



H2 News Hub

Issue 14

H₂ East January 2022

Top stories

Happy New Year and welcome to issue 14 of **Hydrogen East's** Sector Review, where we take a look at important publications and developments over the month of December (2021).

Transport East has released its draft transport strategy for the East of England, where it acknowledges how fuels such as hydrogen could prove to be effective in a shift to cleaner passenger and fleet transport, as well as pledging to work with **Hydrogen East** and **Net Zero East** part of this process. The consultation on the strategy will close on 30 January.

Elsewhere, the **Midlands Engine** has launched a **Hydrogen Technologies Strategy** in a bid to "crystallise and champion" the key role that the Midlands can play in realising low carbon hydrogen ambitions and growth. Actions set to be driven through the strategy could deliver 167,000 new or safeguarded jobs, provide £10bn in GVA to the Midlands and the UK economy, as well as a 29% reduction in CO₂ against current levels over the next 10 years.

This month's H₂ News Hub also takes a look at an insight released by **Westwood Global Energy Group** which sought to frame a business case for hydrogen in Northwest Europe. It reviews the status of hydrogen in the region, explores the barriers to growth of the industry, and discusses factors that will influence the future role or business case for hydrogen in Denmark, Germany, the Netherlands, Norway, and the UK.

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Upcoming webinars

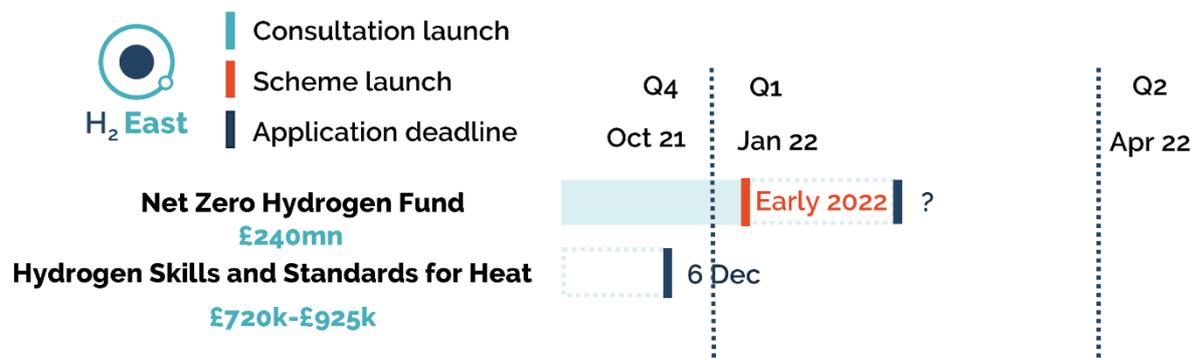
| **17 Jan** – **ICE**: Northern Ireland Water Hydrogen Project | **21 Jan** – **Network-H₂**: Hydrogen uses within bus transportation | **21-22 Jan** – **ICHFCS 2022**: International Conference on Hydrogen and Fuel Cells Safety | **24 Jan** – **National Grid**: Shaping the Bacton Terminal Strategy (Playback Webinar)



Funding tracker

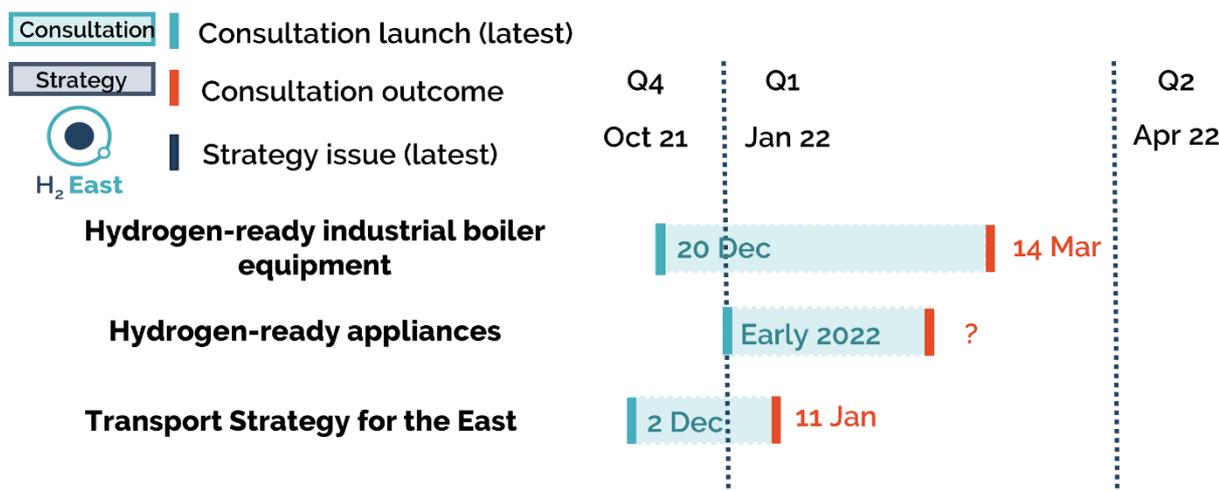
There are a number of funds already available for developers, local authorities and innovative organisations. These cover both feasibility studies and demonstrator projects.

