Hydrogen East

H2 News Hub

Issue 19

H2 East

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Top stories

Welcome to issue 19 of **Hydrogen East**'s Sector Review, where we take a look at important publications and developments over the month of May (2022).

The **North West Hydrogen Alliance** published a report, outlining how the North West can build on its plans for local low carbon hydrogen production and use by also pioneering low carbon energy imports through driving up Britain's use of ammonia. Ammonia as a hydrogen carrier has significant potential to boost its rollout in the UK as a low carbon fuel.

Having previously published an outline of its **REPowerEU** plan back in March, the **European Commission** has now presented its full plan. It includes a target for 10mn tonnes of domestic renewable hydrogen production and 10mn tonnes of renewable hydrogen imports by 2030, as part of efforts to end Europe's dependence on Russian fossil fuels following Russia's invasion of Ukraine.

Elsewhere, the **Institute for Energy Economics and Financial Analysis** warned that blue hydrogen is not a low cost solution in the context of the ongoing gas price crisis, with a project cost of production 36% higher than 2021 UK government estimates.

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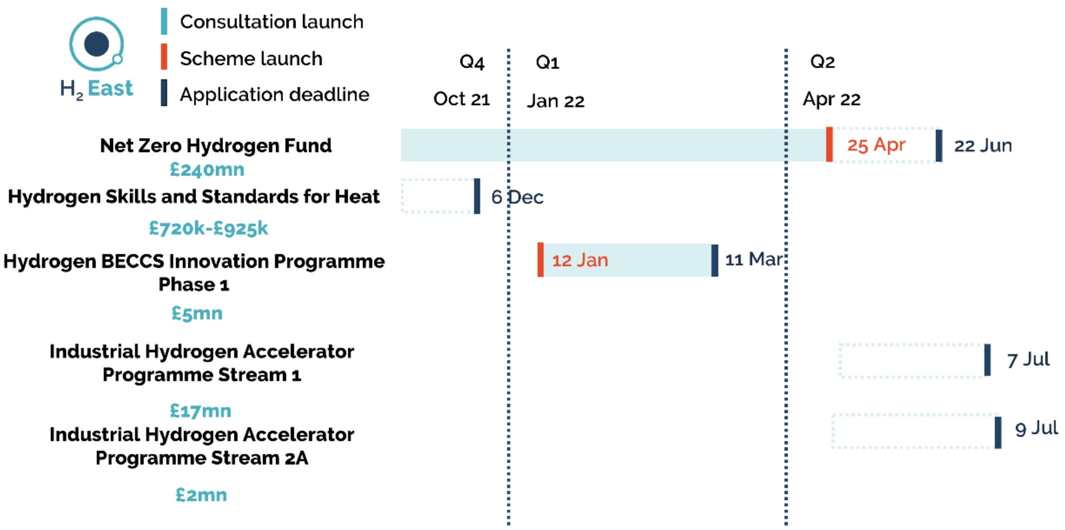
Upcoming webinars

8-9 Jun – **Reuters:** Hydrogen 2022 | **13 Jun** – **Innovate UK:** Net Zero Hydrogen Fund Competition Clinic – Strand 1 | **14 Jun** – **DNV:** Hydrogen Future | **16 Jun** – **Foresight:** Hydrogen Transport Conference | **17 Jun** – **Network-H2:** Hydrogen Transport Standards and Applications | **20 Jun** – **Innovate UK:** Net Zero Hydrogen Fund Competition Clinic – Strand 2 | **27-28 Jun** – **UK HFCA & Climate Change Solutions:** Hydrogen and Fuel Cells: Here and Now

