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H_2GO NEWS

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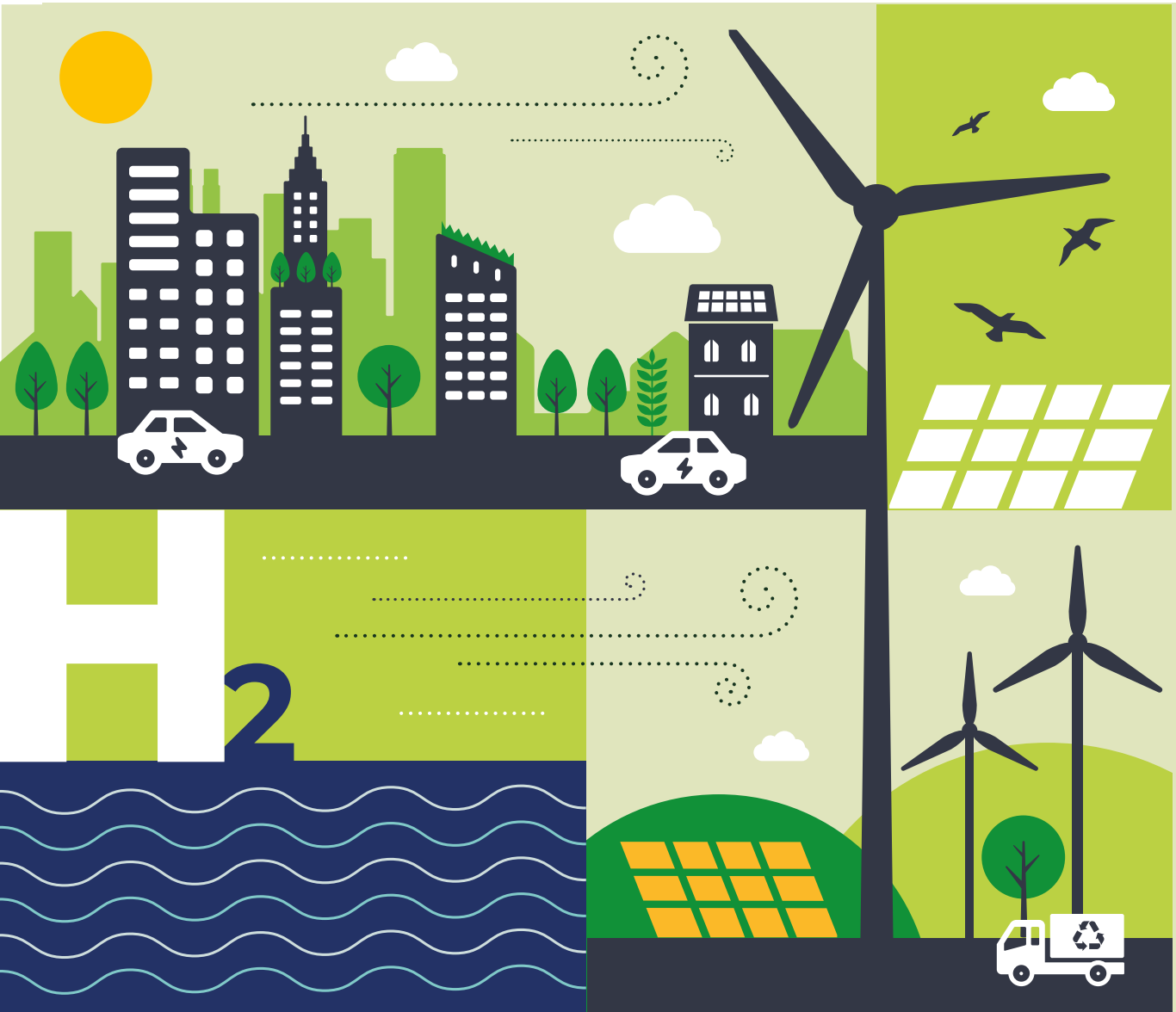


European Hydrogen backbone a boost for energy security

The GenComm Enabling Support Tool

HyLIGHT – Leading Ireland's Green Hydrogen Transition

SHAMROCK - Ireland's Emerald Hydrogen Valley

Cooperative versus Competitive - How Europe's national hydrogen strategies are shaping the new energy market

November Hydrogen Ireland Conference in Dublin

The commodification of Green H2 for Europe

Bosch in Homburg moves the future

European Hydrogen backbone a boost for energy security

The European Hydrogen Backbone (EHB), also known as the European Hydrogen (H2) Highway, is a masterplan for a continent-wide network of hydrogen infrastructure being built by a group of 31 energy operators.

The project is designed to connect regions through a series of hydrogen-dedicated land and sea terminals, storage facilities, pipelines and production facilities throughout the continent. This infrastructure network will ensure access to hydrogen for every EU member state and provide the groundwork from which to accelerate the hydrogen market with key exporters having direct access to areas of need. In line with the tenets of the recent REPowerEU legislation, the EHB will promote system resilience, energy independence and security of supply in Europe.

The plan is split into two milestones, EHB 2030 and EHB 2040, though timelines may shift depending on various factors. However, by 2030, we should expect to have such projects as a subsea pipeline connecting Catalonia and Tuscany, and another between Groningen and Norway, as well as the repurposing of segments of gas pipelines stretching from Bucharest to Edinburgh.By 2040, Dublin should be connected to Great Britain and nearly every capital city in mainland Europe will be part of the network through a combination of repurposed and new infrastructure.

Countries likes Ireland will benefit greatly from being connected to its neighbour, with Scotland considered a very attractive hydrogen destination and Ireland having great potential for future hydrogen production. While scheduled for 2040, it could become a reality even sooner if the political wheels are able to turn. Similarly, the subsea pipelines connecting Norway – a top tier exporter – with mainland Europe will create optimal conditions for all countries involved.

A Proton Exchange Membrane (PEM) electrolyzer at a hydrogen energy pilot project inside Gasunie's Hystock site in Veendam, the Netherlands.