The **Net Zero Hydrogen Fund**, expected to be consulted on in July 2021, has been promised for early 2022. This will be the primary area of government funding for hydrogen projects in the near-term, with up to £240mn on offer.



Policy tracker

A number of consultations and strategies are in development and are expected to be issued in 2022. In December BEIS announced new call for difference seeking views on the development of possible options to enable or require hydrogen-ready industrial boiler equipment, outlined below.





Transport strategy for East of England “embraces” hydrogen

Transport East’s draft strategy for the East of England has acknowledged how fuels such as hydrogen could prove effective in a shift to cleaner passenger and fleet transport.

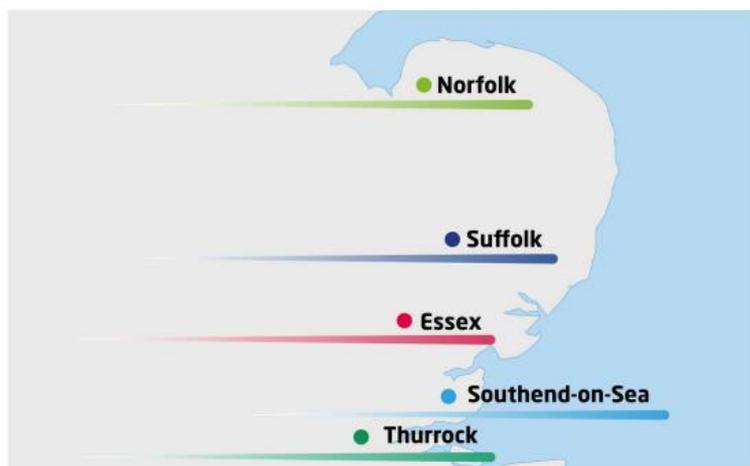


Figure 1: The Transport East region

(Source: Transport East)

On 2 December, it [launched](#) a consultation on the strategy, which maps out a vision where the region has cleaner, greener transport; better public transport connections accessible to everyone; places that make it easy and attractive for people to move around sustainably; more reliable business and freight journeys; a healthier, more active population; and people needing to make fewer journeys.

It identifies a set of strategic priorities: decarbonisation to net zero, with an aim of reaching net zero carbon emissions from transport by 2040; connecting growing towns and cities;

energising coastal and rural communities; and unlocking international gateways.

As part of its path to achieving net zero carbon emissions from transport by 2040 – transport accounts for 42% of the region’s emissions – a key action is supporting residents and businesses to switch all private, passenger transport, fleet and freight vehicles to net zero carbon fuels as quickly as possible. The strategy “embraces” hydrogen here, noting that it could be a good