Funding tracker

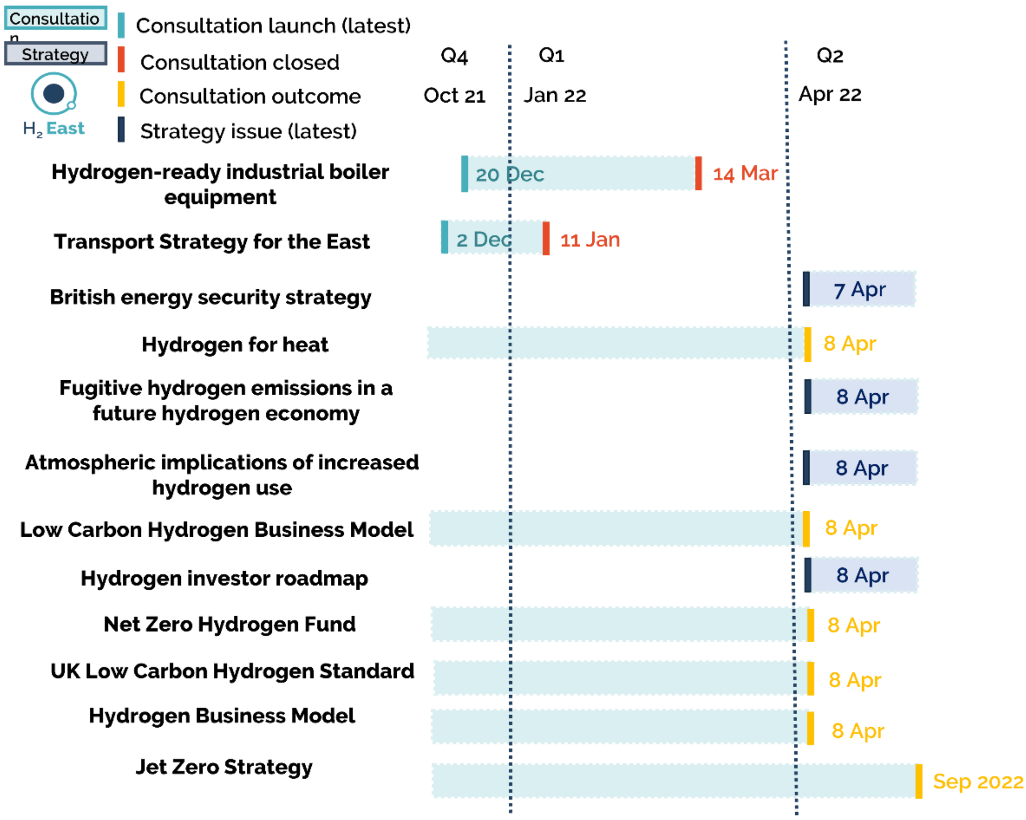
There are a number of funds already available for developers, local authorities and innovative organisations. These cover both feasibility studies and demonstrator projects.

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 2021. Following the launch of the **UK Hydrogen Strategy** on 17 August 2021, government as opened a number of consultations, outlined below.

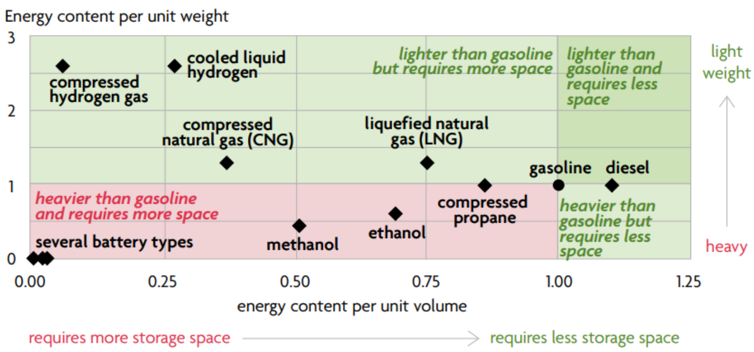


Ammonia market can accelerate the UK's use of hydrogen

Using ammonia as a hydrogen carrier has the potential to boost its rollout in the UK as a low carbon fuel, according to the North West Hydrogen Alliance (NWHA).

Figure 1: Energy density comparison of transportation fuels (indexed to gasoline=1)

(Source: NWHA)



On 12 May, the NWHA published a report, where it outlined how the North West can build on its plans for local low carbon hydrogen production and use by also pioneering low carbon energy imports through driving up Britain's use of ammonia. The UK will need between 200-425TWh of hydrogen to meet net zero by 2050, with imports from international markets set to be crucial in lowering the risks of delivering enough hydrogen production capacity to meet expected UK demand.

There are, however, issues when it comes to transporting hydrogen over long distances at large volumes. It has a higher energy density by mass, but lower energy density by volume in comparison to the most commonly used transport molecules. In liquid form, there are significant losses associated with boil off – around 25% across the supply chain – with alternative methods of transport being explored, including ammonia.

