Hydrogen East

H2 News Hub

Issue 5

H2 East

April 2021

Top stories

In Issue 5 of **Hydrogen East**'s Sector Review, we take a look at important publications and developments over the month of March (2021).

Cadent launched a new report, stressing green gas HGVs are key to net zero, while also calling for hydrogen to be seen as a key decarbonisation option across transport, heat and industry - the **Future Role of Gas for Transport** report.

The UK government published the **North Sea Transition Deal**, which has been agreed with industry, and will see up £10bn invested for hydrogen production and seek to support workers, businesses and the supply chain through the low carbon transition.

The **UK Hydrogen and Fuel Cell Association** published a briefing paper, calling on government to seize the opportunity green hydrogen presents, setting out a roadmap to 2050 where the UK could have up to 80GW of low carbon hydrogen production capacity.

Hydrogen is part of the "narrow pathway" to win the race to net zero, according to the **International Renewable Energy**, which published a preview of its World Energy Transitions Outlook, where it tipped renewable power, green hydrogen and bioenergy to dominate the future energy system,

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Upcoming webinars

13 April – **Advanced Propulsion Centre**: Should we be giving hydrogen the green light? | **14 April** – **Net Zero East**: Launch event | **15 April** – **IOM3:** The Hydrogen Economy | **15 April** – **Reuters:** A Blueprint for Decarbonising the Power Sector | **22 April** – **Essex and East Anglia YPN:** Why Net Zero Needs Nuclear | **26 April** – **FT**: Hydrogen Summit

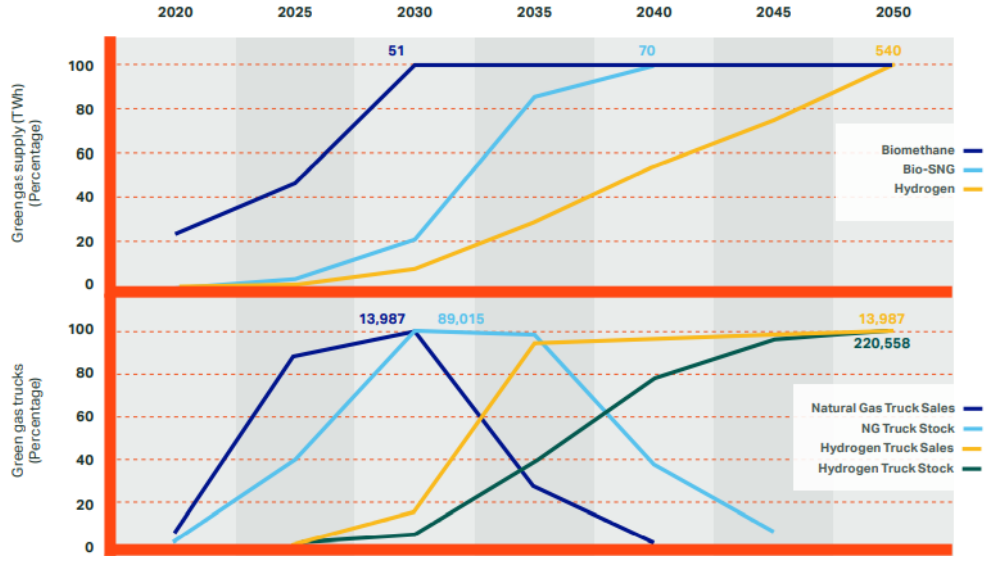
Green gas heavy goods vehicles critical to net zero

Green gas heavy goods vehicles (HGVs) are key to decarbonising the UK's roads and achieving net zero, but the transition must begin now, a report has warned.

On 25 March, Cadent published *The Future Role of Gas in Transport*, setting out a clear pathway for the UK's heavy goods sector to achieve a substantial reduction in its emissions over the coming years, where zero emission HGVs are the norm by 2050. The sector, as it stands, is responsible for around 20mn metric tonnes of CO2 a year but a shift to green gases, such as biomethane, bio-CNG and hydrogen, could result in emissions falling by as much as 38% by 2030.

Figure 1: Green Gas Transport (Percentage)

(Source: Cadent)



It called for hydrogen to be viewed as a key decarbonisation option for transport, heat and industry to achieve effective scale in production and distribution to bring down costs, as well as for existing gas networks to be harnessed to deliver hydrogen fuel to heat, industry and transport. It also called for a ramping up of biomethane and bio-SNG production capacity to realise full feedstock potential ahead of direct demand peaking in 2030s.

Biomethane and hydrogen powered trucks, in particular, were found to represent a substantial opportunity for green gases to accelerate transport decarbonisation. While most use cases for trucks are beyond the capabilities of battery electric and hydrogen models available today, trucks running on biomethane can already operate on the highest mileage applications, with a 10-15 year window of opportunity for biomethane powered trucks to accelerate decarbonisation in what is an otherwise "hard-to-decarbonise" segment.

Hydrogen trucks would then begin being deployed at scale, post 2030, with it noting that deploying gas trucks and associated infrastructure in the short-term will support the later transition to hydrogen trucks.