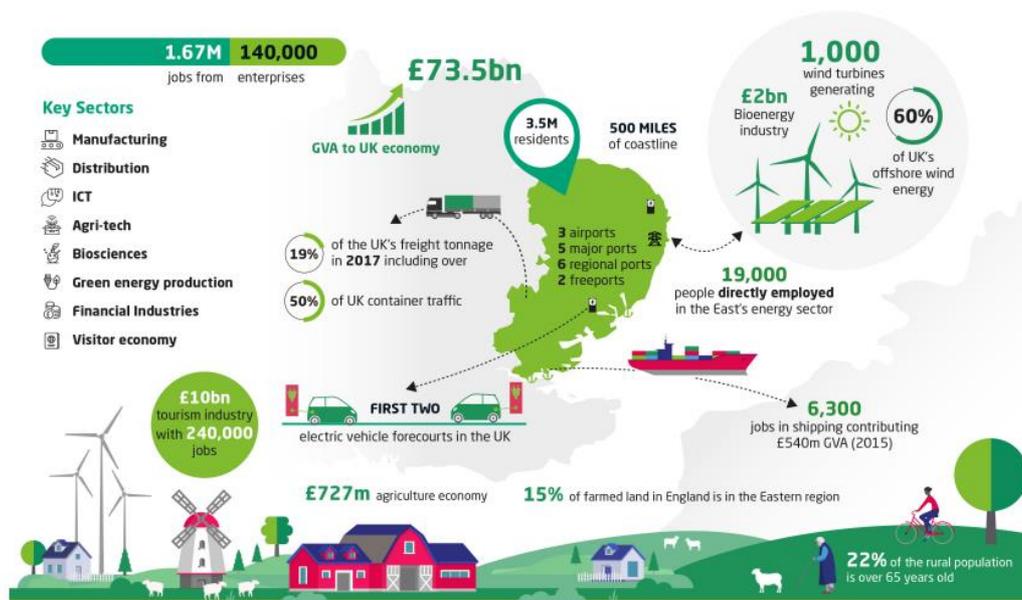


Figure 2: Infographic highlighting the “East’s unique contribution to the UK”

(Source: Transport East)



solution for fleets and larger vehicles, for longer distance services in rural areas and for some rail lines.

To this end, it is pledging to coordinate partner organisations, including Hydrogen East and Net Zero East, along with National Highways, Network Rail and local authorities to elevate and promote the need for investment in the East to decarbonise vehicle fleets and networks.

It also acknowledges a need to unlock international gateways, including ports, which once more will involve alternative fuels – namely increasing the use of them among the region's ports and its freight sector. This will involve leading strategic thinking and developing evidence to accelerate hydrogen and EV infrastructure across the region, including electrified and hydrogen-powered rail routes.

Elsewhere, the strategy hones in on the need to increase access for rural and coastal communities, citing a need to decarbonise rural trips in particular. As well as ensuring a quick transition to electric vehicles in rural areas, with a need to prioritise delivering EV infrastructure in these locations, it also highlights decarbonising business transport within rural economies as "vital".

To this end, Transport East is pledging to work with local authorities, the energy sector and bodies such as Hydrogen East to explore the potential for establishing pilot areas in rural and coastal locations to develop and test innovative transport decarbonisation solutions.

The consultation will close on 30 January 2022.

