Hydrogen East

H2 News Hub

Issue 12

H2 East

November 2021

Top stories

In issue 12 of **Hydrogen East**'s Sector Review, we take a look at important publications and developments over the month of October (2021).

October saw the release of the government's long-awaited **Net Zero Strategy**, where it highlighted cleaner fuels – such as hydrogen – as essential to successfully delivering the 2050 net zero target. Our write-up takes a closer look at its focus on hydrogen.

The government also published its **Heat and Buildings Strategy**, which promised major strategic decisions on the role of hydrogen for heat will come by 2026, with the coming years devoted to exploring hydrogen's potential for use in heating for buildings.

On a global scale, the **International Energy Agency** unveiled its Global Hydrogen Review 2021, tracking progress in hydrogen production and demand, where it called for decisive action to be taken by governments to unlock low carbon hydrogen growth.

This month's H2 News Hub also features write-ups on **DNV's** comprehensive **Pathway to Net Zero Emissions**, which sees hydrogen playing an influential role on a path to a 1.5˚C feature, as well as **Cadent's** Hydrogen Ten Point Plan.

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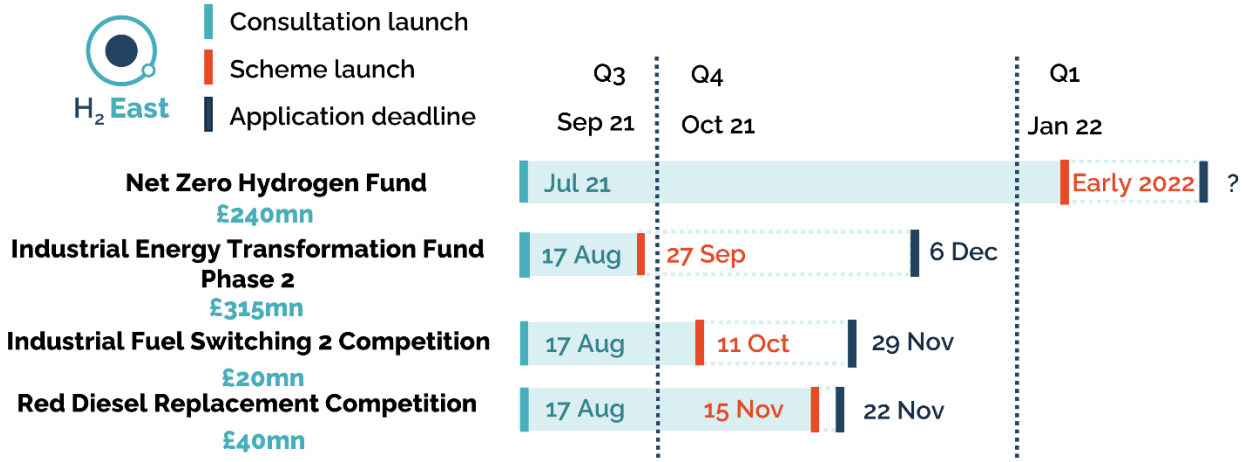
Upcoming webinars

4 Nov – **New Anglia LEP:** Hypothetically Hydrogen | **9 Nov** – **NGG:** Bacton Options Workshop | **16 Nov** – **CCSHFC 2021:** Hydrogen & Fuel Cells: The Time Is Now | **24 Nov** – **NGG:** Future of Gas | **24 Nov** – **Knowledge Exchange and Innovation:** Kent and Medway Hydrogen Summit | **29 Nov – 3 Dec** – **Fuel Cells and Hydrogen Joint Undertaking:** European Hydrogen Week