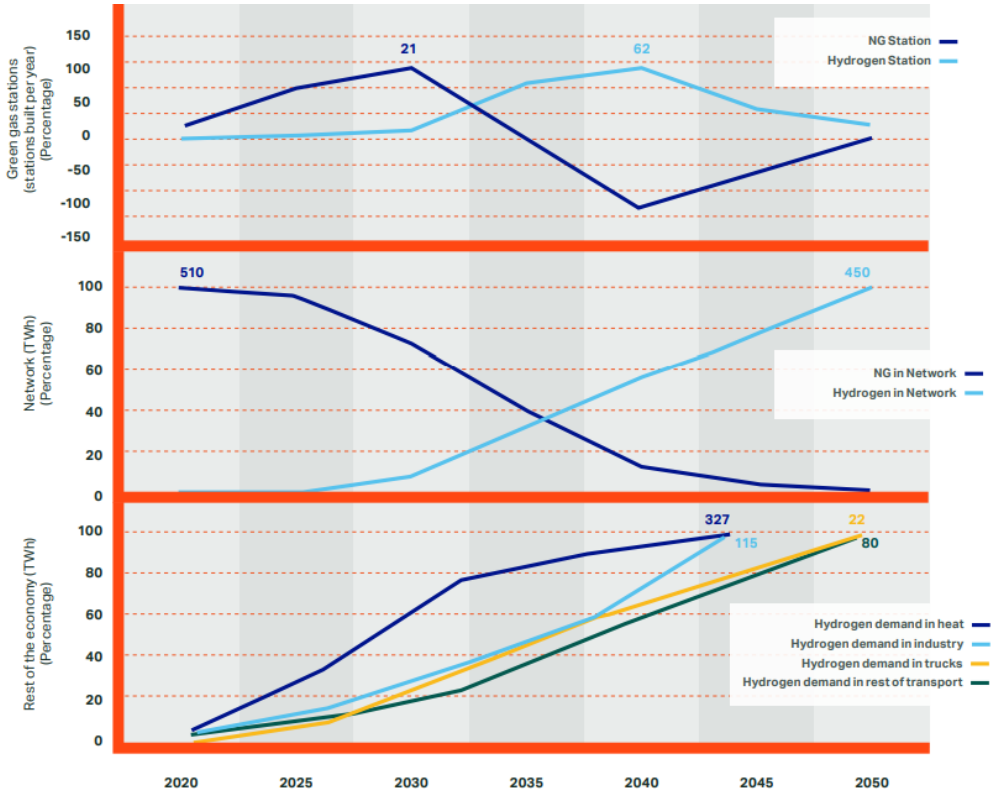
Other key findings included that that hydrogen refuelling stations fed by pipeline will provide an anchor load to support other transport segments using hydrogen, industrial users of hydrogen can provide an anchor load of blue hydrogen production, and domestic demand for hydrogen for heating can provide an anchor load for hydrogen from the gas network – heating will represent the main demand source for hydrogen long-term.

Based on these findings, it made a series of policy asks, including commercial demonstrations of between 400-600 medium and heavy-duty hydrogen trucks by 2025 to ensure they are ready for mass market adoption later in the 2020s.

It also advocated local and national fiscal measures, stressing all zero emission trucks need financial support to become competitive with diesel alternatives; called for truck weight and length regulation to be reviewed to ensure it does not hamper the rollout of zero emission vehicles or improved vehicle design; and setting a 2040 date to end the sale of all emitting trucks, including those running on biomethane, to ensure long-term investment in developing new models is focused on battery electric and hydrogen models.

Figure 2: Green Gas Transport (Percentage) continued

(Source: Cadent)



On the supply side, it asked for support for hydrogen under the Renewable Transport Fuel Obligation. It said the structure and support levels of the scheme should be reviewed on a regular basis, ensuring it is doing enough to encourage significant increases in hydrogen production levels.

It stressed the need for direct government financial support to ensure that both the first large-scale blue hydrogen projects, which are set to form an important part of early large-scale supply, are delivered by the mid-2020s, and that green hydrogen products are able to scale up to the size required to support economy wide demand for hydrogen in the 2030s.

The government should also look to encourage and support the development of industry wide standards and offer financial support for early hydrogen HGV refuelling station development, bringing them online for the commercial vehicle demonstrations.

National Grid exploring plans for UK hydrogen "backbone"

National Grid is exploring the development of a UK hydrogen "backbone", connecting industrial clusters around the country, creating a 2,000km hydrogen network by 2030.

On 18 March, it unveiled Project Union, which would see 25% of the current gas transmission pipelines repurposed and build on the government's 10-point plan, investing more than £1bn to unlock the potential of hydrogen and support the establishment of carbon capture, utilisation and storage (CCUS) in four industrial clusters. The project will connect the Grangemouth, Teesside and Humberside clusters and also establish links with the Southampton, North West and South Wales clusters.

In its feasibility phase, the project will identify pipeline routes, assess the readiness of existing gas assets and determine a transition plan for assets in a way that supports the 2050 net zero target. The research will investigate how to convert pipelines in a phase approach by the end of the decade, confirming to the government's ambition for 5GW of low carbon hydrogen by 2030.

The project will also explore how to connect the backbone to existing interconnectors coming into the Bacton gas terminal in Norfolk, enabling the UK to link with the EU hydrogen backbone also under development, opening the door to future import and export opportunities of hydrogen with European neighbours.

Low carbon hydrogen hub planned for Greater Manchester

The installation of Greater Manchester's first low carbon hydrogen hub is being planned, as part of its efforts to become the first net zero region in the world by 2040.