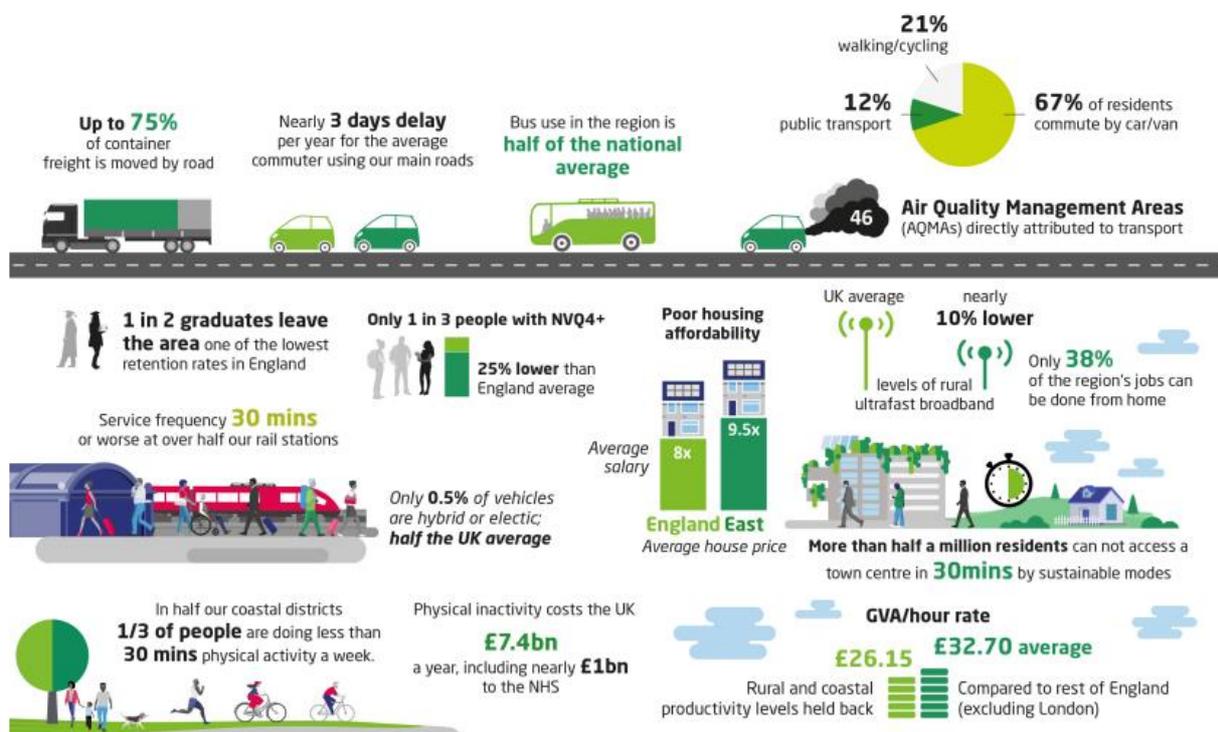


Figure 3: Infographic highlighting the challenges faced by the East of England

(Source: Transport East)



Government investigates future for hydrogen-ready industrial boilers

The government has launched a call for evidence as it looks to develop potential options to enable or require hydrogen-ready industrial boiler equipment.

[Launched](#) on 20 December, BEIS detailed how hydrogen-ready industrial boilers have the potential to help industry decarbonise and kickstart the UK hydrogen economy. The UK Hydrogen Strategy suggests potential hydrogen demand for industrial fuel switching to be between 10TWh and 21TWh per annum by 2030, depending on supply being limited to industrial clusters or available nationwide.

Using the Net Zero Industrial Pathways (NZIP) model, BEIS goes further in the call for evidence, finding potential hydrogen demand for industrial boiler fuel switching to rise to 5TWh by 2030, before then plateauing around 7TWh per annum in the late-2030s under the cluster scenario. In the national scenario, it finds early demand to be realised through clusters, hitting 8TWh per annum by 2030, before going on to plateau at 37TWh per annum in the mid-2040s. Under these scenarios, industrial CO₂ emissions savings of 1.3MtCO₂e would be realised per annum through the cluster scenario and 7.3MtCO₂e per annum in the national scenario by 2050.

Therefore, the government is seeking views and evidence to inform the development of possible options to enable or require hydrogen-ready industrial boiler equipment, with areas of specific interest including how “hydrogen-ready” should be defined. No standardised definition for hydrogen-ready means equipment manufacturers use the term to mean different things, ranging from 100% hydrogen to a blend of hydrogen and methane. An established definition would help sites take informed decisions on whether the technology is suitable for them.

It is also seeking views on whether hydrogen-ready boiler equipment would enable cheaper and faster fuel switching, as well as whether the government should take action to encourage hydrogen-ready boiler equipment. Potential levers at its disposal include providing timely information about the future cost and availability of hydrogen, alongside comparable information or other ways to decarbonise; funding either some or all of the costs of hydrogen-ready industrial boiler equipment, de-risking initial investment as a result; and requiring all new industrial boiler equipment to be hydrogen-ready.

Finally, government wants to explore the role of the supply chain and how to maximise economic opportunities for the UK. The support of a world-class, sustainable supply chain will be key to ensuring industry successfully makes the switch to low carbon hydrogen. This will call for new capabilities across the supply chain, opening up opportunities for new participants, as well as giving existing ones a chance to expand and adapt.

The consultation will run until 11:45PM on 14 March 2022.

Hydrogen to smell like natural gas for the first time

Hydrogen is set to be odourised to smell like natural gas for the first time during the next phase of the H21 programme.

On 13 December, Northern Gas Networks (NGN) [announced](#) that the project will test operational procedures under 100% hydrogen conditions on an existing network for the first time on a disused network of gas mains in the South Bank area of Middlesbrough. It explained that natural gas is odourless, like hydrogen, and has a distinct and widely recognised smell added to it as a means of warning people of a potential gas leak.

A bespoke unit has been built that will now odourise hydrogen in the same way at the South Bank site as it is distributed into the gas mains.



Cadent and Equinor unveil plans for a Hydrogen Town

Cadent and Equinor have joined forces to realise the ambition of delivering one of the world's first low carbon Hydrogen Town.

On 15 December, Cadent and Equinor [announced](#) their plans to collaborate to assess what a hydrogen town conversion would look like in Lincolnshire. A Memorandum of Understanding (MoU) has been signed to develop the technical assessments and concepts for hydrogen production, storage, demand and distribution for heat, in line with government targets to decarbonise domestic heating.