Funding tracker

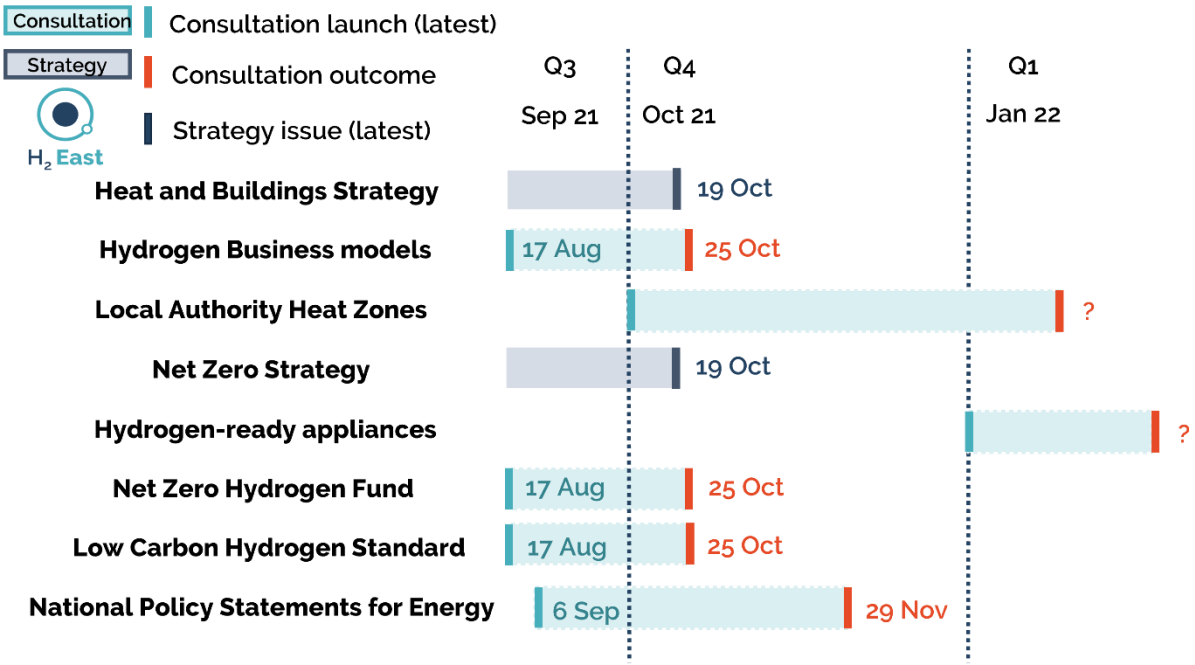
There are a number of funds already available for developers, local authorities and innovative organisations. These cover both feasibility studies and demonstrator projects.

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 has opened a number of consultations, outlined below.

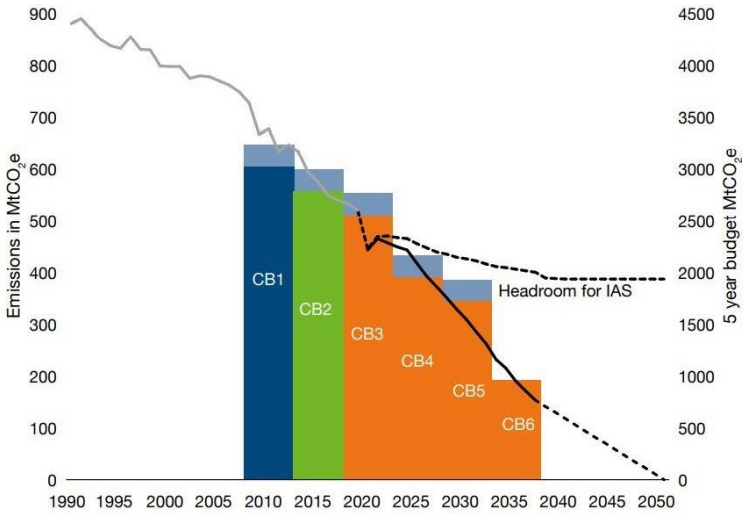


Cleaner fuels essential part of UK's net zero transition

The government has unveiled its landmark Net Zero Strategy, where cleaner fuels, such as hydrogen, have been highlighted as essential to successfully delivering the 2050 target.

Figure 1: Indicative emissions reductions to meet UK carbon budgets and NDC

(Source: BEIS)



Published on 19 October, the government pledged that with the UK already having cut greenhouse gas emissions by 44% since 1990, the economy-wide strategy is its long-term plan to "finish the job" and end the UK's domestic contribution to man-made climate change by 2050. Through a range of measures to transition to a green and sustainable future, the strategy will secure 440,000 well-paid jobs and unlock £90bn in private investment by 2030, while putting the UK on course to reach net zero by mid-century.

It modelled a trio of illustrative net zero scenarios to explore potential energy and technology solutions in 2050 and found varying levels of electricity and low carbon hydrogen generation in each – both cited as among the key green technologies and energy carriers the UK will rely on, on its net zero journey, alongside CCUS and biomass.

Widespread electrification with deep decarbonisation of the electricity supply was explored through "high electrification", with UK electricity generation reaching 690TWh and low carbon hydrogen production scaling to 240TWh in 2050. In contrast, low carbon hydrogen generation was found to reach 500TWh, meeting the majority of building heat demand, in "high resource", which explored the impact of using it more extensively. In "high innovation", meanwhile, the generation requirements of electricity and low carbon hydrogen were found to be 670TWh and 330TWh respectively.

While acknowledging uncertainties remain of just what the energy and technology mix will look like in 2050, it was still able to draw several broad conclusions to help shape an overall approach to net zero.

These include that extensive decarbonisation is needed across transport, buildings and industry, accounting for possible residual emissions in agriculture, aviation, waste and heavy industry, and that different technologies for each of these sectors can be accommodated, such as electric heat pumps or hydrogen for heating, meaning wide ranges of possible electricity and hydrogen demand remain plausible. It also noted the fact both electricity and hydrogen demand will grow significantly from today and must be produced with very low levels of emissions by 2050 as another key takeaway.