On 26 March, it was announced that the hub will be set up in Trafford Low Carbon Energy Park, which already includes several net zero industrial projects in support of government objectives, including one of Europe's largest energy storage facilities based on liquid air storage. It aims to help integrate renewable energy on a regional scale through storage of solar and wind energy, with production and storage of hydrogen now set to follow.

Manchester Metropolitan University (MMU), Greater Manchester Combined Authority (GMCA), Trafford Council, Carlton Power, Cadent Gas and Electricity North West have pledged to work together, signing a Memorandum of Understanding to develop a solution for low carbon hydrogen production and storage. The hub could potentially be used by industry, for vehicle refuelling and residential heating.

MMU's Fuel Cell Innovation Centre will help to develop the skills and supply chains associated the project. It will also provide the research expertise required to maximise the new development's potential.

Investment to speed up ZeroAvia's development of hydrogen-powered aircraft

British Airways (BA) is among a group of investors that are supporting ZeroAvia in launching a new development programme.

On 31 March, BA announced that is among a group – Horizons Ventures, Breakthrough Energy Ventures, Ecosystem Integrity Fund, Summa Equity, Shell Ventures and SYSTEMIQ – investing $24.3mn (c. £17.7mn) in ZeroAvia, supporting it in efforts to further demonstrate the credibility of its technology, accelerating the development of a larger hydrogen-electric engine. This will be capable of flying further and using larger aircraft as early as 2026.

ZeroAvia is anticipating it could achieve commercialisation of its hydrogen-electric power as early as 2024, with flights of up to 500 miles in up to 20-seater aircraft. Through the new investment, it is expecting to have a commercial aircraft of 50 seats or more in operation in five years, accelerating its vision of powering a 100-seat single-aisle aircraft by 20

Government unveils blueprint to cut industrial emissions

The government has unveiled its Industrial Decarbonisation Strategy and set out a £1bn blueprint to create green jobs while cutting emissions from industry, schools and hospitals.

On 17 March, it published the strategy, signalling its ambition to decarbonise industry in line with net zero. To drive this, it pledged to address barriers, mitigate carbon leakage risks and play a key part in delivering large infrastructure projects. It set an expectation that emissions will need to fall by at least two-thirds by 2035, before at least 90% by 2050, with 3MtCO2 captured through carbon capture, usage and storage (CCUS) and 20TWh switching to low carbon fuels by 2030.

In a bid to kickstart this, it further revealed that £171mn has been allocated to nine projects across England, Scotland and Wales through the Industrial Decarbonisation Challenge. This will be used to undertake engineering and design studies for the rollout of decarbonisation infrastructure, such as CCUS and hydrogen. HyNet North West is among the projects to have been awarded funding – £33mn from the Industrial Decarbonisation Challenge and £39mn from a consortium partner contribution – allowing it to accelerate to a Final Investment Decision in 2023 and become operational in 2025. Further elements will follow, such as resulting in the distribution of up to 30TWh a year of low carbon hydrogen by 2030, enough to displace 45% of natural gas across the region.

A further £932mn has been allocated to 429 projects across England to reduce carbon emissions from public buildings, notably hospitals, schools and council buildings, through the Public Sector Decarbonisation Scheme. This will be used to fund low carbon heating systems and energy efficiency measures.

As for the strategy itself, it lays out a series of commitments from government, including a pledge to use carbon pricing as a tool for getting industry to take account of emissions in business and investment decisions and establishing the right policy framework to ensure uptake of fuel switching in industry, moving from fossil fuels to low carbon alternatives, such as hydrogen, electricity and biomass.

It will also explore the role of coordinated action on public procurement to create demand for green industrial products, ensuring that costs are driven down and the broader market develops, as well as establishing a targeted approach to mitigate against carbon leakage. This, it said, will adhere to the government's domestic and global climate goals, while keeping businesses competitive.

Budget gives backing to North Wales hydrogen hub and Freeports

The government has signalled support for a hydrogen hub in Holyhead, committing £4.8mn in funding in the Budget.

On 3 March, Chancellor, Rishi Sunak unveiled how the government is aiming to create the conditions for an investment-led recovery, as well as addressing the immediate challenges of COVID-19. The backing for the hydrogen hub, subject to business case, will support the development of the site which will pilot the creation of hydrogen from renewable energy and its use as a zero emission fuel in HGVs, potentially supporting up to 500 jobs.

It also set out how the government will create eight new freeports in England, including in Felixstowe & Harwich, which is set to produce 1GW of hydrogen at its peak as covered here. Other freeports will be based in East Midlands Airport, Humber, Liverpool City Region, Plymouth, Solent, Thames and Teesside, all being special economic zones with different rules, making easier to do business, bringing investment, trade and jobs to help to regenerate regions.

Discussions are ongoing between the UK government and devolved administrations to ensure delivery of freeports in Scotland, Wales and Northern Ireland as well.

Hydrogen key element of North Sea Transition Deal

The government and oil and gas sector are to invest up to £10bn for hydrogen production as part of the North Sea Transition Deal.

On 24 March, the deal, which has been agreed between government and industry, was unveiled and will seek to support workers, businesses and the supply chain through the low carbon transition. It is aiming to harness the existing capabilities of the industry, along with its infrastructure and private investment potential, to exploit new and emerging technologies, which include hydrogen production, carbon capture usage and storage (CCUS), offshore wind and decommissioning.