The conversion of the gas networks of a town to 100% low carbon hydrogen have the potential to "drastically reduce" the carbon emissions linked to home heating. In turn, this could bring down the overall emissions in the town by around a quarter.

The Humber is considered an "ideal location" for such pilots, owed to the number of proposed low carbon hydrogen production projects in the area. With Cadent the gas network operator for Northern Lincolnshire, it will examine which parts of its distribution infrastructure could be used to carry hydrogen instead of natural gas and develop any infrastructure that is required accordingly.

Dakar Rally showcasing hydrogen's potential in "most demanding conditions"

Aramco is sponsoring the world's first hydrogen-fuelled racing truck as it competes in the 2022 Dakar Rally in Saudi Arabia.

In early December, Aramco [announced](#) a collaboration with Gaussin, part of which has seen it sponsor its hydrogen-fuelled racing truck. Ahmad Al Sa'adi, Aramco Senior VP of Technical Services, [explained](#) to *Oil and Gas Middle East* that the aim is to showcase its potential in the "most demanding conditions", adding that hydrogen can enable emissions reduction in the transport sector, particularly in segments difficult to decarbonise, such as heavy duty vehicles.

Held annually, the Dakar Rally is off-road, with the terrain traversed by competitors much tougher than what is used in conventional racing, meaning the vehicles competing tend to be true off-road vehicles and motorcycles. The 2022 event as a total of 12 stages, covering up to 800-900km per day.

SHAPE UK project to address viability of a local hydrogen infrastructure

Cox Marine has joined the SHAPE UK consortium, which is aiming to transition Portsmouth International Port into the UK's first net zero emissions maritime hub.

On 6 December, Cox Marine [explained](#) that it will work with the University of Brighton to convert one of its CXO300 diesel outboard engines to operate as a dual fuel hydrogen engine, as well as demonstrating the engine operating in the port environment. The SHAPE (Shipping, Hydrogen and Port Ecosystems) UK project is striving to show an achievable modular green hydrogen generation system in Portsmouth International Port.

As well as assessing the viability of a local hydrogen infrastructure through the installation and test of a modular hydrogen electrolyser, SHAPE UK will also demonstrate a use case of portside hydrogen through the dual fuel Cox outboard, generate a digital twin of the port as a tool to demonstrate the economic and environmental suitability of deploying hydrogen systems within key stakeholder ports, and assess the regulatory landscape around the generation and use of hydrogen in a port environment. This will help to determine where deployment can occur immediately and where regulations need to be addressed.



Strategy strives to realise role of Midlands in hydrogen growth

A “pioneering” strategy has been launched in an effort to “crystallise and champion” the key role the Midlands can play in realising low carbon hydrogen ambitions and growth.

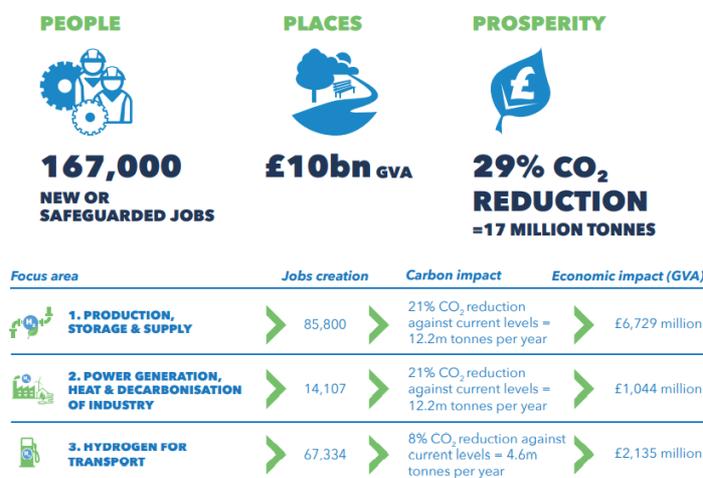


Figure 4: Potential impact of actions to be driven forward from the strategy

(Source: Midlands Engine)

However, to maximise these strengths, action is needed, particularly when it comes to developing, demonstrating and commercialising hydrogen technologies; leveraging opportunities to plan for the strategic development of hydrogen assets at key sites across the region; and identifying and leveraging opportunities for innovation and industrialisation support to help the market for hydrogen technologies to develop and scale faster.