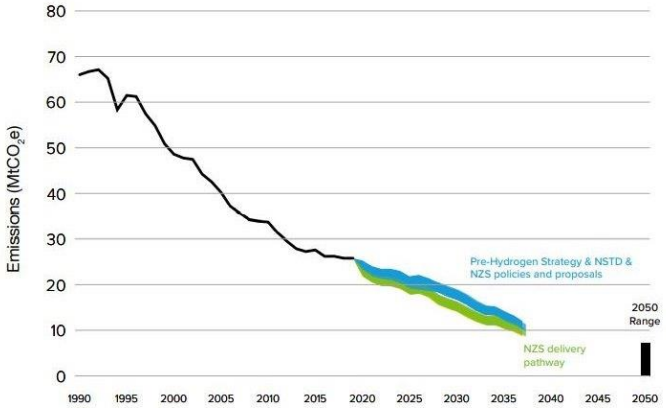
From these insights, it went on to develop a delivery pathway, broken down sector by sector, offering an indicative trajectory of the emissions reductions to meet targets up to the sixth carbon

budget (CB6), ending in 2037, which would include the UK's Nationally Determined Contribution (NDC), and put the country on course to reach net zero.

The pathway targets a fully decarbonised power system by 2035, subject to security of supply, made up of abundant, cheap renewables, cutting edge new nuclear power stations and underpinned by flexibility, such as storage, gas with carbon capture and storage (CCS), and hydrogen. It further set out how clean fuels, such as hydrogen, have a crucial role to play, serving sectors where electrification is not a viable option.

Figure 2: Indicative fuel supply emissions pathway to 2037

(Source: BEIS)



The strategy sets out the government's commitment to significantly reducing emissions from traditional oil and gas fuel supplies, while scaling up production of low carbon alternatives, such as hydrogen and biofuels. It highlighted how the current gas price spikes have underlined the need to move away from hydrocarbons "as quickly as possible", but stressed the transition must protect jobs and investment, use existing infrastructure, maintain security of supply and minimise environmental impacts.

Low carbon hydrogen in particular was cited as having the potential to enable significant emissions savings through fuel switching across a range of end use sectors. Fuel supply currently accounted for 5% of UK emissions in 2019, with the government envisaging a reduction of 53-60% by 2035 from 2019 levels.

The Hydrogen Strategy had projected 7-20GW of production capacity could be needed in 2035, rising to 15-60GW in 2050, depending on developments across heat, industry, transport and power. The illustrative pathway in the Net Zero Strategy suggests the figure could be 10GW in 2035, assuming heat is electrified, rising to 17GW if hydrogen is used widely for heat.

Key commitments to help hydrogen realise its potential and clean up fuel supply include 5GW of low carbon hydrogen production capacity by 2030 and the establishment of the Industrial Decarbonisation and Hydrogen Revenue Support scheme to fund new hydrogen and industrial carbon capture business models. Up to £140mn will be provided to set up the scheme, including up to £100mn to award contracts of up to 250MW of electrolytic hydrogen production capacity in 2023, with further allocation in 2024.

It will also implement the £240mn Net Zero Hydrogen Fund, while finalising the Hydrogen Business Model and Low Carbon Hydrogen Standard in 2022; collaborate with the sector to develop a low carbon fuel strategy for transport, for publication in 2022; work with stakeholders to address barriers to electrification for oil and gas production by Q4 2022; and regulate the oil and gas sector in a way that minimises greenhouse gas emissions.

There is also acknowledgement of a potential role for hydrogen in heat and buildings within the Net Zero Strategy. There is a commitment to establishing large-scale trials of hydrogen for heating to take decisions in 2026 on its role in decarbonising heating and consulting on a case for enabling or requiring hydrogen-ready boilers and broader heating system efficiencies.

UK set to welcome its largest supplier of green hydrogen

Fortescue Future Industries (FFI) has signed an agreement with JCB and Ryze Hydrogen, which will see it become the UK's largest supplier of green, renewable hydrogen.

On 31 October, the Australian firm announced that it had signed a multi-billion-pound deal with JCB and Ryze. It will see the pair purchase 10% of FFI's global green hydrogen production, which it expects to grow to 15mn tonnes per year by 2030, before accelerating to reach 50mn tonnes a year in the following decade.

The memorandum of understanding, which was signed ahead of COP26, will see FFI lead the green hydrogen production and logistics to the UK market, while JCB and Ryze manage distribution and development of customer demand.

Octopus Energy and RES aim to turbocharge UK's hydrogen economy

Octopus Energy and RES have joined forces, pledging to invest £3bn to build new green hydrogen plants across the UK by 2030.