All in all, the EHB will make up 53,000km – 60% of which will be repurposed and the remaining 40% newly built pipelines – at an investment cost of somewhere between €80bn and €143bn.

The EHB is based on national analyses of availability of existing natural gas infrastructure, future natural gas market developments, and future hydrogen market developments under an accelerated and ambitious climate scenario, its official website reads. It will be central to achieving the goals set out in REPowerEU, the legislation devised in the wake of the Russian invasion of Ukraine focused on the rapid reduction of Russian fossil fuel dependence in Europe by accelerating the clean energy transition in the Union.

Hydrogen is a key component of the plan due to its suitability as an energy source in many fossil fuel-dependent sectors, and REPowerEU in fact mentions the hydrogen backbone by name. It builds on the Fit for 55 package, which is a set of proposals to update relevant EU legislation in an effort to achieve a 55% net reduction in greenhouse gas emissions by 2030 and climate neutrality by 2050. War in Ukraine has focused minds in Brussels on achieving these targets in a timely, inclusive way.

The EHB plan allows for the highest levels of efficiency and cost effectiveness for transporting hydrogen. Pipelines are amongst the cheapest and most efficient way to carry the fuel. For the transmission system operators (TSOs), there is an incentive to retrofit and repurpose their gas pipelines for this new endeavour, which is to prolong the value of their infrastructure and for the TSOs to remain as key players in the new energy landscape.

Thus, the EHB provides all European energy stakeholders with opportunity borne out of necessity. The need to accelerate the transition has created an impetus within the EU, with TSOs, infrastructure developers and policy makers united in their efforts to achieve a proper energy union. One of the biggest challenges in the energy transition is to ensure security of supply and retain system resilience throughout, and these challenges becomes greater when timelines are brought significantly forward, as REPowerEU does. But a solid and far-reaching EHB will do much to meet these important goals, not to mention promote further European unity.

Technicians perform maintenance on a Proton Exchange Membrane (PEM) electrolyzer at a hydrogen energy pilot project inside Gasunie's Hystock site in Veendam, the Netherlands.

THE EUROPEAN HYDROGEN BACKBONE (EHB) INITIATIVE

The European Hydrogen Backbone (EHB) initiative consists of a group of thirty-one energy infrastructure operators, united through a shared vision of a climate-neutral Europe enabled by a thriving renewable and low-carbon hydrogen market.

MISSION

The EHB initiative aims to accelerate Europe's decarbonisation journey by defining the critical role of hydrogen infrastructure – based on existing and new pipelines – in enabling the development of a competitive, liquid, pan-European renewable and low-carbon hydrogen market.

The initiative seeks to foster market competition, security of supply, security of demand, and cross-border collaboration between European countries and their neighbours.

PARTNERS

Participating companies include Amber Grid, Bulgartransgaz, Conexus, CREOS, DESFA, Elering, Enagás, Energinet, Eustream, FGSZ, FlusSwiss, Fluxys Belgium, Gas Connect Austria, Gasgrid Finland, Gassco, Gasunie, GAZ-SYSTEM, Gas Networks Ireland, GRTgaz, National Grid, NET4GAS, Nordion Energi, OGE, ONTRAS, Plinacro, Plinovodi, REN, Snam, TAG, Teréga, and Transgaz.

The full article can be accessed on the GenComm website **here**

Jorgo Chatzimarkakis
CEO of Hydrogen Europe

Jorgo Chatzimarkakis,
CEO of Hydrogen Europe

The GenComm Enabling Support Tool

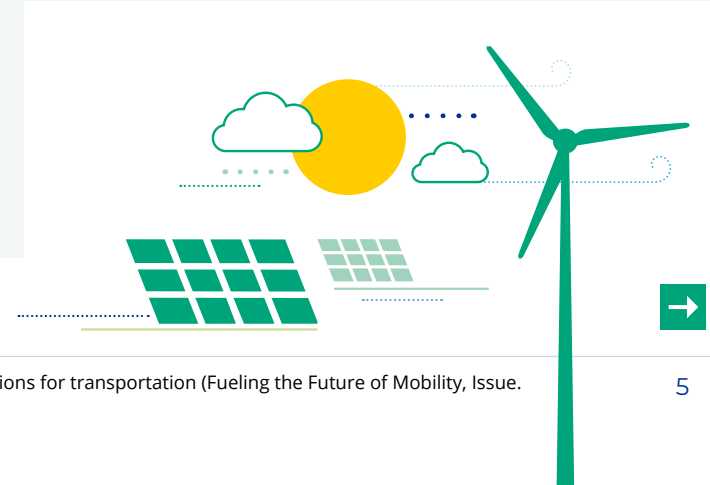
The EU aims to be climate neutral by 2050. Given that the transport sector accounts for a significant portion of CO2 emissions in the EU, it is a key sector for decarbonisation.

In EU cities, bus fleets are usually the backbone of the public transport system and while many cities are introducing Zero Emission Buses (ZEBs) into their fleets, at present the vast majority of buses are still running on diesel. Due to the climate neutrality goals and the recent volatility of fuel prices, the transition to ZEB fleets is being accelerated.

There is currently a wide range of ZEB types on the market, each with their own advantages and disadvantages, therefore bus fleet operators and regional authorities must choose carefully when transitioning to a ZEB fleet. In most cases fleet operators want the cheapest option that will meet the requirements of their existing fleet, in other words a solution that will not cause disruptions to the day-to-day operation of the fleet.

While battery electric buses (BEBs) are usually the cheapest zero-emission choice due to their relative maturity, they suffer from range and autonomy limitations. This means that in some cases, fleet operators must increase the battery size, add extra buses, or invest in opportunity charging infrastructure, which leads to additional costs. In this case it could be more economically feasible to invest in a ZEB with higher range and autonomy, for example a fuel cell electric bus (FCEB) powered by green hydrogen. FCEBs have a range of over 300km and can be fully refuelled in 10 to 15 minutes, making them an attractive option for when BEBs do not have sufficient range. The reason why there are not more FCEBs currently in operation is mainly due to the high cost of green hydrogen. However, there are many projects underway, GenComm included, that are accelerating the establishment of a green hydrogen supply chain. With the contribution of these projects, along with economies of scale, the costs of green hydrogen and FCEB technology are expected to decrease rapidly over the next decade (Deloitte, 2020).