It maps out a vision of a Midlands Engine Hydrogen Technologies Valley, which is an ecosystem linking hydrogen production with end users, based on industrialising hydrogen technologies at scale. It said that partners are moving “rapidly” to act on opportunities, with key outcomes already being accelerated including Midlands Engine partners leading the H2GVMids consortium, which is preparing the ground for a green hydrogen fuelled 44-tonne truck demonstration programme in the region.

Overall, the strategy sets out 10 main actions that, according to independent analysis, have the potential to deliver 167,000 new or safeguarded jobs; £10bn GVA to the Midlands and UK economy; and a 29% reduction in CO₂ against current levels in the next 10 years.

These actions include working with government to advance the aims and actions in the UK Hydrogen Strategy; establishing a Midlands Engine Hydrogen Network; completing and publishing in-depth, interactive mapping of the region’s hydrogen technologies capabilities to support promotion of a Midlands strategic investment portfolio; and enabling analysis and underpinning research to map then foster regional supply chains for technologies and services, to facilitate opportunities in the growth areas of hydrogen production, storage and supply assets as a driver of high-value, high-skilled jobs and economic growth.

Further actions involve actively drawing together and sharing learnings from industrial decarbonisation, heat and power exemplar projects, and working actively to advance the application and subsequent scale up of hydrogen technologies to decarbonise power and heat supply in energy-intensive industrial clusters, commercial and domestic buildings.



Government reveals plans for oil and gas climate compatibility checkpoint

The government has launched a consultation on the design of an oil and gas climate compatibility checkpoint.

On 20 December, BEIS [outlined](#) how the checkpoint will apply to any future oil and gas licenses to ensure they are aligned with the government's climate change commitments, helping the UK's oil and gas sector to transition to net zero. It follows a commitment set out earlier in 2021 to introduce the checkpoint alongside the North Sea Transition Deal.

The consultation is now open for views and sets out potential tests that could be used to assess new licenses, including domestic demand for oil and gas, the sector's projected production levels, the sector's continued progress against emissions reduction targets, and the sector's progress in supporting energy transition technologies. Its rationale for the latter is that it could incentivise investment in, and the development of, technologies such as carbon capture usage and storage (CCUS) and hydrogen.

This test would work by comparing the sector's progress in developing energy transition technologies with commitments set out within the North Sea Transition Deal. If the sector were to fall behind relative to a predefined trajectory towards targets in the North Sea Transition Deal, then the test would fail, resulting in a negative checkpoint outcome. These targets include 5GW of low carbon hydrogen capacity by 2030 and an ambition to capture 10mn tonnes of carbon dioxide per year by 2030, of which the latter has since been increased to 20-30MtCO₂ across the economy through the Net Zero Strategy.

It stressed that delivering on these ambitions will call for the oil and gas industry to play their part, leveraging the existing infrastructure they have, where appropriate, to provide key transport and storage capability. It did, however, acknowledge potential limitations of such a test, such as how the ability to directly influence the development of key energy transition technologies, including CCUS and hydrogen, is limited to a small number of oil and gas companies, which makes it outside of the control of most of the sector.

Further issues include how making the checkpoint outcome dependent on the successful deployment of newer technologies could add uncertainty to the investment landscape, with some also arguing that continued licensing is necessary to provide a stable investment environment for the sector to invest in energy transition technologies.

The consultation will remain open until 28 February 2022, with the final checkpoint design then announced in due course.

SGN and H2 Green launch plan for Inverness hydrogen hub

H2 Green has signed a deal with SGN to develop a major green hydrogen production, storage and distribution facility in Inverness.

On 14 December, H2 Green [announced](#) plans for the hub, describing the location of Inverness as ideal, due to hydrogen presenting a valuable and cost effective route for the widespread decarbonisation of the wider Highland region. The hub capacity is set to scale in the medium-term to eight tonnes of hydrogen a day, serving up to 800 HGVs, with the ability to reduce carbon emissions by 30,000 tonnes per year. This hydrogen will also be able to be used to provide zero carbon heat and medical-grade oxygen for hospitals, aquaculture and water treatment works in the area.

SGN's former gas holder site on Harbour Road, which lies between Inverness' rail depot and industrial area, has been earmarked for development. It will mean green hydrogen can be provided directly to large volume anchor customers, including rail, bus and HGVs.



Experts launch independent hydrogen coalition

A group of scientists, academics and engineers have come together to form the world's first independent coalition on hydrogen's role in the energy transition.