Figure 2: Ammonia is rapidly being considered the most promising long term molecule for global energy markets

(Source: NWHA)

Type	MGO	LNG	Bio gas	Bio diesel	Methanol	Ammonia	Hydrogen
Carbon	Fossil Fuel		Carbon neutral				
Storage condition	Ambient temperature and pressure	-162°C	-162°C	Ambient temperature and pressure	Ambient temperature and pressure	-34°C or 10bar	-253°C
Relative fuel tank size	1	2.3	2.3	1	2.3	4.1	7.6
Relative CAPEX	1	1.3	1.3	1	1.15	1.2	Very expensive
Fuel cost & availability	Less expensive, high availability		Supply constraints mean this isn't a large scale option	Difficult to forecast due to unstable supply and food security issues	Expensive due to high cost of CO2 capture	Expensive compared to fossil fuel but low priced for carbon neutral	Reasonable fuel production cost. High storage and transport cost

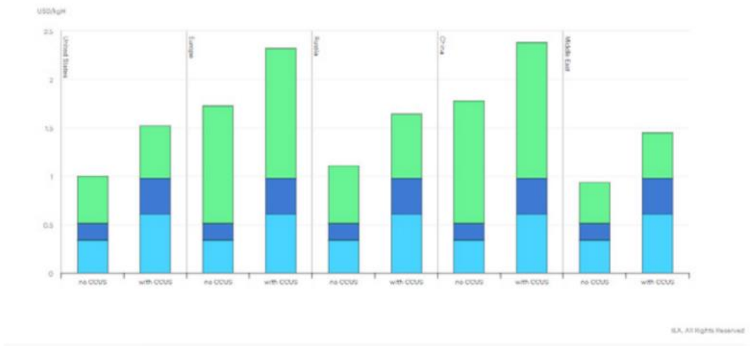
There are a number of characteristics that make ammonia an ideal hydrogen carrier, such as its high hydrogen content by mass (18%) and zero carbon content, with it unique among hydrogen carriers in that its non-hydrogen molecule is nitrogen, instead of carbon. It is also similar to LPG, allowing existing storage, transport and terminal equipment to potentially be used; can be liquified under mild conditions; and has a mature supply chain.

Global production of ammonia is already at 176mn tonnes per year, with the majority produced at large-scale through the Haber Bosch process. This is where hydrogen and nitrogen react at pressures of up to 200 bar. The carbon intensity here is dependent to the source of hydrogen used, with almost all ammonia today produced using natural gas or LPG as feedstock, before being reformed to produce hydrogen.

This means producing low carbon ammonia will call for a low carbon hydrogen source, with the most significant factors influencing the economics here the input cost of renewable electricity

Figure 3: Hydrogen production cost from natural gas by region

(Source: IEA, via NWHA)



for electrolytic production, or natural gas for CCUS-enabled production. These are likely to be geographically driven, with the low cost of solar in the Middle East and Australia suggesting hydrogen imported from these areas will be competitive with domestic production and could help support the UK in meeting domestic hydrogen demand.

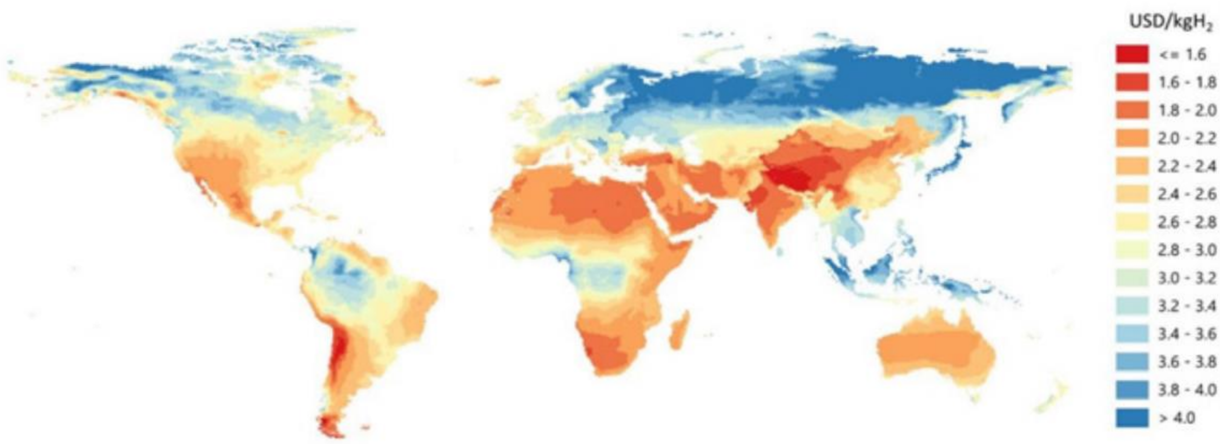
Furthermore, with the UK currently importing around 200TWh of energy in the form of LNG each year from Qatar (49%) and the US (27%), ammonia and hydrogen offer the UK a chance to diversify and decarbonise its energy imports.