One of the outputs of GenComm is the Enabling Support Tool (EST). The EST is an online, easy-to-use tool that will enable bus fleet operators and regional authorities to make more informed decisions when transitioning to ZEB fleets. As mentioned previously, the main concern that fleet operators usually have is the cost of the new fleet. Hence, the main feature of the EST is a Total Cost of Ownership (TCO) mathematical model. TCO is the most commonly used cost metric for bus fleets and considers all the cashflows involved in acquiring and operating the fleet over its lifetime. Based on data input by the user, the model estimates the TCO of different ZEB fleet types. Currently, the three ZEB fleet types included in the model are BEB, FCEB, and a mixed fleet of BEBs and FCEBs.



Deloitte, B. (2020). Hydrogen and fuel cell solutions for transportation (Fueling the Future of Mobility, Issue.

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Based on interviews with bus fleet operators, there appears to be a lot of interest in examining the trade-offs between BEBs and FCEBs and investigating the possibility of a mixed fleet of these two bus types. The EST assists the user to plan a mixed fleet by estimating the range reduction of a BEB due to the local conditions. Based on the local climate and road topology data, the EST calculates how many FCEBs and how many BEBs should be in the mixed fleet to meet the existing fleet requirements.

The goal of the EST is to provide useful insight to fleet operators and regional authorities to accelerate the transition to zero-emission public transport, and to do so in an easy and interactive manner. In the coming months, usability tests will be performed with key stakeholders and their feedback will be used to improve the EST. It will then be made available to the public as a free online tool.

Tadgh Cummins,
NUIG

From left: **Paul McCormack**, GenComm Programme Manager, **Louise Warde Hunter**, Principal and CEO, Belfast Met, **Chris Corken**, Head of Dept for Science, Engineering and Construction, Belfast Met and **Andrew Griffiths**, Planet Mark team.

HyLIGHT – Leading Ireland's Green Hydrogen Transition

Roadmaps for Hydrogen to Support Decarbonisation of Ireland's Economy by 2050

In 2021 the Irish Government signed into law Ireland's Climate Act mandating a 51% or a 7% annual emissions reduction by 2030 (with potentially more expected from the energy sector with less from agriculture).

The EU Commission has set similar targets for all EU countries and in addition in 2022 under **REPowerEU** aims to achieve accelerated decarbonisation to diminish its reliance on conflict fossil fuels, mainly fossil gas.

Energy efficiency improvements and direct electrification are key enablers of the plan, however scientists and the commission recognise even when supplied by carbon-free sources, these measures are unlikely to decarbonise all sectors fully; including long-distance/heavy-duty road freight, maritime and air transport, high-temperature industry heat, chemical feedstocks and power generation.

Among approaches to decarbonise **hydrogen** has been identified as having a significant role to play in these hard-to-abate sectors not only by replacing fossil fuel gas but also as a winter energy store as well as smoothing renewable power generation. This hydrogen, if produced by electrolysis powered by renewable energy, can ensure country and EU wide decarbonised energy security.

Stakeholders in the emerging hydrogen sector in Ireland are varied and are from many different industries, including gas, waste, electricity, heating, and renewables, etc, categorised with the capacity for; Hydrogen Production; Hydrogen Storage & Delivery; Hydrogen Demand.

Stakeholders may need a source of green hydrogen, effectively locate infrastructure and develop logistics for transporting the hydrogen from production to demand sites in a safe, economical manor. They need to understand the connections between each other and develop markets, technology, logistics, pilots and demonstrations together. Stakeholders also need to understand national and local policies and standards for hydrogen, source trained technicians and managers for the growing hydrogen industry, and understand and facilitate public awareness and perception of hydrogen. Certification or guarantees of origin (GOOs) must be developed for hydrogen from different origins. The certificate design must integrate a clear value differentiation between hydrogen produced from fossil fuels, with (blue) or without (grey) carbon capture and storage (CCS), and renewable electrolytic (green) hydrogen, to allow market growth and competition.

Hydrogen is most effective when it is synergistically deployed across a range of sectors, not just one and therefore collaboration and knowledge sharing between industry is more likely to result in deeper decarbonisation and cost reductions for all energy customers in Ireland.

HyLIGHT offers a structured and collaborative way to manage this exchange of knowledge and share and disseminate the outputs with fellow academic and scientific colleagues, industry, NGOs, National Associations, energy leaders, policy makers and the general public.

HyLIGHT is a 3-year project funded by **Science Foundation Ireland (SFI)** and a 25-strong industry consortium led by Dr James Carton of **Dublin City University (DCU)** in collaboration with Dr Rory Monaghan **NUI Galway**, and Prof Jerry Murphy **UCC** through **MaREI**, the SFI Research Centre for Energy, Climate and Marine; enabling a team of 5 PHD students, 2 Post Doctoral Posts, 2 Research Fellows. The overall aim of HyLIGHT is to provide the knowledge, data, and tools necessary to draft a roadmap for sustainable large-scale implementation of hydrogen technologies in Ireland as part of a zero-carbon, secure, resilient energy system. HyLIGHT is achieving its aim by collaborating with leading national and international companies, universities and stakeholders working to facilitate the delivery of hydrogen to all energy sectors, including heat, transport, industry and electricity, in a safe and cost-effective manner.

For more information about the project or if you are interested in joining, **connect with us.**

Dr James Carton, (DCU), Chair of Hydrogen Ireland and Dr Rory Monaghan, (NUIG)

The Hylight Partners

SH$_2$AMR☘CK - Ireland's Emerald Hydrogen Valley

Ireland is positioning to become a world leader in green hydrogen. Its renewable energy resources are some of the best in Europe and readily attract global attention.