With the extraction of oil and gas from the UKCS accounting for around 3.5% of the UK's greenhouse gas emissions, the package of commitments laid out within the deal are set to cut pollution by as much as 60mn tonnes come 2030, including 15mn from oil and gas production on the UKCS, and support up to 40,000 jobs across the supply chain.

Figure 3: Overview of sector action to support the energy transition

(Source: BEIS)

Sector action to support the energy transition

Create low carbon hydrogen production capacity

The sector will work with the government to deliver the ambition for 5GW of low carbon hydrogen production capacity by 2030.

Support Hydrogen RD&D

The sector will invest in RD&D for hydrogen technologies that support the production, transportation, storage and consumption of hydrogen at lower cost. The sector will work with the government to align innovation objectives and maximise investments.

Support offshore green hydrogen production

The sector will support the development and deployment of offshore green hydrogen production using offshore wind to enable the technology to reach maturity.

Continue the hydrogen safety programme

The sector will support measures related to safety working with the Health and Safety Executive (HSE) and others such as the Institution of Gas Engineers and Managers (IGEM) to facilitate the effective dissemination of evolving hydrogen equipment and gas handling safety standards through the workforce.

Understand hydrogen and public opinion

The sector will measure and track public opinion on the use of hydrogen across a variety of applications, focusing on heating, to better understand the public's appetite for hydrogen. This will inform communication campaigns.

Targets include reducing emissions by 10% by 2050, 25% by 2027 and 50% by 2030, along with a pledge of up to £16bn investment from government and the oil and gas sector by 2030. This will include £3bn to replace fossil fuel-based power supplies on oil and gas platforms with renewable energy, up to £3bn for CCUS and up to £10bn on hydrogen.

In terms of specific sector action on hydrogen, the deal tasks it with creating low carbon hydrogen production capacity, working with the government to deliver the ambition of 5GW by 2030; investing in RD&D for hydrogen technologies to support the production, transportation, storage and consumption of hydrogen at lower cost, once more working with government to align innovation objectives and maximise investments; and supporting the development and deployment of offshore green hydrogen production, using offshore wind to enable it to reach maturity. It will also support measures to continue the hydrogen safety programme and take steps to understand hydrogen and public opinion.

The government, meanwhile, will deploy funding from the £1bn Net Zero Innovation Programme for hydrogen technologies supporting the production, transportation, storage and consumption of hydrogen at lower cost; bring forward details on preferred hydrogen business models and the revenue mechanism to stimulate private investment in 2021, with the former finalised in 2022; and review the overarching market framework set out in the Gas Act 1995 to ensure the appropriate powers and responsibilities are in place to facilitate a decarbonised gas future. It will also look to accelerate the hydrogen project planning process and ensure the continued delivery of the iron mains replacement programme.

Elsewhere, other key commitments set out within the deal include the sector ensuring 50% of offshore decommissioning and new energy technology projects are provided by local businesses and an Industry Supply Chain Champion is appointed to support the coordination of local growth and job opportunities with other sectors.

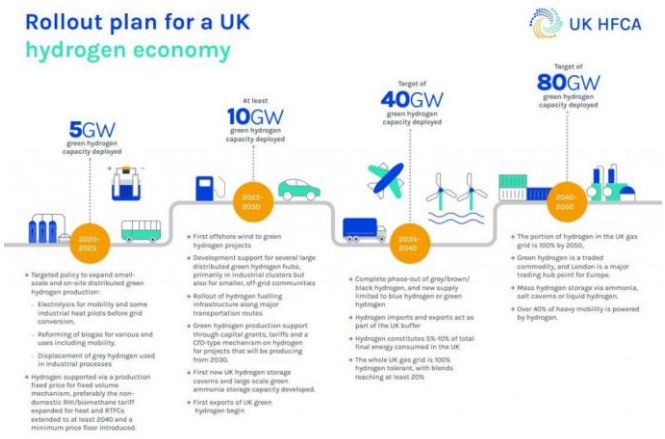
Government told to seize green hydrogen opportunity

With the right policy support, the UK can deliver double the government's target of 5GW of low carbon hydrogen by 2030, according to a report.

On 3 March, the UK Hydrogen and Fuel Cell Association (UKHFCA) published a paper, highlighting green hydrogen's potential to become a leading sector in the UK for job creation and exports. With the right policies in place, it can deploy 10GW of green hydrogen by 2030 and 80GW by 2050, while achieving a price target of £2kg as the average green hydrogen price across projects by 2030 if investments are to begin now. It called on government to support domestic hydrogen-focused businesses with sufficient national opportunities. This would allow them to achieve scale and compete internationally. Incentivising hydrogen production is essential in this context, with the paper detailing the "ready to go" policies that can accomplish this.

Figure 4: Rollout plan for a UK hydrogen economy

(Source: UKHFCA)



These include a 10-year moratorium on VAT for green and net zero hydrogen production; allowing green hydrogen to qualify for the green gas levy; including hydrogen fuelling infrastructure for funding available from the Office of Low Emission Vehicles (OLEV), alongside direct funding of hydrogen fuelling station (HRS) capital costs; and co-locating green hydrogen production and HRS with EV rapid charging sites. All of these are amended, existing policies that can deliver significant growth in green hydrogen production, without substantive, complex changes in policy.