The North West in particular has the potential to become a low carbon ammonia import hub. NWHA set out how this is down to the high concentration of hydrogen demand it has due to its industrial activity, the ammonia users in the region – CF Fertiliser's Ince and Billingham sites can produce material volumes of ammonia each year – and the fact it has one of the largest ports in the UK in the Port of Liverpool, which offers an opportunity to develop infrastructure to import and export ammonia.

To capitalise on this opportunity, the North West should look to explore an ammonia decomposition demonstrator, with this one of the least developed areas of the decarbonised ammonia supply chain; explore opportunities for ammonia in the hydrogen economy, both as a means of transporting and storing hydrogen in the region; explore opportunities to import or export ammonia; and explore the use of decarbonised ammonia in other applications, including maritime use and as an energy source off the grid, where hydrogen is not available.

Figure 4: Hydrogen production costs from hybrid solar PV and onshore wind in the long term

(Source: NWHA)



Government reveals winners of £60mn hydrogen competition

The government has revealed that 28 projects spread across the UK have been awarded funding through its Low Carbon Hydrogen Supply 2 (HySupply2) competition.

On 19 May, BEIS announced the winners, which will benefit from a share of £60mn in funding. This backing will support research and innovation in the supply of producing and transporting hydrogen, paving the way for it to become a more viable, affordable fuel to power industry. It will also help to drive the UK hydrogen industry forwards, cutting costs, bringing new solutions to market, and ensuring that the UK continues to develop world-leading hydrogen technologies "at home".

ITM Power's plan to build a next generation 5MW electrolyser stack is among the successful projects. Supported with £9.2mn, this will build on findings from the first Hydrogen Supply programme, with ITM Power aiming to bring the lowest cost green hydrogen solution to the market. Vattenfall's 8.8MW Hydrogen Turbine 1 project has received £9.3mn, with this set to be a world-first full scale demonstration combining offshore wind and green hydrogen production, while ERM Dolphyn has been awarded £8.6mn as it focuses on the production of green hydrogen at multi-gigawatt scale from floating offshore wind.

Elsewhere, Gemserv is leading a consortium to design, build, commission and operate the world's largest and most efficient ammonia to hydrogen integrated membrane reactor, with £6.7mn awarded to support this work, while Cadent (£296,174) is set for feasibility work focused on how to purify hydrogen that has been through the gas grid to make it suitable for use in vehicles, and the National Nuclear Laboratory (£242,619) will review and model processes that can use the heat from nuclear reactors to produce hydrogen.

Airbus launches platform for hydrogen development in the UK

Airbus has announced the launch of a Zero Emission Development Centre (ZEDC) for hydrogen technologies in the UK.

On 25 May, Airbus outlined how a priority for the UK ZEDC will be the development of a cost-competitive cryogenic fuel system, which is required for the successful entry-into-service of Airbus' ZEROe passenger aircraft by 2035. It will also look to accelerate UK skills and know-how on hydrogen propulsion technologies. Technology development has already commenced at the centre, which is based in Bristol, and will cover the full product capabilities from components all the way through to whole system and cryogenic testing.

The ZEDC will complement the existing research and technology footprint that Airbus already has in the UK – it opened its £40mn AIRTeC research and testing facility in 2021 to deliver the next generation of aircraft wind, landing-gear systems and fuel system designs. It will also complement the work being done on cryogenic liquid hydrogen tanks across Airbus' existing ZEDCs in Spain, France and Germany. All Airbus ZEDCs are set to be fully operational and ready for grounds testing with the first fully cryogenic hydrogen tank during 023, with flights testing then starting in 2026.

Sabine Klauke, Airbus Chief Technical Officer, said: "Establishing the ZEDC in the UK expands Airbus' in-house industrial capabilities to design, develop, test and manufacture cryogenic hydrogen storage tanks and related systems for the ZEROe project across Airbus' four home countries. This, coupled with our partnership with ATI, will allow us to leverage our respective expertise to realise the potential of hydrogen technology to support the decarbonisation of the aviation industry."

Europe targets 20mn tonnes of renewable hydrogen

The European Commission has set a target of 10mn tonnes of domestic renewable hydrogen production and 10mn tonnes of renewable hydrogen imports by 2030.

Figure 5: European map of infrastructure for gas – PCIs and additional projects identified through REPowerEU, including hydrogen corridors

(Source: European Commission)

On 18 May, it presented its REPowerEU Plan, having initially unveiled an outline back in March. REPowerEU is a response to hardships and global energy market disruptions exacerbated by Russia's invasion of Ukraine. Through a range of measures aimed at transforming Europe's energy system, including energy savings, diversification of energy supplies and an accelerated roll-out of renewable energy to replace fossil fuels in homes, industry and power generation, it will strive to end the EU's dependence on Russian fossil fuels and tackle the climate crisis.