Announced on 14 October, the partnership will see Octopus Renewables and RES use their expertise and capital to develop, own and operate new green hydrogen plants, delivering a reliant, cost competitive source of clean hydrogen that is insulated from present and future gas price volatility. The partners will seek to maximise the use of green electrons when they are generated on sunny and windy days by storing them as green hydrogen, helping the UK to become more energy independent.

Co-Head of Octopus Renewables, Alex Brierley, said: "The supply of green hydrogen will be critical to the success of many industries in meeting the UK's net zero targets and with this partnership we are providing a solution for those businesses to help deliver on the government's ambitions. We invite industrial businesses that are currently using hydrogen to contact us and benefit from the early mover advantage."

CNG Fuels set to host HGV hydrogen trials

CNG Fuels is to host hydrogen trials for HGVs, helping to decarbonise UK fleets and prepare customers for a multi-fuel future.

On 28 October, CNG Fuels announced its plans to hold the trials across its expanding UK network of public access biomethane refuelling stations. To this end, it has established a new branch of the company in HyFuels, tasked with identifying the best hydrogen production pathways and infrastructure solutions for HGVs, enabling it to support customers in adopting hydrogen quickly and easily once it becomes commercially viable.

The first trials are set for mid-2022, with the company in discussions with international partners and undertaking feasibility studies across its upcoming development sites. From 2025, it is planning to allocate 100 acres of its land to public access hydrogen refuelling.

The first initiatives will be a number of hydrogen-ready mobile refuelling units, with findings from the trials to be used to inform government, industry and existing customers on the effectiveness of different hydrogen solutions and outline key infrastructure considerations for a hydrogen refuelling network.

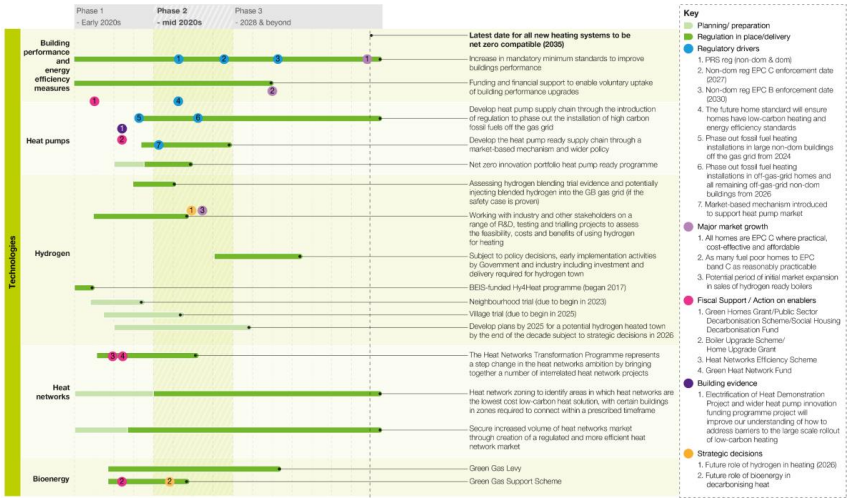
The company also is planning on including the findings in a wider business strategy, which will have a complete roadmap for companies to switch fleets from diesel to net zero fuels.

Major decisions on role of hydrogen for heat to come by 2026

Over the coming years, government is set to explore the potential to use hydrogen for heating in buildings, before making a final decision in 2026, it has announced.

Figure 3: An overview of the government's policy approach in its Heat and Buildings Strategy

(Source: BEIS)



On 19 October, it published its Heat and Buildings Strategy, outlining how it plans to incentivise people to install low carbon heating systems in a way that is simple, fair and cheap, helping to significantly reduce the UK's reliance on fossil fuels and exposure to global price spikes, while supporting up to 240,000 jobs across the country by 2035.

Key commitments include providing grants of £5,000 from April next year in a bid to encourage homeowners to install more efficient, low carbon heating systems through a £450mn three-year Boiler Upgrade Scheme and taking no-regrets action now. This will include supporting ongoing trials and other research and innovation on future heating systems, such as hydrogen.

Specifically, it will assess the feasibility, safety, consumer experience and other costs and benefits of hydrogen for heating buildings by the middle of the decade, working with industry and other key stakeholders to examine its potential as an option. It will support industry in conducting first-of-a-kind 100% hydrogen heating trials, including a neighbourhood trial by 2023 and village-scale trial by 2025, along with plans for a possible hydrogen town that could be converted before the end of the decade.

Elsewhere, an indicative assessment of the value for money case for blending of hydrogen in the gas grid is being targeted for autumn 2022, ahead of a final policy decision in 2023. It noted that blending of up to 20% hydrogen into the existing gas network could drive emissions reductions of up to 7% from the grid, while supporting the development of a UK hydrogen economy.