The country's largest and most prestigious universities have already made considerable progress initialising Ireland's hydrogen sector by developing the necessary skills infrastructure to obtain a hydrogen-ready workforce via participation in collaborative European projects such as GENCOMM and SEAFUEL. However, Ireland is yet to deploy its first large-scale low or zero-carbon hydrogen project, and with the rest of Europe moving at substantial pace, it risks losing potential international investment due to its continental hydrogen position despite its readiness – currently, according to Aurora Energy Research (2021), the 14th best EU country for hydrogen deployment. A national hydrogen strategy, consultation which began recently, will partly address this. Although, a signal of government's intent to act, in terms of a hydrogen support scheme, is also required to instigate growth in this area. Irish hydrogen can play a major role in helping to achieve a 51% reduction in the country's emissions by 2030, particularly by aiding the replacement of highly emitting Heavy-Duty Vehicles (HDVs), but only if the necessary infrastructure is in place in this timeframe.

Shamrock is a hydrogen valley project seeking to unite the whole island of Ireland in progressing towards a hydrogen future. At its core is the Galway Hydrogen Hub (GH2) and its plan unveiled by An Taoiseach Micheál Martin TD in April to transform Galway into a flagship area for Irish sustainable energy growth. The GH2 consortium currently consists of eight members: NUI Galway, the Port of Galway, CIÉ Group and Bus Éireann, Colas, Aran Islands Ferries, Lasta Mara Teo, Aer Arann Islands, and SSE Renewables. Shamrock will expand this partnership to receive access to learnings achieved in other EU hydrogen valley initiatives and apply this knowledge to an Irish context, focusing on the emerging need in transport, industry and local communities to reduce emissions and improve overall energy security.

From left to right: **Dermott Crombie**, Aran Ferries, Lasta Mara Teoranta, **Rory Monaghan**, NUIG, **Stephen Kent**, CIE, **Conor O'Dowd**, Port Galway, Taoiseach **Micheal Martin**, **Louise Glennon** SSER, **John O'Sullivan**, SSER, **Jarlath Conneely**, Aer Arrann, **Maurice O'Gorman**, Port of Galway.

The project will build an electrolyser in the Port of Galway, which will be connected to renewable electricity from SSE Airtricity. The green hydrogen produced will be compressed to enable both the fuelling of vehicles at the site, and its distribution for use across a wider region for buses and trucks initially, extending to maritime and aviation. GH2 will become Ireland's first multi-modal, zero emission, integrated green hydrogen transport and distribution hub – this will provide Shamrock with the tools to deliver replication across the whole of the island of Ireland, supporting the establishment of a network of hydrogen hubs from different organisations. These hubs will supplement GH2's renewable hydrogen supply and promote further growth of the Irish hydrogen sector, enabling the development of a countrywide ring of HRSs both sides of the Irish border along key haulage routes.

Shamrock will also enable the roll out of further Hydrogen Refuelling Stations (HRSs), supporting the two hydrogen corridors, along the west and east coast, envisaged by the government's both sides of the border, thereby enabling Ireland to progress towards meeting the Alternative Fuels Infrastructure Regulation for hydrogen. Maritime, and aviation applications are also part of the future phases of the project and will feature in the application. The project's success will boost Ireland's hydrogen credentials and provide its Irish partners with outreach and further European partnership opportunities.

The development of Shamrock as the country's first Hydrogen Valley is a major step in developing domestic sector competence and positioning Ireland at the strategic centre of renewable energy generation and energy sector integration in Europe. Domestic green hydrogen is expected to provide energy security, assist in countering long-term energy price fluctuation, improve air quality, make a significant contribution to reducing Ireland's greenhouse gas emissions and decarbonising the transport sector as well as becoming a significant wealth generator for the country.

WHY GALWAY?

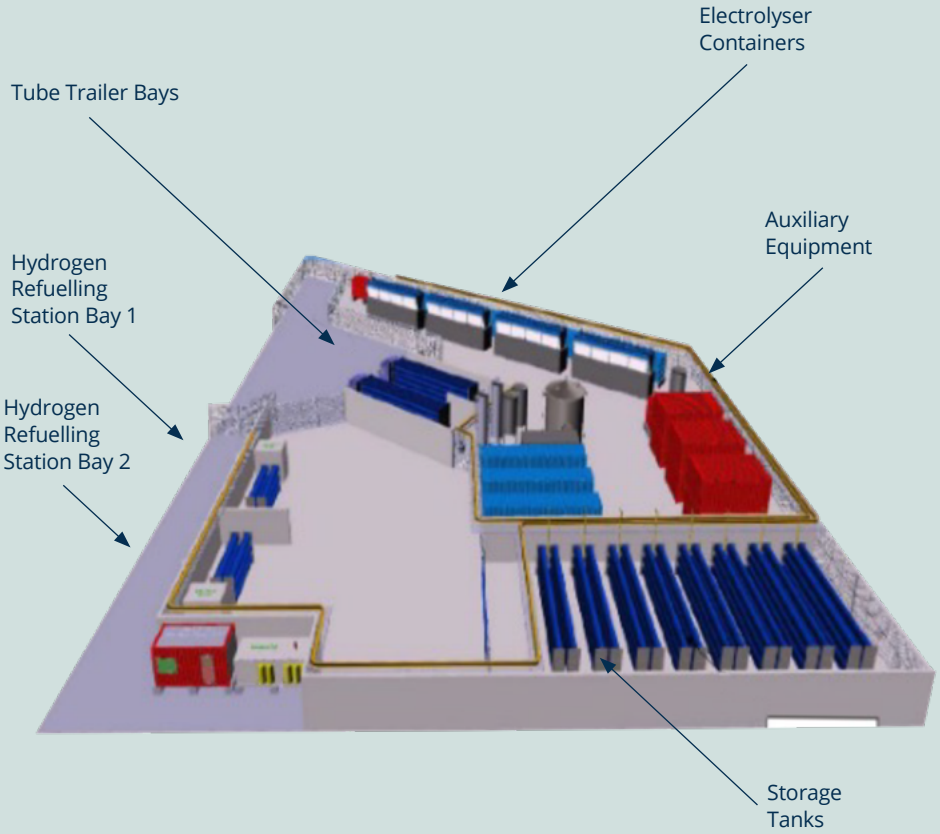
- Abundant onshore and offshore renwable energy resources
- Ideal solution for intermittent renewables and storage
- Large energy demand in Galway - must be decarbonised
- NUI Galway's position as Ireland's leading Green Hydrogen centre of excellence (through the internationally recognised GenComm, HUGE, Seafuel, HyLIGHT, Green Hysland projects)
- Development of the Port of Galway into an offshore wind and green hydrogen hub
- Development of Ceannt Station with the growth of zero emission transportation technologies, including hydrogen fuel cell buses and trains
- The role Green Hydrogen can play in attracting innovative hi-tech industries and employers to Counry Galway

From today's 'standing-start' in hydrogen terms, Shamrock will demonstrate and begin to deliver Ireland's potential as a future major European user, producer, and exporter of hydrogen.