On 9 December, the Hydrogen Science Coalition was [launched](#), with members pledging to volunteer their expertise to the media and policymakers in a bid to bring "concrete evidence" back into the hydrogen debate, which is free from industry bias. They will do this through briefings, access to data and media events.

The five founding members have diverse portfolios of hydrogen expertise, spanning chemical engineering, energy processing, decarbonisation heavy duty road transport, aviation and domestic heating. They are based in the UK, Germany and Netherlands and are planning to focus on the hydrogen policies of the UK and the EU.

As part of the launch, the coalition published a joint manifesto, detailing their central recommendations for policymakers, the first of which is that the only true zero emission hydrogen is made from renewable electricity – green hydrogen – and this is what governments should prioritise their support for. The first point of use for green hydrogen should be in hard to decarbonise sectors, starting where grey hydrogen is used today.

The coalition also warned that hydrogen should not be used to delay deploying electrification alternatives that are already available today, particularly in heating and transport. If hydrogen is considered more risky or expensive than already deployable alternatives, then, the experts stressed, it is not the best option and focusing on the wrong demand sectors for hydrogen could prove an expensive mistake. In contrast, prioritising electrification, energy efficiency and green hydrogen for heavy industries will bring jobs to both the UK and the EU.

As a final recommendation, the coalition explained that given how valuable green hydrogen is, blending it into the existing gas grid does not make sense, owed to it having a limited impact on emissions savings. With hydrogen-ready natural gas transmission pipelines not yet existing today and case studies finding that injecting 20% of green hydrogen into the existing natural gas pipelines will only result in around 7% of carbon emissions savings, the priority should be on areas where green hydrogen can have a significant, immediate impact.

ExxonMobil explores potential for a Southampton Hydrogen Hub

ExxonMobil has joined forces with SGN and the Green Investment Group (GIG) to explore the potential for a hydrogen hub in Southampton.

On 8 December, the trio [signed](#) a Memorandum of Understanding (MoU) to investigate the use of hydrogen and carbon capture to help reduce emissions in the Southampton industrial cluster. An initial feasibility study carried out by SGN and the GIG has found annual hydrogen demand from the cluster could rise to 37TWh by 2050, including the heating demand of 800,000 homes across the South of England.

The feasibility study further revealed that carbon capture facilities could capture an estimated 2mn tonnes of CO₂ per year. This would include from initial hydrogen production of around 4.3TWh per year.

It means that an increase in hydrogen with carbon capture has the advantages of reducing emissions in the area's industrial sector, stimulating the local economy through conversion of the natural gas network, and reducing emissions from domestic heating and transport. If technical and business feasibility are confirmed, and the right government support is in place, hydrogen production could commence from 2030.



Insight explores hydrogen business case for Northwest Europe

Consideration must be given to all parts of the value chain to understand what role hydrogen can play and how it can be commercialised, according to research.

On 14 December, Westwood Global Energy Group [published](#) an insight, entitled, *Framing a business case for Hydrogen in Northwest Europe*, where it looked to review the status of hydrogen in the region, explore the barriers to growth of the industry, and discuss factors set to influence the future role or business case for hydrogen in Denmark, Germany, the Netherlands, Norway and the UK.

	Denmark	Germany	The Netherlands	Norway	United Kingdom
Hydrogen Strategy Targets by 2030	In preparation-To be announced*	5 GW	3-4 GW by 2030	Has a strategy but not a clear target	5 GW by 2030
Active or Announced Hydrogen Projects	11	19	16	4	-
Active or Announced CCUS Projects	2	0	2	2	4
Number of Projects Submitted to IPCEI Hydrogen	2	62**	24**	3	N.A
Primary Hydrogen preference	Green	Green	Mostly Green but mentions Blue	Blue	Blue
Top projects to watch	<ul style="list-style-type: none"> Green fuels for Denmark operated by Ørsted HySynergy operated by Everfuel Greensand by Ineos Bifrost by Noreco 	<ul style="list-style-type: none"> Aquaventus by RWE 	<ul style="list-style-type: none"> North H2 lead by Gasunie Porthos by the Port of Rotterdam 	<ul style="list-style-type: none"> Hegra by Yara Barents Blue by Horison Energie Longship by Equinor 	<ul style="list-style-type: none"> East Coast Cluster HyNet Northwest Cluster GigaStack

* Hydrogen Denmark association recommends 6GW target
 ** Germany and the Netherlands submitted several mid and downstream projects, while Denmark and Norway focused on a more limited set of upstream/production projects

Figure 5: Overview of hydrogen production targets and projects for countries in NW Europe

(Source: Westwood Global Energy Group)

As it stands, the Northwest region is leading the deployment of hydrogen and associated CCUS projects for Europe. Broad support for the hydrogen economy in Northwest Europe has been reflected in the EU and UK hydrogen strategies, as well as the fact 22 EU member states and Norway launched the Important Projects of Common European Interest on hydrogen in late 2020. However, while there is this support and a strong project pipeline, there are substantial barriers that exist from turning vision into reality.