It is also aiming to consult on the case for enabling, or requiring, new natural gas boilers to be easily convertible to use hydrogen by 2026 "soon". It explained that this would ensure new boilers are fit for the future, minimising later disruption and costs to consumers, with this consultation also to be used to test proposals on the future of broader boiler and heating system efficiency, and explore the best ways to reduce carbon emissions from gas heating systems over the next decade.

This will culminate with an evidence base having been developed to take strategic decisions on the role of hydrogen for heating buildings in 2026. Local trials and planning work, along with results from government's wider research and development and testing programme, informing and enabling decisions on the role of hydrogen for heating in delivering net zero and the actions required to support this.

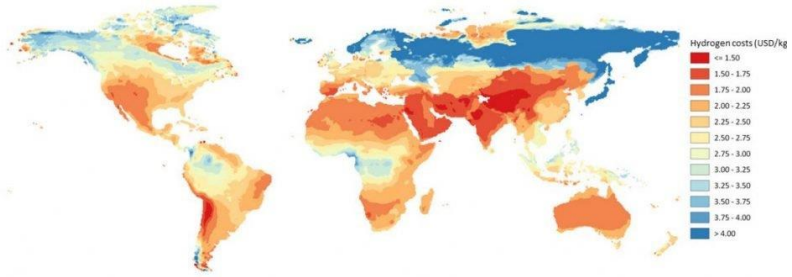
Decisive action key to realising low carbon hydrogen potential

To unlock low carbon hydrogen growth, the International Energy Agency (IEA) has called on governments to take decisive action.

On 4 October, the IEA published its *Global Hydrogen Review 2021*, tracking progress in hydrogen production and demand, as well as other areas such a policy, regulation, investments, innovation and infrastructure development. While investment in hydrogen projects is increasing and there are encouraging signs hydrogen is close to significant cost declines and widespread global growth, greater efforts are needed to fully realise this.

Figure 4: Hydrogen production cost from hybrid solar PV and wind systems in 2030

(Source: IEA)



As of 2020, hydrogen demand stood at 90Mt, made up of almost entirely refining and industrial applications, produced near exclusively from fossil fuels. This has resulted in 900Mt of CO_2 emissions, though there are signs of progress. The IEA pointed to the global capacity of electrolysers doubling over the last five years, reaching just over 300MW by mid-2021 and the fact there are around 350 projects in development that could lift global capacity as high as 54GW by 2030. Another 40, accounting for over 35GW of capacity, are in the early stages of development and would see global hydrogen supply from electrolysers exceed 8Mt by 2030, however this would lag behind the 80Mt deemed necessary in the IEA's 2050 net zero emissions pathway in its Roadmap for the Global Energy Sector.

At least $37bn investment has been committed by countries through hydrogen strategies, alongside a further $300bn announced by the private sector. Once more, however, this is some way short of what is required with the IEA citing the need for $1,200bn of investment in low carbon hydrogen supply and use through to 2030. With government policies focused on production, it stressed the particular need for a step change in policies devoted to demand creation to boost the role of low carbon hydrogen in clean energy transitions.

Technology innovation and increased deployment have the potential to cut costs, with the IEA highlighting how hydrogen from renewables could drop to $1.3/kg by 2030 in regions with excellent renewable resources under its net zero emissions (NZE) by 2050 scenario. The levelised cost of hydrogen production from natural gas – the cheapest option in most parts of the world – currently ranges between $0.5-1.7/kg, whereas hydrogen from renewables is currently $3-8/kg.

It went on to make a series of recommendations, calling for the continued development of hydrogen strategies and roadmaps to build momentum and trigger investments; for governments to use mechanisms such as carbon pricing, mandates, quotas and hydrogen requirements in public procurement to stimulate demand and reduce price differences; and for tailor-made support to be provided to shovel ready flagship projects, kickstarting the scaling up of low carbon hydrogen and development of infrastructure to connect supply sources to demand centres and manufacturing capacities. It also stressed the need for international cooperation to establish standards and regulations and create global hydrogen markets.

Industrial scale green hydrogen production eyed for Orkney

Plans have been unveiled to create a green hydrogen hub on the island of Flotta in Orkney, powered by offshore wind projects.

On 12 October, the Offshore Wind Power Limited (OWPL) consortium – formed by the Green Investment Group, TotalEnergies and Renewable Infrastructure Development Group – announced that it is studying the use of offshore wind to power green hydrogen production at an industrial scale on Flotta.

A proposal has been submitted to the Crown Estate Scotland's offshore wind leasing round to develop the N1 plan option area west of Orkney. If successful, the proposal – the West of Orkney Windfarm – would deliver part of its low carbon capacity to a proposed Flotta Hydrogen Hub. It is collaborating with Repsol Sinopec and Uniper on these plans.

The Flotta Hydrogen Hub would be located at a repurposed area of the existing Flotta Terminal, using power from offshore wind projects to generate green hydrogen. The potential multi-billion pound project could be realised in the late 2020s, before then exporting to Europe or other destinations, being blended into the gas grid at St Fergus and driving forward an international maritime green refuelling hub.

