North German Real Laboratory. On several occasions, he acted as co-opted member of the EEHH Executive Board for the university sector.

Media Award of the Year category

"A brilliant report in which the Süddeutsche Zeitung journalist describes his journey along the Südlink route deploying wit, thoughtfulness and a balanced approach to chart the debate between opponents and supporters. In doing so, he stripped this German megaproject of its gargantuan scale and emphasised its standing as a vitally important contribution to supplying Germany with clean energy", says head juror Klaus Liedtke about the article entitled "Lange Leitung" by Jan Schmidbauer in the Sueddeutsche Zeitung. In total, 29 journalists submitted entries in the areas of podcast, print and television







Impressive EEHH media presence

New technologies, the question of acceptance and the solar boom - the network's huge range of topics was reflected in the EEHH Cluster Agency's media channels. The high number of hits for the EEHH blog and LinkedIn, in particular, once again demonstrated the Cluster Agency's popularity.

Sector coupling press trip

In the name of sector coupling, 15 journalists visited three prominent Hamburg projects with EEHH in late summer as part of a traditional press trip. This began at the Stromnetz Hamburg Innovation Campus, where digital solutions are tested and developed into marketable products. The second stop was the Nexxoil biofuels plant at HAW Hamburg, which processes waste cooking oil. The highlight was the final visit to the Hamburger Energiewerke construction site for the new district heating tunnel.

Three Media Forum meetings

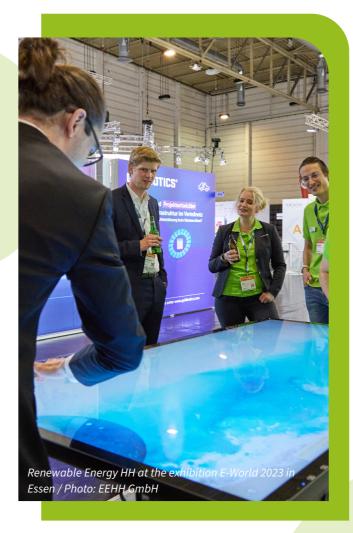
Members of the Media Forum met a total of three times to discuss urgent PR issues. These included the right trade fair presence and the focus of policy communication, for which EEHH always found the right approach. The final forum, in particular, on the topic of 'Acceptance for the energy transition', attended by representatives from the Northern German Living Lab, the Offshore Wind Energy Foundation and the Association of Energy Market Innovators (BNE), stimulated intensive discussions. The energy transition cannot succeed without public involvement.

EEHH blog highlights

The EEHH blog has now become the central EEHH communication channel. For example, an interview with Dr Ursula Prall, Managing Director of cruh21, achieved around 4,700 impressions, while the interview with Carina Meyer from the logistics service provider Hoyer Group also gained more than 5,000 impressions. Posts regarding international developments and hydrogen attracted most readers.

'New energy from Hamburg' podcast

their opinions in writing, but also orally – in the EEHH 'New Energy from Hamburg' podcast. Around 30 episodes have now been created with a wide range of partners. In 2023, for example, **Felix Fischer**, Partner at Chatham Partners and **Jan Philipp Schmidbauer**, Süddeutsche Zeitung, Winner of the 2023 Media Prize at the German Renewables Awards 2023, were featured, as well as **Mike Blicker** and **Prof Hans Schäfers**, CCE4 and Northern German Living Lab. The EEHH podcast attracts around 300 listeners per month.



Growing follower numbers on LinkedIn

The LinkedIn success story continued in 2023. In December, the EEHH corporate page had around 9,750 followers. This was an increase of 2,236 over the course of the year. Around a third of these come from Hamburg, 6% from Berlin and 3% from Munich. The posts received a total of 415,244 organic impressions and 64,170 sponsored impressions.

INTERNATIONAL

Around the world with EEHH: International collaboration in the renewables sector



Wind Europe in Copenhagen 2023 / Photo: EEHH Gmbl

German-Norwegian H2 workshop

Delegates from leading Hamburg-based, German and Norwegian companies gathered in Hamburg at the start of the year to discuss safety in the hydrogen sector as part of the partnership between the REH Cluster Agency and Innovation Norway. Experts from both countries gave talks outlining a wide variety of safety aspects in production, transport and use.