Specific plans include enhancing long-term energy efficiency measures and a newly created EU Energy Platform, supported by regional taskforces, to enable voluntary common purchases of gas, LNG and hydrogen by pooling demand, optimising infrastructure use and coordinating outreach to suppliers. It also proposes a massive scaling-up and speeding-up of renewable energy, including a dedicated EU Solar Strategy to double capacity by 2025 and install 600GW by 2030, as well as a targeted amendment to the Renewable Energy Directive to recognise renewable energy as an overriding public interest.

As for renewable hydrogen specifically, to deliver on the 20mn tonnes targeted by 2030, it is calling on the European Parliament and the Council to align the sub-targets for renewable fuels of non-biological origin under the Renewable Energy Directive for industry and transport, and to rapidly conclude the revision of the Hydrogen and Gas Market package. It will also top-up Horizon Europe investments on the Hydrogen Joint Undertaking to double the number of Hydrogen Valleys, publish two Delegated Acts on the definition and production of renewable hydrogen for public feedback, complete the assessment of the first Important Projects of Common European Interest on hydrogen by the summer, and regularly report from 2025, in close cooperation with Member States, on hydrogen uptake, and the use of renewable hydrogen in hard-to-abate appliances in industry and transport.

It further outlined how accelerated efforts are required to deploy hydrogen infrastructure for producing, importing and transporting 20mn tonnes of hydrogen by 2030, with total investment needs for key hydrogen infrastructure categories forecast to be in the range of €28-38bn for EU-internal pipelines and €6-11bn for storage. It pledged to support the deployment of three major hydrogen import corridors in the Mediterranean, North Sea and, as soon as conditions allow, Ukraine. To achieve these goals, the Commission will undertake actions including mapping preliminary hydrogen infrastructure needs by March 2023, as well as setting up a dedicated workstream on joint renewable hydrogen purchasing under the EU Energy Platform.

Gas distributors plot hydrogen communities

Cadent and Northern Gas Networks (NGN) are set to progress plans for a UK hydrogen village, after being shortlisted by Ofgem.

On 6 May, Ofgem announced that it will fund two detailed design studies under the RIIO-GD2 Net Zero Pre-Construction and Small Projects (NZASP) re-opener. Having received applications from gas distribution network companies in December 2021 to fund detailed design studies for a Hydrogen Village Trial, it concluded there was value in funding both of Cadent and NGN's detailed design studies, given they had clear plans and demonstrated a diversity of information that will be captured as they progress.

Cadent is looking to use up to 2,000 properties in Ellesmere Port for the UK's first hydrogen village. This would see the properties stop using natural gas for heating and cooking, replacing it with hydrogen instead. It has developed the proposal alongside British Gas, with support from Cheshire West and Chester Council.

It would see each property in the area receive free boiler upgrades to new hydrogen-ready ones, while residents would pay the same to use hydrogen as they would natural gas throughout the duration of the two-year programme. Cadent and British Gas have written to all residents whose properties would be supplied with hydrogen, explaining the programme in greater detail. Cadent further revealed that every property in the area will be surveyed, while pledging that residents will be consulted throughout the process.

Northern Gas Networks (NGN), meanwhile, is exploring the potential to bring hydrogen for heating and cooking to some areas of Redcar. It would see 2,000 homes and businesses in parts of Redcar, including the town centre, using hydrogen, with this produced in Teesside and thus ensuring Redcar is self-sufficient, generating its own hydrogen locally from renewable sources. NGN will now develop its proposal in greater detail and liaise with the local community and stakeholders in the area. This consultation will see everyone in the project area sent information, including a letter and leaflet, outlining more about the project.

Approval for the projects is set to be given in 2023, with the studies enabling a go/no-go decision, before the projects themselves commence from 2025.

Green hydrogen manufacturing capability to accelerate research and innovation

A new green hydrogen production and storage facility is set to serve as a regional and national demonstrator for local green energy generation and use.

On 16 May, IAAPS announced that following a successful £2.5mn bid to the UK Research Partnership Innovation Fund (RPIF), it will establish green hydrogen manufacturing capability at its new research and innovation facility at the Bristol and Bath Science Park. As well as acting as a regional and national demonstrator, it will address a number of other key objectives, including decarbonising the energy used on the site through reducing the whole building's carbon footprint, supporting the transition to net zero.

It will also support crucial research and innovation into sustainable propulsion technologies and the use of hydrogen as an alternative green energy vector to achieve net zero targets, as well as acting as a catalyst for the adoption of hydrogen across a wide range of applications.