Renewable hydrogen holds the key to avoiding future winter supply challenges

Future winter energy supply crunches can be avoided through renewable hydrogen from British wind farms and stored in disused oil and gas fields, according to research.

On 12 October, the Energy Networks Association (ENA) published *A System For All Seasons*, which – through analysing Britain's electricity generation and consumption trends – found that wind and solar farms in the country generate enough spare electricity in spring and summer, when demand is lower, to produce 60-80GW of green hydrogen – equivalent to 25 Hinkley Point C power stations.

Using this spare renewable electricity to produce green hydrogen that would otherwise go to waste, would see the required total electricity generating capacity of UK wind farms drop from 500-600GW by 2050 down to 140-190GW – a 76% reduction. The alternative scenario would see additional windfarms having to be built for autumn and winter energy demand peaks, only to then be left unused during other times of the year.

Under the ENA's proposal, 115-140TWh of green hydrogen would be stored, with its analysis finding the UK has enough capacity to do so through a combination of salt caverns and disused oil and gas fields in the North Sea. The potential storage volume from Britain's salt fields ranges from 1TWh to 30TWh, whereas in disused oil and gas fields, the potential storage volume for individual sites ranges from 1TWh to 330TWh.

Mapping out the benefits of such a system made up of green hydrogen and seasonal storage, it noted that as well as being resilient by ensuring there is sufficient energy available during cold winter days, it would maximise the use of installed capacity and reduce the need for disruptive interventions in buildings that are deemed unsuitable for electrification.

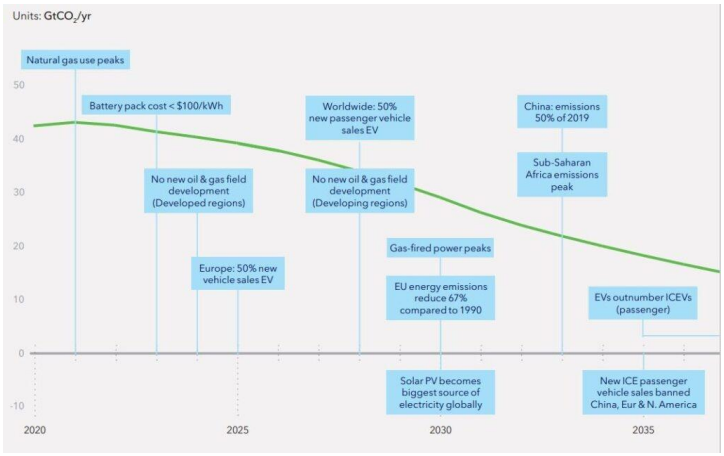
The system would also prove more practical as, without seasonal storage, a prohibitive amount of wind capacity would be necessary, and more cost-effective, owed to the fact it can be delivered with minimal upgrades to existing infrastructure and is all in all cheaper to deliver. Based on this, it stressed hydrogen is a key enabler for allowing a wind-based system to function effectively and creating an energy system for all seasons.

Hydrogen influential on path to net zero and 1.5˚C future

Hydrogen from renewables and fossil fuels, combined with carbon capture and storage (CCS) will set to support a net zero energy system in 2050 a report has mapped out.

Figure 5: Pathway to net zero emissions (2020-2035)

(Source: DNV)



On 27 October, DNV published *Pathway to Net Zero Emissions* (PNZ), setting out a "technically and politically feasible" path to limiting global warming to 1.5˚C. As it stands, halving global CO2 emissions by 2030 relative to 2017 is almost out of reach, with leading regions and sectors facing having to go further and faster for the world to reach net zero by 2050 and secure that 1.5˚C future. Europe and North America, in particular, have to reach net zero by 2042 under the pathway, with Greater China cutting emissions by 98% by 2050.

In contrast, Sub-Saharan Africa and the Indian Subcontinent will only achieve a 23% and 64% reduction respectively. A similar trend is seen in sectors, with those harder-to-abate ones having to cut emissions by 80%-95%, leaving easy-to-electrify demand subsectors having to go beyond zero.

Hydrogen is among the key technologies on this pathway, alongside renewable electricity and bioenergy. However, maximising non-fossil sources in the energy mix will only achieve 80% of the emissions reductions needed for net zero in 2050, leaving the remaining 20% relying on carbon capture applied to fossil CO2 and carbon removal, delivered through bioenergy with carbon capture and storage, direct air capture and nature-based solutions.

Hydrogen is set to make up 13% of demand by 2050, with more than half of this supply coming from dedicated renewable energy production from wind and solar plants. It is the most viable option for decarbonisation in many hard-to-abate sectors, such as aviation, long-haul trucking, iron and steel production, or high heat processes.