Westwood compared it to the early stages of developing renewables, though did note the hydrogen value chain is significantly more complex. It has multiple stakeholders, as well as regulatory, technical and commercial challenges, and safety concerns, all of which must be overcome. Particular hurdles include the current high cost of green and blue hydrogen, as well as uncertainty around the standards for low carbon hydrogen which, in turn, create uncertainty for some of the most important blue hydrogen-based projects.

Another challenge is selecting the right commercialisation route for each country, with multiple potential uses of hydrogen and questions over how this will be supplied, with three influencing factors identified to make a business case for hydrogen a reality: matching the opportunity of hydrogen with a country's needs; identifying synergies and collaboration opportunities; and determining a business case facilitator.

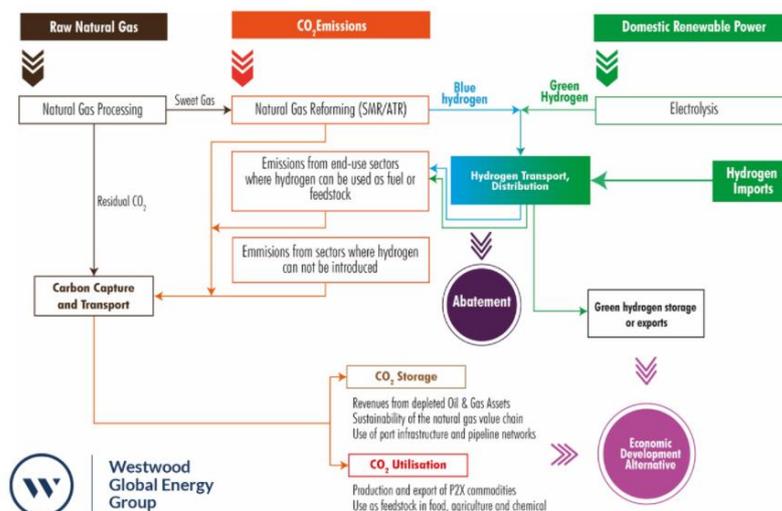


Figure 6: Hydrogen commercialisation routes to meet objectives of domestic climate commitment and/or stimulating economic development

(Source: Westwood Global Energy Group)

Matching the opportunity of hydrogen with a country's needs will involve working out whether it is the appropriate decarbonisation solution and where its use should be prioritised, with it citing three factors that merit consideration. There are structural barriers, with some hard to abate sectors set to require too significant a structural change to make hydrogen technically or commercially feasible, while there is the issue of alternatives too, with end-use markets currently assessing various alternatives to decarbonise their operations and the final option not yet set in stone.

The final factor is that of demand, with the likes of Denmark and Norway countries which have the potential to produce hydrogen, though a lack of clarity on its ultimate end-use potentially holding back the necessary investment in the required energy sources to support its growth. Imports can offer a solution, but this will require clarity on the end-use market to warrant them while, on the flip side, end-use markets themselves will not develop until hydrogen is viewed as an attractive alternative.

Once the appropriate target end-use sectors have been selected, along with greater clarity in the downstream part of the value chain, project leaders can then determine which other stakeholders should be involved and build synergies through collaboration. This will strengthen the business case.

Finally, a business case facilitator is a further element required to develop an opportunity for hydrogen. Westwood highlighted an example from Denmark, where the close collaboration of industry associations Wind Denmark and Brintbranchen (Hydrogen Denmark) has provided a consistent and aligned voice for stakeholders in hydrogen, something that has proven essential to frame a business case for hydrogen in a country that has low domestic demand, though substantial resources and the need to seek economic alternatives to oil and gas.

The overriding point of a business case facilitator is to align a particular proposal or project with the government strategy to address its domestic emissions or create a new economic development opportunity, while it also can allow for a quicker and more focused identification of policy gaps in the value chain of a project.

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