"We support cluster members in their foreign trade activities and present Hamburg as an international model region for the connected energy transition under the slogan "From Hamburg to the World"."

Senator travels to Scandinavia and North America

Led by Hamburg's Senator for Economic Affairs, Dr Melanie Leonard, a delegation from Hamburg's energy industry including members of the EEHH Cluster Agency travelled to Den-

mark and Norway in spring and then to the US and Canada in autumn. These trips were intended to strengthen collaboration in the renewables sector, for instance in the expansion of offshore wind energy and hydrogen production/export.

Norway and Denmark are preparing for the production and export of green hydrogen by ship/ pipeline to Germany in the me-

> dium term, while the North American energy market holds significant business prospects for German technologies and expertise.



Hamburg delegation in Denmark and Norway / Photo: EEHH GmbH

Hamburg delegation attends the

Following its successful participation last year, the REH Cluster Agency attended the 2023 IPF in Baltimore at a joint stand with GOI, the German Offshore Wind Initiative. Also present were a number of REH members, including

International Partnering Forum (IPF)

Schmidbauer, J.B.O and 8.2 Consulting. The US government and individual coastal states have set ambitious expansion targets to stimulate industry growth. RWE Renewables, also an REH member, clocked up some initial success at the auctions in New York Bight, California and the Gulf of Mexico.

H2-Cooperation with Chile

Chile is an important partner country for the City of Hamburg within the framework of its hydrogen import strategy. In autumn, the REH Cluster Agency and the Innovation Centre at the Pontificia Universidad Catolica signed a memorandum of understanding that aims to strengthen commercial and industrial collaboration in the hydrogen segment. REH members Evos and Lother Group

are planning a terminal for e-fuels at the Port of Hamburg (Blue Hub Hamburg), which will also be used to import H₂ derivatives produced in Chile.



Top: US-American dekegation at the booth of Renewable Energy HH at Husum Wind 2023 / Photo: EEHH GmbH, bottom: Excursion to DNV test site for hydrogen in Northern England / Photo: EEHH GmbH



Significant regulatory progress has been made in 2023, most likely caused by crisis. The renewable electricity sector experienced significantly more vigorous market activity. A strong regulatory foundation has been laid for heat supply and the development of a hydrogen economy.

In 2024, the EEHH Cluster Agency will also focus on harnessing these vital bases to complete as many projects as possible in the region, in the coastal area and at international level. In view of the federal government's current budgetary situation, it is important that cluster members concentrate on projects that can be implemented within the existing framework conditions and with manageable economic risks. In the Hamburg metropolitan region, we expect to reach several milestones in the establishment of a regional hydrogen ecosystem, the important decarbonisation of district heating supply and the expansion of wind and solar energy in the city of Hamburg.

We will prepare a mid-term review of the Cluster Agency's Strategy2025 over the course of the year. This will enable us to evaluate where we stand. In particular, we anticipate – building on the strategy – fresh activities and stimulus in the areas of solar energy and heat supply.

It is becoming increasingly clear that the most important growth factor in the energy sector is the availability of skilled labour. Potential growth will be inhibited both in trades businesses and larger industrial and service companies if skilled labour cannot be recruited. The Cluster Agency intends to provide new services to its members in this area!

Although the current financial constraints in Germany leave little room for manoeuvre, we at the EEHH Cluster Agency anticipate that the factors we have outlined will stimulate dynamic growth in our cluster. We can hardly wait!



Imprint

PUBLISHER

Renewable Energy Hamburg Cluster Agency Wexstraße 7 20355 Hamburg

Tel.: +49 (0)40/694573-10 Fax: +49 (0)40/694573--29 E-Mail: info@eehh.de

www.eehh.de

V.i.S.d.P.: Jan Rispens

CONTACT IN THE AUTHORITY FOR ECONOMY AND INNOVATION

Authority for Economy and Innovation Alter Steinweg 4 20459 Hamburg

Tel: +4940115

Fax: +49 40 4279-41333

E-Mail: poststelle@bwi.hamburg.de

IMPLEMENTATION

Webmag.io