It outlined how technologies to supply electrolysers with either renewable power or fossil fuels, along with the conversion to hydrogen via electrolysis or steam methane reforming and gasification are mature and in commercial use. Alkaline electrolysers are more mature than polymer electrolyte membrane

Figure 6: Pathway to net zero emissions (2040-2100)

(Source: DNV)

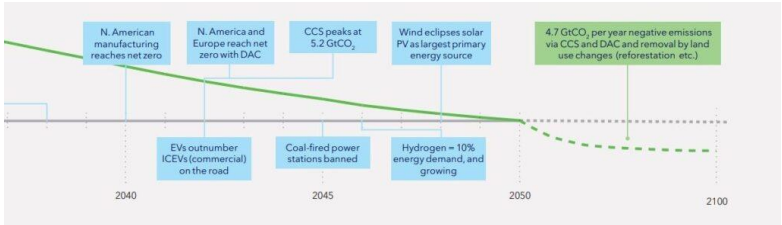
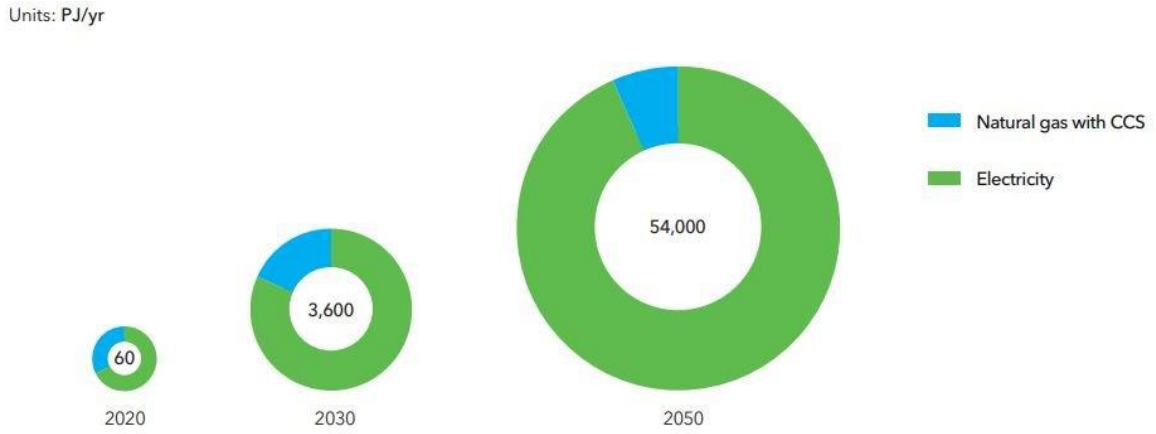


Figure 7: Hydrogen production as energy carrier by production type

(Source: DNV)



(PEM) electrolysers, dominating the market at present, but PEM's advantage when it comes to operating more flexibly will increase its share.

Under the PNZ, there are two main production routes for electrolyser-based hydrogen – grid-based electrolysers and standalone renewables-based electrolysers. To prevent future fluctuations of electricity prices, it tipped investors to gravitate to dedicated off-grid renewable generation for hydrogen production, though grid-based hydrogen production will exploit these to make use of cheap electricity available for long hours, avoiding curtailment of solar and wind.

Hydrogen produced from CCS-treated natural gas through steam methane reforming will continue alongside electrolysis-based hydrogen production, though growing renewable power installations will see fossil-fuel based hydrogen for energy purposes experience a large reduction in market share.

It further mapped out how under the PNZ, significantly growing hydrogen production based on demand will likely result in inter-regional hydrogen trade. It foresees pipeline and shipping as important means for hydrogen trade, as well as hydrogen transformed to larger molecules. Depending on the end use, it foresees hydrogen blended with natural gas in existing grids for the likes of buildings gas supply, or dedicated hydrogen pipelines in transport. What's key is the basic technologies to realise global hydrogen trade exist today, with ongoing R&D effort needing to aim at improving PEM fuel cells and electrolysers, alongside storage and transport options through improved tank design and metal hydrides.

The main policies needed to channel hydrogen use to where its best suited will involve sectoral hydrogen support and incentives to create hydrogen demand.

In manufacturing, hydrogen consumption will see energy taxation favouring hydrogen, boosting the likes of carbon neutral steel or zero emission process heat, while mandates or fuel-mix shifts and emission trajectories in aviation and maritime transport will result in a significant demand market for hydrogen. Further policies include refineries being required to increase their hydrogen share for energy provision, advancing their own global emission reduction contribution in the process, with explicit CAPEX reducing measures needed on the production side to boost cost learning curve-based cost reductions for hydrogen.

Plan highlights potential of a hydrogen ecosystem in Thames Estuary

The Thames Estuary Growth Board has launched a Thames Estuary Hydrogen Route Map, setting out why the Estuary is "uniquely placed" to deliver a hydrogen ecosystem.