A mixture of supply side and demand side measures would then be needed over the short to medium-term, focused on transportation, industrial and domestic heat, and industrial processes – the three sectors with the greatest potential decarbonisation opportunities in the UK that would allow green hydrogen to continue growing.

It set out a roadmap up to 2050, outlining actions and goals for government to support sector development, beginning with 5GW of capacity being deployed over the next five years and targeted policy to expand small-scale and on-site distributed green hydrogen production. From 2025 to 2030, the goal would then for capacity to reach 10GW as the first offshore wind to green hydrogen projects roll out, along with support for several large distributed green hydrogen hubs. This period would also see rollout of hydrogen fuelling infrastructure along major transportation routes and support for green hydrogen production through capital grants, tariffs and a CfD-type mechanism on hydrogen.

Up to 2040, capacity would reach 40GW with a complete phase-out of grey, brown and black hydrogen as the new supply, limited to blue or green hydrogen, sees hydrogen account for 5-10% of total final energy consumed in the UK. The whole UK gas grid would be 100% hydrogen tolerant with blends reaching at least 20%. By 2050, capacity would reach 80GW, the portion of hydrogen in the UK gas grid would be 100% and green hydrogen a traded commodity, with London a major trading hub point for Europe.

UK set for first ever hydrogen transport hub

A "masterplan" has been unveiled for the UK's first-ever hydrogen transport hub, along with £3mn in government funding.

On 17 March, the Department for Transport (DfT) revealed plans for a first of its kind transport hub to be built in the Tees Valley, bringing together leading figures from government, industry and academia to focus research, testing and trials across all modes of transport as the UK mounts a green recovery from COVID-19. The plan is for it to be fully operational by 2025, creating up to 5,000 new jobs in the north-east long-term.

Under the DfT's masterplan, the hub will include an R&D campus for the creation and sharing of knowledge, enabling the hydrogen transport hub to act as a living lab to understand the role hydrogen has in the energy transition for transport.

The hub will create real-world hydrogen transport pilots, with pop-up trials potentially involving shops, supermarkets, online retailers, warehouse operators and delivery companies using hydrogen-powered transport, alongside local transport operators working with the transport research and development sector to deliver emission-free hydrogen passenger services, including on-demand regional buses or zero-emission refuse vehicles.

Establishing the hub will support understanding of the role hydrogen has to play in meeting the 2050 net zero target, informing investment decisions and export opportunities.

Gas networks set out hydrogen plans for 2021

Following a "great year" for hydrogen, the UK's gas networks have pledged to continue working to turn Britain's hydrogen ambitions into a reality throughout 2021.

On 11 March, the Energy Networks Association (ENA) published the body of work the *Gas Goes Green* programme is aiming to undertake and deliver on for 2021. The programme, which is seeking to convert Britain's £24bn gas network infrastructure to run on hydrogen and biomethane, spent much of 2020 in the planning and research phase of its pathway to net zero. While that work will continue this year, it will also strive to take initial steps forward with its second phase – facilitating the connection of more green gas.

Part of that will involve making progress against the recently revealed Britain's Hydrogen Network Plan, with *Gas Goes Green* to coordinate joint government and industry hydrogen programme activity and aim to develop a Network Entry Agreement. This agreement, focused on hydrogen blending and 100% hydrogen connections, was explained as being necessary to address network configuration, the gas quality specification, the physical location of the injection or delivery point into the network, and standards to be used for gas quality and the measurement of flow.

To prepare for the transition of the gas network enable biomethane and hydrogen to be transported and distributed safely to a maintained quality, the plans include the development of a blending delivery timeline. Building on the HyDeploy trial and the government's commitment blending, as outlined in the 10-point plan for a Green Industrial Revolution, it will set out the gas network's vision for introducing hydrogen blends.

Other areas of work focused on hydrogen targeted for 2021 include a proposed licensing regime for industrial cluster hydrogen infrastructure and the Cost to Consumer analysis being updated, in light of updates to key assumptions, such as the cost of conversion to distribute hydrogen and energy storage, and the fresh scenarios in the Committee on Climate Change's Sixth Carbon Budget advice to government.

bp unveils plans for UK's largest hydrogen project

bp has signalled its ambition to build the UK's largest blue hydrogen production facility in Teesside, capable of 1GW of hydrogen production by 2030.

On 18 March, it unveiled its plans for H2Teesside, which would capture and store up to 2mn tonnes of CO2 per year and make a significant contribution towards the government's target of 5GW of hydrogen production by 2030. Considering its close proximity to storage sites in the North Sea, pipe corridors and existing hydrogen storage and distribution capabilities, H2Teesside would be ideally placed to lead a low carbon transformation, support jobs, as well as regenerate and revitalise the surrounding region.

A final investment decision is expected for early 2024, before production commences from 2027, if not earlier. A feasibility study is being carried out, exploring technologies that could capture up to 98% of carbon emissions from the hydrogen production process.

Through large-scale, low cost production of clean hydrogen, H2Teesside will be able to support the conversion of surrounding industries to use hydrogen instead of natural gas and play a pivotal role in decarbonising a cluster of industries in the region. It will be developed in stages, beginning with an initial 500MW of blue hydrogen production capability in 2027 with further capacity being deployed from 2030 as hydrogen demand intensifies.