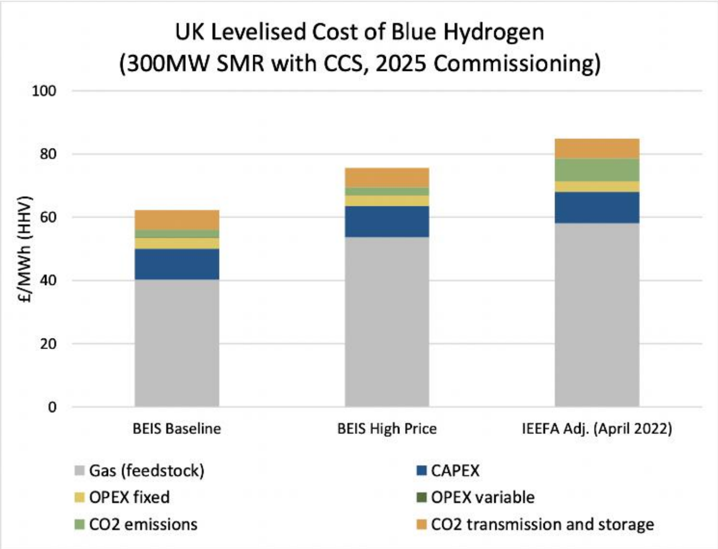
The production and storage facility is set to be the first of its kind in the South West of England. It will form the foundations for a regional hydrogen and sustainable transport acceleration hub, working with more than 30 cross-sector partners to stimulate green growth in the region, while providing an important link in the national hydrogen research infrastructure. It is due to be completed in spring 2023.

Blue hydrogen risks increasing UK's gas import dependency

A report has warned blue hydrogen is not a low cost solution amidst the ongoing gas price crisis, with a projected cost of production 36% higher than 2021 UK government estimates.

Figure 6: The UK's expected cost of blue hydrogen has risen by 36% compared to baseline estimates published a year ago

(Source: IEEFA, BEIS)



On 24 May, the Institute for Energy Economics and Financial Analysis (IEEFA) published a report, warning that continued UK investment in blue hydrogen will risk deepening the country's vulnerability to gas price volatility and supply uncertainty. As an extension of the gas value chain, it stressed that blue hydrogen no longer makes sense as an investment during a gas price crisis. According to the IEEFA, the UK would likely have to import 10% more natural gas to produce blue hydrogen than if the gas was used directly for heat.

This would raise demand for gas at a time when Europe is seeking to reduce its dependence on the fossil fuel. Citing findings from the BENF, it noted that reducing demand for gas needed for grey hydrogen production could help to ease issues with gas price, security of supply and energy transition. Replacing this current demand from grey hydrogen with green hydrogen for oil refining and fertiliser production could see the EU's gas demand fall by 12%.

The IEEFA believes that blue hydrogen projects are high risk and will likely become stranded assets. It highlighted that are 26 green hydrogen projects expected to start construction around the world this year, with no blue hydrogen projects slated. This suggests financial risks are already playing out in the global market, it said.

It went on to set out how, in future, both the EU and UK face having to reduce their gas dependency, something that can only be done by reducing defining energy security as being based on a diversity of energy sources, not as a diversity of gas supply routes and infrastructure. Hydrogen can play an important role here, though blue hydrogen project economics are tied to the volatilities of the gas market.

Unlike gas, renewables can be more regionally or locally located. They are free from annual fuel cost dependency too, meaning green hydrogen projects can capitalise on this advantage and offer an alternative route to hydrogen production that generates net zero emissions, at a cost expected to become cheaper than blue no later than 2030. It stressed that with expected blue hydrogen production costs only published a year ago now significantly higher today, continued policy support for the technology is questionable.

Arjun Flora, IEEFA Director of Energy Finance Studies, Europe, said: "Looking ahead to 2030, the cost curve speaks clear. Since both the price of gas and UK emissions allowances have risen, not only is blue hydrogen no longer a low-cost technology, but its green rival will become cheaper to produce this decade and well before the end of blue hydrogen projects' lifetimes – which makes blue hydrogen a bad investment."

RenewableUK sets out how to unlock "at least" 5GW of green hydrogen

The government has been told to outline a detailed green hydrogen roadmap to deliver its 5GW target for 2030.

On 5 May, RenewableUK published *Green Hydrogen: Optimising Net Zero*, a report mapping out a series of policy recommendations to drive government to its target of 10GW of low carbon hydrogen by 2030. This includes at least 5GW from green hydrogen production. It noted how a UK-wide green hydrogen economy has the potential to tackle hard-to-electrify sectors on route to net zero, solve the challenge of integrating renewables, boost the UK's energy security, and create jobs.