GenComm partner HyEnergy Consultancy is one of the companies helping to develop both the GH2 and Shamrock projects and Ian Williamson, Director, commented **"Through our involvement in Irish hydrogen projects, we've seen first-hand the potential a large-scale green hydrogen sector can play across the whole of Ireland both environmentally and economically. These projects – GenComm, SEAFUEL, and HyLight to name just a few – have done great work setting the foundations for a domestic hydrogen economy but a step up in the scale of deployment is now required, and that is where Shamrock comes in."**

Ian Williamson
Hy Energy

From left: **Dr Rory Monaghan**, NUIG, **Caoimhe Donnelly**, CIE and **John O Sullivan**, SSE.



A hydrogen hub.

Cooperative versus Competitive - How Europe's national hydrogen strategies are shaping the new energy market

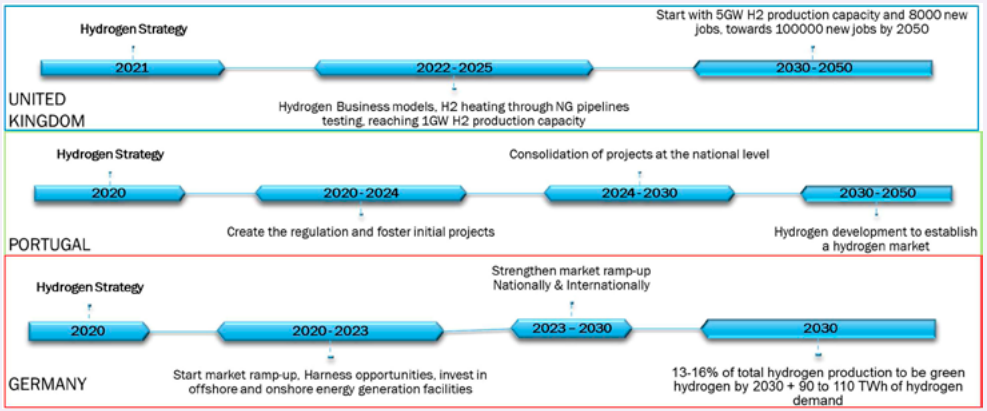
In March 2022, Julia T.M. Machado (NUI Galway PhD student), Professor Dr Brendan Flynn (NUI Galway) and Ian Williamson from GenComm partner HyEnergy, published a paper called "The National Shaping of Europe's Emerging Hydrogen Strategies: Cooperative or Competitive Hydrogen Politics?" in the Competition and Regulation in Network Industries journal.

Several around the world, European member states included, have decided to invest heavily in hydrogen technologies to secure greater decarbonisation potential. This is a much-needed step to ensure nations meet legally binding emission targets (Sustainable Development Goals, Paris Agreement, National Policies) to achieve the transformation of our long-term energy mix. In this context, six European countries - Netherlands, Norway, Germany, Spain, Portugal and France, chronologically - were the first movers in detailing and publishing their national hydrogen strategies.

National hydrogen strategies are intrinsically complex energy and technology R&D investment plans, which raise long-term questions on national competitiveness and market dominance, for example. not all strategies are equal in their scale, sophistication, or ambition level, and, as such, these strategies can also have implications for existing energy regimes that remain strongly dependent on fossil fuels alongside those with greater integration of renewables.

Thus, this brings to light fundamental questions:

- **Is a co-operative or competitive mode of hydrogen politics and policymaking emerging in Europe?**
- **How critical is the role of the European Union as a legislator and of non-European actors as partners in this transition?**



Hydrogen national plans' timeline for Germany, the UK and Portugal

For now, the EU's role has largely been to support, finance and stimulate the growing hydrogen sector. However, we argue that, in the longer term, the EU will increasingly have to consider regulatory and competition policy issues amongst its member states, because national hydrogen strategies have the potential to create market concentrated and integrated national or regional hydrogen energy regimes. Although recent EU plans consider green hydrogen central to fully decarbonising large-scale applications in industry, transport, heat, and power, these documents are carefully written not to rule out other forms of H2 production, at least in the short term. However, these inconsistencies and other technological, political, and social barriers could easily distort the wider energy market and result in a leading position for some countries and firms while leaving other countries outside of the energy market shift, which is not the expected outcome of a fair transition.

There are significant differences in how hydrogen is generated. Thus, the issue of hydrogen emission certification and how the different technologies and hydrogen production pathways will develop over the short-, medium-, and long-term are being heavily debated. To map these possible differences, challenges, and opportunities, we employed a comparative analysis that considered three countries - Germany, Portugal and the UK - and their strategic hydrogen approaches.

Hydrogen strategies, just like other contemporary H2 policies, often distinguish between the so-called 'colours of hydrogen'. In a nutshell, regarding these colours, the 3 countries will have different profiles. Germany's National Hydrogen Strategy was released in June 2020 and, although blue hydrogen is still part of the plan, it will behave as a purely transitionary measure in a wider shift from 'grey' to 'green' pathways.

Portugal published its National Hydrogen Plan (EN-H2) in August 2020, focussing on green hydrogen and not even mentioning the rainbow of alternative possibilities, despite demonstrating interest in blending hydrogen with natural gas in pipelines for heating systems in the medium-term. Contrariwise, the UK has pledged up to £ 1billion for CCUs and an additional 40GW of offshore renewable energy by 2030 as part of its consistent efforts to combine blue and green hydrogen production in the UK system.