Inquiry to explore role of hydrogen in powering industry

The All Party Parliamentary Group (APPG) on Hydrogen is to explore the role and potential of hydrogen in powering industry through a new inquiry.

Announced on 23 March, the inquiry will also explore the policies required to accelerate hydrogen's potential, unlocking the wider hydrogen economy, which will lead to high skilled jobs across the UK and support the government's net zero objectives. Written submissions are invited to inform the inquiry, with suggested areas of focus including hydrogen's role and potential across different UK industry sectors, such as heating, chemicals, oil and gas, and carbon capture and storage, along with which UK industry sectors specifically would particularly benefit from hydrogen.

Elsewhere, views are sought on issues around hydrogen production, transmission, distribution and storage; how hydrogen can contribute to the UK meeting its net zero target; hydrogen's potential to both support and create high-skilled jobs in the UK; what opportunities there are to accelerate hydrogen activity in the UK; how an economic, timely transition to hydrogen can be achieved while retaining and promoting UK industry; and the policies required to unlock a UK hydrogen economy. The deadline for submissions is 5PM on Tuesday 20 April.

Public to be offered chance to invest in greener future

The public have been handed the opportunity to invest in a hydrogen-ready network for the first time after the launch of Northern Gas Networks (NGN)'s green transition bond.

On 24 March, NGN announced it has joined forces with Abundance to launch the bond, helping to fund the upgrade of pipes to prepare the gas distribution network to transport hydrogen. It is aiming to raise £1mn through a lower-risk, long-term investment with returns of 1.6% over a 10-period. It marks the first time a regulated energy distributor has offered a green transition bond exclusively for members of the public.

Three quarters of the region's pipework has already been upgraded to polyethylene as part of NGN's plans to transition its network to net zero. The investment will support the replacement of a further 2,900km by 2026, creating a hydrogen-ready gas network and reducing emissions from the day-to-day operation of the network.

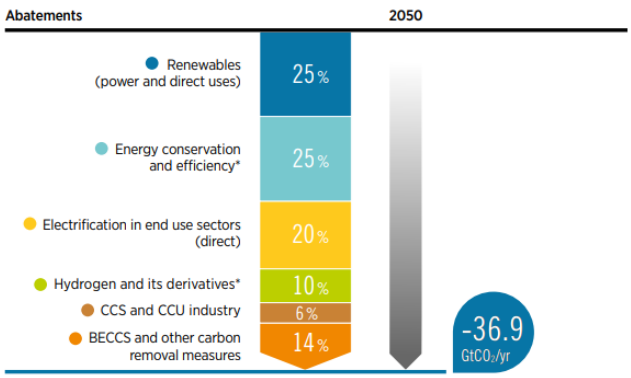
Hydrogen part of "narrow pathway" to win net zero race

Proven technologies for a net zero system already largely exist, with renewable power, green hydrogen and bioenergy set to dominate the future energy system, a report has said, though the "window of opportunity" to achieve the 1.5˚C Paris Agreement pathway is closing fast.

On 16 March, the International Renewable Energy Agency (IRENA) published a preview of its *World Energy Transitions Outlook*, setting out how 90% of decarbonisation solutions in 2050 will involve renewable energy through a direct supply of low-cost power, efficiency, renewable-powered electrification in end-use and green hydrogen. The "last mile" of CO2 reductions for net zero will be delivered through carbon capture and removal technologies alongside bioenergy.

Figure 5: Six components of the energy transition strategy

(Source: IRENA)



IRENA's 1.5˚C pathway sees electricity becomes the main energy carrier in 2050 with renewable capacity growing more than ten-fold in that same time period. The highest growth of electrification (30-fold) will come in transport, with direct or indirect electrification delivering almost 70% of carbon emission reductions in this area, while green hydrogen is set to emerge as a major source of electricity demand.

By 2050, 30% of electricity use will be dedicated to green hydrogen production. Hydrogen and its derivatives, namely e-ammonia and e-methanol will account for around 12% of final energy use. It forecast that as electrolyser costs fall, combined with further reductions in renewable electricity costs, green hydrogen is likely to be less expensive than the estimated cost of blue hydrogen in many locations during the next 5-15 years.

In the 1.5˚C pathway, hydrogen is able to mitigate close to 12% and 26% of CO2 emissions from industry and transport, acting as a solution for these hard-to-electrify sectors. It further forecast a demand of 613Mt of hydrogen – two-thirds of which will be green hydrogen – by 2050, with the electricity demand to reach almost 21,00TWh by 2050, almost the level of global electricity consumption today. This requires a significant scale-up of electrolysers' manufacturing and deployment, with an average of around 160GW having to be installed on an annual basis to 2050. It expects this to occur from 2030 onwards, exceeding 400GW per annum by 2050.

It stressed the importance of innovation in driving the energy transition process, with an integrated approach across different dimensions needed. With reducing the cost of low carbon technologies an overriding priority for innovation, a suite of emerging technology solutions will shape the sector's decarbonisation, with renewable power generation sources set to be economically attractive driven by innovation and economies of scale. Special attention should be given to the expansion of emerging technologies, such as green hydrogen.