While describing the 5GW green hydrogen target for 2030 as encouraging, it stressed this ambition now needs to be met with an enabling policy and regulatory environment. Government has proven too slow in announcing key policy decisions needed to give certainty and unlock future pipelines of green hydrogen projects. It further warned that a failure to drive the necessary policy changes for green hydrogen in the 2020s could see the UK lose out on the opportunity to countries that have robust electrolyser-specific strategies.

RenewableUK went on to highlight key enabling actions to drive a green hydrogen revolution, noting that laying the necessary foundations today could see the cost of green hydrogen fall to £2/kg by 2030 and below £1.50/kg by 2050.

It is therefore calling for government to set out a detailed roadmap, outlining how 5GW of green hydrogen capacity can be secured by 2030. This should include a supportive planning regime, ensuring electrolysers can be built alongside windfarms, while RenewableUK is also calling on ministers to exempt electrolysers from some charges for access to the grid.

Further recommendations include the introduction of a standard that specifically promotes green hydrogen as a zero carbon fuel, making it clear other types of low carbon hydrogen do not have this pedigree; for BEIS to ensure all types of green hydrogen projects, big or small can receive support under the Hydrogen Business Model; and more funding and clearer and simpler rules nationwide to allow large green hydrogen projects faster to be built, helping to address barriers to the planning system.

It is also pledging to work with ministers to develop a UK-based green hydrogen supply chain, manufacturing electrolysers and compressors, ensuring the economic and industrial benefits of this technology can be felt in the UK, while stressing the need to ensure the UK has large-scale green hydrogen storage facilities for the future. This would involve making use of former gas storage facilities and salt caverns, as well as good interconnections with the European hydrogen network, allowing for exports.

Hydrogen partnership looks to transform industry in the Highlands

ScottishPower and Storegga have joined forces to develop, build and operate green hydrogen production plants across Scotland.

Announced on 5 May, the partnership will have the potential to transform industry and transportation in the Highland region, with the first project in the pipeline the Cromarty Hydrogen project, north of Inverness. This will be designed to deliver up to 20 tonnes of green hydrogen, per day, from 2024, while also having the potential to scale to 300MW through a series of modular expansion phases, subject to customer demand.

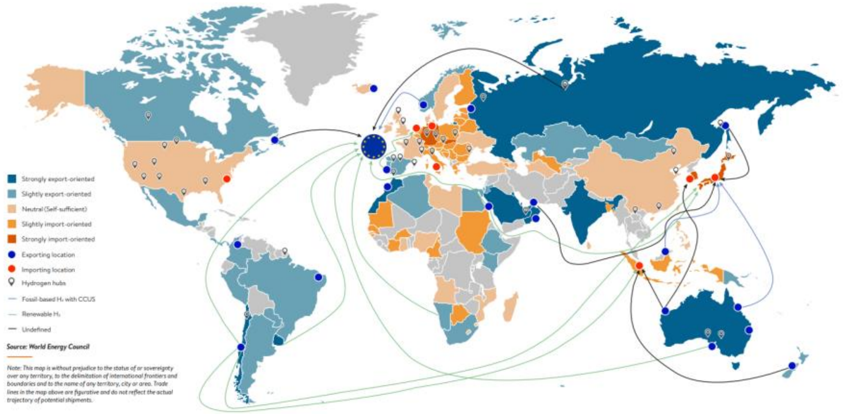
The project will see existing fossil fuel sources displaced, enabling the supply of green hydrogen into the heating processes of distilleries, along with additional potential supply to other local manufacturing, food production and industrial heating applications.

Low carbon hydrogen to play significant role worldwide

Across the world, low carbon hydrogen has the potential to play a significant role in achieving aims under the Paris Agreement, according to a report.

Figure 7: Map of potential low-carbon hydrogen import-export dynamics in 2040

(Source: WEC)



On 23 May, the World Energy Council (WEC) published a working paper following a series of deep dives to understand regional differences within low carbon hydrogen development. It found that as well as supporting the pursuit of Paris Agreement goals, low carbon hydrogen can also help countries in both diversifying their energy portfolios and strengthening the security of them.

However, the extent to which low carbon hydrogen is able to fulfil its potential is dependent on the evolution of its key production technologies, as well as significant global trade flows of hydrogen and hydrogen-based fuels.