Table 1. Comparison of national hydrogen strategies and targets.

Territories/indicators	Germany	Portugal	United Kingdom
Hydrogen demand (domestic)	55 TWh/a (2020); 90-110 TWh/a (2030)	0 TWh/a (2020); 0.8 to 7,4T Wh/a (2030)	90 to 110 TWh/a (2030)
Renewable energy consumption	20 TWh/a (2020); 40 TWh/a (2030)	47% of total consumption (2030)	30-45% of toal consumption (2030)
Electrolysis capacity	5 GW (2030), 10 GW (2040)	2-2,5 GW by 2030	5 GW by 2030
H_2 fuelling stations	91	0	16
CO2 emissions reduction	5.8-18.7 Mt CO2/a by 2030	6-8 Mton, 45% e 55% by 2030 of 2005 PT emissions	41 MtCO2e between 2023 and 2032, 9% of 2018 UK emissions
Direct job creation	[FCH] 6560-25 300 (by 2030)	[FCH] 630-5340 (by 2030)	[FCH] 3550-13 900 (by 2030)
Export and import market	Domestic use; Import	Domestic use (short-term) Expert (mid and long-term)	Domestic use; Import
Hydrogen focus	Green H_2	Green H_2	Blue H_2
Use of natural gas pipes	Yes	Yes	Unclear
Overall share of energy from renewable sources (% of gross final energy consumption) 2019 / EU 2020 targets	17,3% / 18%	30,6% / 31%	12,3% / 15%

[Source: National Plans; EUROSTAT; Ten Point Plan; UK Renewable Energy Roadmap; FCH Opportunities for Hydrogen Energy Technologies Considering the National Energy & Climate Plans]
Abbreviations: FCH = Fuel Cells and Hydrogen.

Comparison of national hydrogen strategies and targets

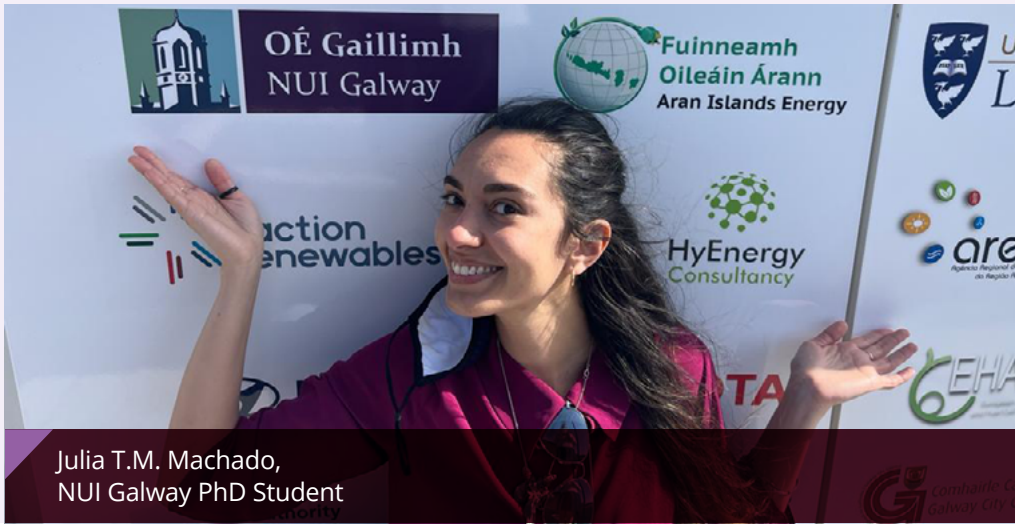
Germany, regarded as a global hydrogen leader,is a good example of a more consensual, neo-corporatist policymaking style with the added complexity of a federal system. It is also a good example of a state where policy has been informed by other energy sectors, notably the Natural Gas (NG) industry. Acknowledging the need for future imports of hydrogen, Germany is exploring partnerships with other countries, and is contacting several global locations with preferable renewable portfolios including countries across North Africa, South America, and Oceania.

Portugal, by way of contrast, is a small, peripheral and unitary state, but the Portuguese National Strategy adds a useful contrast due to its green focus based on the country's renewable-friendly geographic conditions. A key feature of the Portuguese case is the fact that Portugal hopes to become an exporter of green hydrogen, after solving its domestic needs, engaging with and receiving export revenues from its European neighbours.

The United Kingdom has been at the forefront of hydrogen mobility technologies, with operational hydrogen mobility projects since 2015. The country has a significant interest in developing hydrogen with carbon capture and storage (CCS) technologies but was a relative latecomer in announcing a formal national hydrogen strategy. Yet, the UK is in an advantageous position due to its wide experience in the use of NG, expanding offshore wind sector, and favourable geology for large-scale storage of both hydrogen and CO_2. Also, the recent political and commercial distancing from the EU adds an interesting layer of complexity and uncertainty to the discussion about the role of the EU in the northern hemisphere transition to a cleaner energy matrix.

Additionally, with regards to energy transitions, hydrogen synergies, and renewables, the article contrasts the UK and Scottish hydrogen plans, hydrogen valleys, and the relationship between NGs and hydrogen transportation in these countries. In conclusion, the findings of this article highlight that copying, learning, and analogous modes of national policymaking can be found across Europe's various hydrogen strategies. However, divergences and asymmetric design on a national level have left the EU in a unique position of varying importance during the creation of this new market and political framework. So, if you are curious about the MLP analysis and other conclusions obtained from this study, find out more from the full open-access article, which is available **here**.

Julia T.M. Machado



Julia T.M. Machado,
NUI Galway PhD Student

November Hydrogen Ireland Conference in Dublin

Hydrogen Ireland says those with an interest in the realities of Ireland's future energy needs should register today to attend its upcoming annual conference, where the theme will be 'Hydrogen: Securing Ireland's Green Energy Future'.