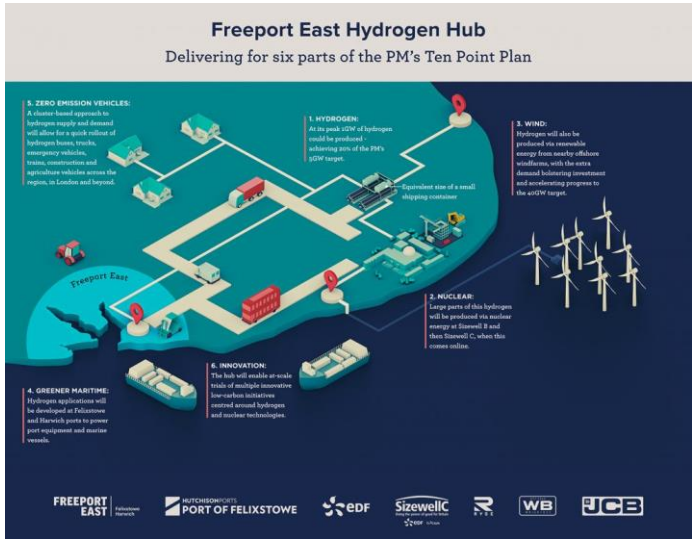
Elsewhere, it drew on how financial markets and investors are already reacting to the coming energy transition by directing capital from fossil fuels to other energy technologies, including renewables. Energy transition investment is set to have to grow by 30% over planned investment, reaching $131tn between now and 2050, working out at around $4.4tn every year. It stressed the importance of national social and economic policies, which will be key to delivering the transition at the speed needed to restrict global warming to 1.5˚C.

Panel hear opportunity of Freeport East Hydrogen Hub

Green hydrogen could be supplied in Freeport East by the end of the year, according to Robert Edge, Business Development Manager of the Haven Gateway Partnership.

Figure 6: Freeport East Hydrogen Hub

(Source: Freeport East Hydrogen Hub)



On 10 March, Edge was among those speaking during Riviera's *Green hydrogen as a marine fuel: what it means for shipping* webinar, part of its Marine Fuels Webinar Week, where he mapped out Freeport East's unique selling point as being both the diversity of clean energy sources for producing green hydrogen and diversity of use cases. It is a rail connected hub, juxtaposed between existing nuclear power and those under construction, while it has substantial offshore wind assets it can call on as well.

It will work with EDF to generate hydrogen and the partnership is tendering for construction of the hydrogen plant to generate it from water using nuclear and electricity from offshore windfarms. Fuel system procurement is being eyed for Q2 2021, ahead of construction starting in Q3, with hydrogen then potentially produced in Q3 2022 for the Sizewell C construction vehicles.

Meanwhile, 50% of UK offshore wind generation is situated in the southern North Sea, with the potential for its offshore gas production platforms could be used for hydrogen production or seawater desalinisation, producing saline-free water for hydrogen production.

On the demand side, Edge noted there are 200 diesel-fuelled off-road vehicles in the port of Felixstowe, as well as citing small local diesel-powered vessel manufacturers that could use fuel cells, along with 8,000 heavy good vehicles and 36 container trains travelling through Felixstowe and Harwich every day.

Elsewhere, the webinar heard from CEO of TECO 2030, Stian Aakre, speaking after his firm unveiled plans to build a hydrogen fuel cell gigafactory in north Norway with an annual production capacity of 1.2GW. Hydrogen, Aakre said, fulfils the sustainability concept for vessels to be greenhouse gas free, adding: "Synthetic fuels start with hydrogen as the building block and we should use green hydrogen instead of refining it."

Bud Darr, MSC Group Executive VP for maritime policy and government affairs, signalled his belief the shipping industry will adopt low emission fuels, but not without international government support. There will unlikely be one clear option, with everyone needing to play their part owed to decarbonisation being "the biggest challenge society faces".

On hydrogen specifically, Darr said MSC Group are "bullish" on it as a significant part of the main solution. To prevent emissions across the whole fuel production chain, green hydrogen production and efficient storage systems are needed owed to substantial challenges arising from hydrogen's volume, explosion risk and the high pressures and very low cryogenic temperatures necessary to main molecules in the liquid phase.

Researchers to convert sewage waste to hydrogen

Tankers and other vehicles could use hydrogen converted from sewage waste as a clean fuel under the plans of a new project.

On 11 March, Coventry University announced it will collaborate with Severn Trent and the Organics Group to capture waste ammonia from Severn Trent's sewage treatment facility and turn it into hydrogen. Should the trials prove successful, up to 10,000 tonnes of green ammonia could be recovered per year and converted into 450 tonnes of hydrogen. It would had Severn Trent a more efficient way of processing ammonia, which it currently destroys owed to its toxic properties.

The Organics Group will be responsible for developing an ammonia-stripping unit to recover the chemical, while researchers from Coventry University will be tasked with converting it into hydrogen. They will do this by forming a purified electrolyte from the ammonia which can also be processed to create nitrogen.

The project is part of the €15mn REWAISE programme funded by the EU Horizon 2020 initiative. Led by a consortium of 24 organisations, REWAISE is aiming to provide expertise across the water management and academic sectors to develop a carbon neutral water cycle.

UK boiler manufacturers commit to hydrogen future

The Heating and Hotwater Industry Council (HHIC) has reached an agreement in principle with UK boiler manufacturers to support a hydrogen future.