Due to the high cost of transporting hydrogen, the majority will be consumed in the country or region where it is produced, with China and the USA – the two largest markets – expected to be self-sufficient. Though if enough regional and global cooperation emerges in the near future, there will be scope for substantial trade flows to open up by 2030. Hydrogen's versatility makes it is relevant in many countries, with regional similarities and potential synergies therefore possible. This will pave the way for increasing regional cooperation in hydrogen development.

There are significant uncertainties that must be addressed as the focus switches from "whether" to develop low carbon hydrogen to "how" to do it. These include whether challenges in various supply chain options can be overcome, as well as whether hydrogen can play a role in tackling climate change in the short-term. The issue here is that the timeline for low carbon hydrogen project development is not sufficiently aligned with the need to address climate change.

Further uncertainties included whether bankable projects can emerge, along with if the gap between engineers and financers can be bridged. This gap refers to what technology providers could deploy and what bankers will finance. Guaranteeing the stability of supply of the main low carbon hydrogen production sources is also an issue, for both renewable hydrogen and fossil-based low carbon hydrogen. Renewable hydrogen relies on the supply of electricity from renewable resources which are at the mercy of weather fluctuations, while hydrogen derived from fossil fuels with CCUS could encounter issues through major fluctuations in the price of natural gas.

Looking ahead, to enable low carbon hydrogen at scale will call for greater coordination and cooperation among stakeholders worldwide to better mobilise public and private finance, and to shift the focus to end-users and people. Key enablers include moving from production cost to end-use price; developing Guarantees of Origin schemes with sustainability requirements; developing a global monitoring and reporting tool on low carbon hydrogen projects; and better coordination of social impacts alongside economic opportunities.

Future hydrogen-ready energy storage project targeted for Dorset

UK Oil & Gas (UKOG) has announced that UK Energy Storage – its wholly owned subsidiary – is set to develop plans for a future hydrogen-ready energy storage project.

Through an Agreement to Lease with Portland Port (PPL), announced on 30 May, UK Energy Storage will develop, subject to new planning consent and securing necessary development finance, an integrated Energy Hub at two sites at what once was a Royal Navy port in Dorset. The plan is centred around hydrogen-ready gas storage and a future green hydrogen generation capability, with the Hub building on a previously unrealised project from Portland Gas Storage. Back in 2008, Portland Gas Storage granted planning consent to situate around 48bn ft^3 of underground salt cavern storage underneath PPL's land.

UK Energy Storage will use established engineering concepts, public record planning submissions, publicly available data, UKOG internal studies, and technical engineering and economic modelling advice from Xodus as it develops the strategically located hydrogen-ready Energy Hub in the active harbour site. As a hydrogen-ready build, it would be able to hold either hydrogen or natural gas from operational conception.

The salt cavern storage would be linked to the national pipeline transmission system through a new hydrogen-ready pipeline. This pipeline would be designed with an envisaged capacity capable of handling up to 1bcf per day, equating to around a seventh (14%) of the current estimated UK daily natural gas consumption. Another feature will be pilot scale green hydrogen production and storage, together with hydrogen battery concept investigation. Alongside Xodus, UK Energy Storage will develop future potential to supply renewable electricity for green hydrogen production at the site through an over-the-horizon floating windfarm.

Elsewhere, planned elements include a new LNG import facility in the port, designed to optimise cavern-fill cycle times and maximise revenues; future proofing the development through engineering to transition seamlessly into green hydrogen production and storage as the hydrogen economy evolves; an investigation of local high geothermal heat gradient for potential local heat networks, or to power green hydrogen production; and a joint investigation from UK Energy Storage and PPL into the potential of using future green hydrogen generation at the port to directly fuel future hydrogen propelled ships, with the possibility of future green hydrogen export by ship also to be explored.

British Steel targets green hydrogen with feasibility study

British Steel has launched a major study into the use of green hydrogen as part of its drive to decarbonise its operations and manufacture net zero steel.

On 31 May, it announced that it is collaborating with EDF UK, University College London and the Materials Processing Institute, having secured government funding for a feasibility study into switching from natural gas to green hydrogen as a fuel source for re-heating furnaces. British Steel has already pledged to deliver net zero steel by 2050, while significant reducing its CO2 intensity by 2030 and 2035 in the interim.

Should the study prove successful, then British Steel plans to undertake an industrial-scale demonstration. This could see the technology developed and rolled out across all its operations, including its main manufacturing base in Scunthorpe. It could also then be adopted by other UK steelmakers.

The six-month study is taking place at British Steel's Teesside Beam Mill. It is linked to the Tees Green Hydrogen project, which will see electricity from the nearby Teesside offshore wind farm, along with a new solar farm set to be constructed, power EDF Renewables UK's hydrogen electrolyser.

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