The aim of the event at Dublin's Radisson Blu Royal Hotel on November 22 and 23, 2022 is to provide business and academia with the latest insights on what hydrogen can offer them, the economy and the environment. Leading member of Hydrogen Ireland Paul McCormack says *"We expect the EU's hydrogen industry could be worth 65 billion euro by the end of this decade. It's within Ireland's power to capture a significant percentage of that market, if we act now to reach our potential. I believe everyone has a part to play here - from government to business and academia too - we're on a learning curve and we must move forward together".*

Hydrogen Ireland is an all-island association composed of academics, individuals, NGO's, students and small and large industrial partners. It promotes and facilitates discussion on the role of hydrogen as a clean fuel and energy vector and looks at how related technologies in the energy, mobility, heat, domestic and industrial systems can become key components of our future low carbon economy.

The conference is happening amid what the Hydrogen Ireland team believes are signs that the transition to alternative energy is growing more urgent. Recent amber alerts on the energy market into Ireland received much media coverage. Leading Hydrogen Ireland member Paul McCormack says these incidents will become more frequent: *"Wind speeds had been very low so our wind power potential was limited over those few days, and we've been importing lower amounts of energy than before. Add to this the already growing fears of energy shortages this winter and the message couldn't be clearer: we have to act more quickly to help ourselves in this situation. This isn't a once off either - In July, 75% of Ireland's electricity was generated using fossil fuels – with most of that being imported."*

The conference will feature a keynote speech from Minister for the Environment, Climate, Communications and Transport, Eamon Ryan TD, who says: *"I've been following the rapid development of the technology around delivering hydrogen and there certainly has been a lot of progress. It is vital that Ireland should realise the full potential of green hydrogen in decarbonising our economy and energy systems and we are taking important steps to achieve this. The government has just launched a public consultation on developing our national hydrogen strategy and I hope to see the strategy published by the end of the year. November's conference will be a timely one and I'm looking forward to attending".* Hydrogen Ireland recently called on businesses to engage in the public consultation process and ensure their voices are heard as the future strategy is put together.

Paul McCormack's fellow board member at Hydrogen Ireland Catherine Sheridan says now is a great time for business to have their say: *"We welcome the signals from government in relation to hydrogen, most recently announcing a 40% increase in their ambition for using offshore wind to generate electricity for hydrogen production. That additional 2GW of renewable electricity will separate water into oxygen and hydrogen. The hydrogen can be used to replace fossil fuels. The government will set the policy but it will fall to industry to make the change happen. The public consultation is an opportunity for businesses to put forward their ideas and proposals on how they can lead the country into a new age of energy generation, use and storage, so we're strongly encouraging people to have their say now".*

The line up of expert speakers at Hydrogen Ireland's conference this November also includes:

- Piero Ercoli, Senior Vice President of Decarbonisation Projects at Snam, (a leading global player in gas transmission, storage and regasification)
- Jorgo Chatzimarkakis, Hydrogen Europe
- Bart Biebuyck, Clean Hydrogen Partnership
- Catherine Joyce O'Caollai, Indaver and representatives of other organisations including Siemens, ESB, GNI, Bord na Mona, dCarbonX, ITM Power, Bord Na Mona, Pinsent Mason, Bechtel IDA, Enterprise Ireland, DfE Hydrogen, EIH2, An Post

The Hydrogen Ireland Conference is supported by ESB, Gas Networks Ireland and Siemens Energy. For more information on the event and registration, click here.

REGISTRATIONS NOW OPEN

Ciara McDonagh,
Healy Communications

The commodification of Green H2 for Europe

GenComm Partners from the Belfast Met led EU energy project will present an EU Energy Week 2022 policy session on September 27th, 2022 titled: 'The commodification of Green H2 for Europe.'

Europe faces multiple pressures to decarbonise economies and to address the urgent need to achieve EU energy independence by accelerating the integration of greater renewable energy sources into our energy systems In order to accelerate the hydrogen revolution we must make hydrogen an everyday commodity.. For Europe's energy journey to be widely accepted and deployed we must replace fossil fuels with a commodity that brings a seamless change.

We face multiple pressures to decarbonise economies. Enabling increasing integration of greater renewable energy sources into the energy mix can be achieved by hydrogen as a key green energy vector and will result in exponential growth of the green energy market.

What will be Hydrogen's role in the final energy mix of a future net-zero emission Europe? This session will examine how we can optimise the use of Hydrogen for it to become an energy commodity and to accelerate the decarbonisation journey for Europe by utilising Green Hydrogen as a key energy vector.

The interactive session will examine how we can position Hydrogen technically and environmentally to become an energy commodity. This session will examine how we optimise all stages in the 4 Stage Green H2 Commodification Value Chain.

Click here to register for the session.

Paul McCormack, GenComm Programme Manager and Belfast Met Innovation Manager will speak on:
• **H2 Optimisation** – Belfast Met N. Ireland

Optimisation of Green H2 – building on the Hydrogen topography –geographical Green H2 specialisms dependant on the local renewables and availability. A geographical approach preferable to a widespread sectoral approach leading to increased demand/ deployment.

Diana Raine, Hydrogen Advisor, Worley will speak on:
• **H2 Actualisation**

She will detail the tangible benefits from Green H2 deployment and the challenges for hydrogen to reach its potential. How can we effectively address the barriers for hydrogen to become a meaningful part of the future energy mix in the timescales that are needed?

Marianna Rossi from GenComm Partner IZES GmbH will speak on:

• H2 **Evaluation** – IZES, GmbH, Germany. Marianna will evaluate the social benefits and how Green H2 can assist EU Communities face multiple challenges and become energy secure, sustainable and assure future growth.

Marianna will also detail how Green H2 is evaluated by relevant stakeholders, which barriers result for the further development in the hydrogen sector due to the current social climate and how to overcome these barriers.

Dr Rory Monaghan from GenComm Partner NUIG will speak on:

• H2 **Validating P2X** – NUI Galway Ireland

Validation of the use of Green H2 and accelerating through the creation of a techno-economic model enabling support tool.