On 1 March, HHIC wrote to the Prime Minister, outlining the support of UK boiler manufacturers for any future UK government legislation mandating for all new models of domestic boilers to be "hydrogen-ready" from 2025. It has also developed a specification with industry, outlining how a hydrogen-ready boiler should need just an hour of adjustment to allow for a future switch from natural gas to hydrogen.

It means that in the upcoming heat decarbonisation plan and hydrogen strategy, the government would be able to confirm it has a long-term plan to repurpose current gas networks for hydrogen, a key tool in allowing the more than four-in-five UK homes currently using natural gas to achieve zero carbon heating, the HHIC said.

Stewart Clements, HHIC Director, explained: "Hydrogen-ready boilers are the least disruptive means of decarbonising homes as they offer the opportunity for people to continue to heat, cook and use hot water in the same way they do today, without ripping out pipes, boilers, and in some cases floors."

UK's first domestic hydrogen meter calibration facility launches

TÜV SÜD National Engineering Laboratory has unveiled the UK's first traceable hydrogen calibration facility for domestic gas meters in East Kilbride.

On 23 March, as it announced the new facility, it explained it will help manufacturers determine whether or not existing meter stock and new technologies under development correctly measure hydrogen flow rates. This is regarded as a key step in ensuring that hydrogen gas meters deployed onto the market in future deliver accurate measurements for customer billing and taxation purposes.

Funded by BEIS through the National Measurement System mechanism, the facility will support ongoing hydrogen feasibility and metrology research at first. Research will be shared publicly, allowing the industry to make more informed choices about meter selection. It will also be able to calibrate other meter types, including Coriolis, turbine and differential pressure, while the facility can be used by hydrogen flow meter manufacturers for their own R&D purposes as well.

UK should avoid "twin track" approach to hydrogen

The UK should focus on clean, green hydrogen and avoid a "twin track" approach where it pursues blue hydrogen as well, according to E3G.

On 29 March, the think tank published *Between Hope And Hype – A Hydrogen Vision For The UK*, highlighting key considerations for government ahead of its forthcoming Hydrogen Strategy and recommendations of how it can maximise hydrogen's value. It explained that blue hydrogen is not zero emissions and should not be classed as low carbon, adding that it carries the risk of a lock-in to high carbon infrastructure and jobs. In contrast, the green hydrogen path is where the UK can secure its competitive advantage.

Sourced through harnessing the full potential of the UK's offshore wind resources, a focus on green hydrogen within targeted sectors and hubs would see multiple government objectives supported, including a green recovery from COVID-19, demonstrating climate leadership and aiding the "levelling up" agenda.

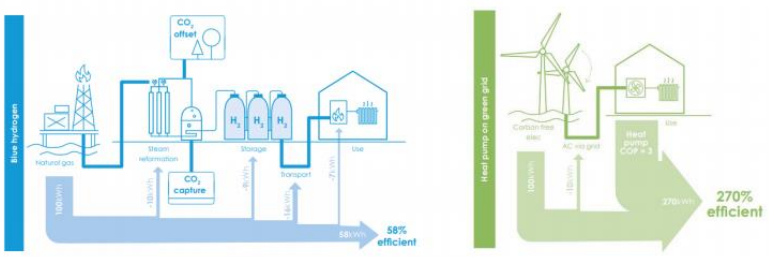
As BEIS develops a strategy to decarbonise and scale-up the hydrogen economy, achieve the 5GW of low carbon hydrogen by 2030, and set the context for further scale-up, E3G explored some of the core factors that should underpin its development. These include considering what the future demand for hydrogen will look like and whether the supply-side can accommodate for this, along with analysis of technical options and likely cost implications of hydrogen in comparison to other pathways for decarbonisation.

It highlighted the importance of separating industrial and consumer markets. In the former, the choice will be entirely driven by technical and economic factors, and can be thought of as a classic industrial strategy, while in the latter, a strategy for home heating would be dependent on consumer consent as well as reliable technical and real economic advantages or disadvantages. It also stressed the strategy should trigger a race in innovation, while maintaining options until more is known about the feasibility of decarbonisation pathways.

It went on to make a series of recommendations for government, including the need to scale up green hydrogen with parallel rapid growth in renewable energy – especially offshore wind – as well as electrification, efficiency and the circular economy, and ensuring that the vision identifies where green hydrogen production and use is likely to add the most value.

Figure 6: Efficiency of blue hydrogen for heat vs renewable electrification

(Source: LETI, through E3G)



On the decarbonisation of heat in buildings, the report called for the UK to focus on rapid gains on energy efficiency, heat pumps and renewable heat networks, noting there is a growing body of evidence that green hydrogen will only play a small role in industrial clusters where there is a surplus. It stressed that waiting for long-term progress on hydrogen must not act as a blocker to action that can be taken today.

It further called for governance mechanisms for risk-managing delivery and avoid a lock-in of fossil fuel derived energy sources; hydrogen pipelines that are built around secure hydrogen demand and supply, rather than how existing gas assets can be best kept functioning; a focus on jobs, skills and supply chains to ensure a just transition and support for the "levelling up" agenda; and that government promotes evidence-based and society-wide decision making.

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Upcoming events

Net Zero East Launch – 14 April 2021

Bacton Energy Hub: Findings Dissemination – May 2021