Europe finds itself in the middle of a H2 energy revolution and crisis –where all of Europe must be informed, assisted and enabled to transition from fossil fuels to a net zero C02 destination. Hydrogen is no longer an 'if and why' it is now 'when and how,' Working to technically and financially optimize the commercialisation of renewable hydrogen. As the EU green energy revolution continues, authorities and agencies need continued information and key data analytics outputs to support and encourage confidence in their green energy planning. The validation tool the EST – a dynamic and collaborative decision support tool involving regional stakeholders is one aspect of a regional empowerment strategy for communities to play an active role in energy transition.

GenComm Programme Manager Paul McCormack is looking forward to speaking at EU Energy Week saying: ***"GenComm has been a constant voice in EU Energy week since 2019 and we are delighted to return again to continue our message on generating energy security for communities. . For our energy journey to be widely accepted and deployed we must replace fossil fuels with a commodity that brings a seamless change. This session will examine how we can optimise the use of hydrogen for it to become an energy commodity and to accelerate the decarbonisation journey for Europe by using green hydrogen as a key energy vector."***

Bart Biebuyck, the Director of the Clean Hydrogen Partnership will introduce the 4 GenComm speakers, namely, Paul McCormack, GenComm Programme Manager, Belfast Met, Marianna Rossi, IZES GmbH, Dr Rory Monaghan, NUIG and Ms Diana Raine, Hydrogen Advisor, Worley.

Eugene McCusker,
GenComm Communications Officer

Bart Biebuyck, Director, Clean Hydrogen Partnership

Bosch in Homburg moves the future

In this framework, Bosch and IZES gGmbH are working together to develop a connected H2 cycle for the production site in Homburg/ Saar. The different aspects of the connected H2 cycle or the strategy behind is shown in the figure to the right.

The Bosch plant in Homburg is the leading plant and competence centre for various diesel products and technologies and plays an outstanding role in the company's international manufacturing and development network.

With technologies for fuel cells, the site is also opening up new fields of business. For example, it manufactures components for mobile fuel cells that will be used in fuel cell electric vehicles in the future. The electric air compressor, the anode recirculation blower and the hydrogen metering valve are required to supply the fuel cell with oxygen or air and hydrogen. The first components are already in series production.
The site has also been working on various applications for hydrogen tank systems.

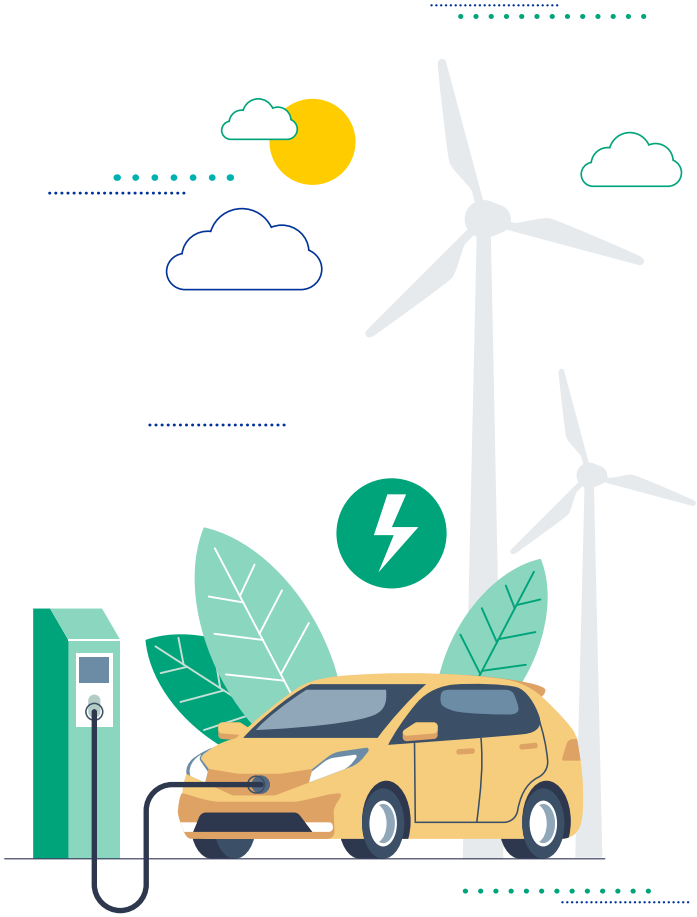
The Connected H2 Cycle

Alongside these products for mobile applications, the plant is an industrialisation partner for the development and production of stationary fuel cell systems (Solid Oxide Fuel Cell). These are small decentralised networkable power plants that convert natural gas, biogas or hydrogen into electrical energy and heat. They can be used in cities, factories, data centres and to operate charging stations for battery electric vehicles. Bosch wants to go into series production with the stationary fuel cell in 2024. The so-called hotbox will then come from the Homburg site. The prototype production has already delivered more than 100 units.

As part of a development project, a hydrogen cycle is being set up at the Homburg site this year. With the help of an electrolyser, green hydrogen will be produced with the energy from a photovoltaic system. The produced hydrogen will be used in production or for mobile applications, e.g. for Bosch's own vehicle fleet. A mobile hydrogen refuelling station is available at the Bosch plant in Homburg and will soon be available for refuelling of vehicles. In addition, green hydrogen will be used to generate electricity and heat using a stationary solid oxide fuel cell. The electrical energy generated in this way can cover peak loads in the plant's operations. With the hydrogen cycle, Bosch wants to expand its expertise in the production and use of green hydrogen. The complete installation of the entire hydrogen cycle is planned for autumn 2022.

The project is financially supported by the Federal Ministry for Economic Affairs and Climate Protection to the amount of one million euros. Robert Bosch GmbH's project partner is IZES gGmbH (Institute for Future Energy and Material Flow Systems, Saarbrücken). The main scientific objective of IZES within the framework of the project is the monitoring and evaluation of the pilot operation. The main technical goals of Bosch are the construction, operation and use of the plant or the produced hydrogen in different sectors.

Dr. Bodo Groß
IZES gGmbH



Interreg North-West Europe GenComm
European Regional Development Fund

For more information

on the GenComm Project and our work in the green hydrogen arena contact

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Engage in the hydrogen evolution and join the CH2F

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