Unveiled on 26 October, the Hydrogen Route Map details the "economic desirability" of a hydrogen ecosystem in the Thames Estuary, drawing on how by 2035, demand for hydrogen manufacture and supply could support more than £2.2bn of investment and 9,000 jobs within the region. It could also support an additional 5,300 roles in the automotive industry and the potential for a further 1,750 for assembly of electrolysers, supported by the Thames Estuary's advanced manufacturing sector.

Further benefits of a hydrogen ecosystem in the Thames Estuary include £3.8bn of cumulative Gross Value Added (GVA) and up to 5.9mn tons of CO2 avoided.

Outlining why the Thames Estuary would suit a hydrogen ecosystem, it cited its position next to London and stretching out into the North Sea as advantages, as well as the fact the region has a wide range of potential end users across a number of industries. These included high heat industrial end users, along with those in transport, data and heating.

There are also a number of major infrastructure projects in the region, such as the Lower Thames Crossing, which offers an opportunity to demonstrate fossil-free alternatives for construction, while local demand for carbon dioxide is an opportunity for re-use when it comes to storage. Finally, the Thames is the largest port cluster in the UK, supported by a significant fleet of back-to-base logistics operations in multiple port locations.

The next phase of the project will seek to convert this hydrogen opportunity into bankable projects, including deep dive analysis into so-called "showcase" clusters; further local stakeholder engagement o refine hydrogen demand assumption; stress-testing shortlisted technical applications with stakeholders; deciding on optimal technical solutions; refining of business models, if needed, to get stakeholder support for a specific project; outlining the business case development for identified projects, and the nature of parties sought to deliver them; and presenting projects to investors, where external financing is sought.

Edinburgh Airport teams up with Ørsted to bring sustainable air travel to UK

Edinburgh Airport and Ørsted have joined forces to set out plans to decarbonise the airport, rapidly accelerating the shift to sustainable air travel.

On 21 October, the parties signed a Memorandum of Understanding (MoU) to work together to explore how emissions at Edinburgh Airport can be reduced, allowing it to meet its target of net zero by 2040, while also offering a template for other airports around the world. It will see the airport become one of the most sustainable in the world, using green technologies, including hydrogen fuels produced at scale from offshore wind farms.

The partners will identify the most effective and affordable options for the airport, before working with the Scottish and UK governments on the changes to regulations and policy needed to introduce them. This will include proposals for hydrogen production facilities powered by offshore wind to support decarbonisation.

The first phase of the MoU will involve the partners examining and analysing operations, with future phases in 2022 then focused on implementing projects and bringing other partners on board. The project will see electricity sourced from offshore wind farms and the renewable hydrogen then combined with sustainably sourced carbon, producing 250,000 tonnes of e-kerosene and e-methanol per year, once scaled up.

Cadent sets out plans for hydrogen

Cadent has signalled its ambition to make hydrogen a safe, fair and reliable choice for consumers with the release of its "Hydrogen Ten Point Plan".

Figure 8: An overview of Cadent's 10-point plan

(Source: Cadent)

Launching the plan on 11 October, Cadent explained how it sets out its long-term commitment to decarbonising the way energy is used in homes and businesses, while also creating jobs across the UK. With hydrogen set to be a $2.5tn economy in future, Cadent is pledging to work with government, local authorities, industry partners and consumer groups to maximise the decarbonisation and economic opportunity that it presents.

The plan details actions Cadent will take across three areas, the first of which is preparing and scaling up hydrogen production, where it is committed to introducing net zero construction sites from 2023; delivering the first scaled hydrogen blending facility from 2025, with hydrogen blended into the gas networks for 2mn homes across the Liverpool and Manchester region from 2027; delivering the UK's first hydrogen pipeline by 2027; and enabling 5GW of hydrogen production in its region by 2030.

To scale up investment in jobs and skills, Cadent is pledging to launch a Hydrogen Skills Academy and develop a hydrogen education programme, both by 2024, as well as working in partnership with others to catalyse the development of hydrogen refuelling hub within its region. One hydrogen refuelling stations is targeted by 2025, followed by the first gas network connected refuelling station in 2030. Cadent has the ambition of having the gas network deliver hydrogen to future refuelling stations.

Efforts to look after its colleagues and customers, meanwhile, will see Cadent work with partners to enable access to new finance options and heat as service solutions for its 6,000 plus employees, allowing them to purchase the low carbon heating system to best meet their needs; publish plans to demonstrate heat decarbonisation of whole communities by 2025; and commit to delivering hydrogen-ready appliances as part of its Fuel Poverty programme, as soon as manufacturers make them available, which it hopes is by 2026.

However, for the full potential of the plan to be realised, Cadent has acknowledged the need for close collaboration with government to deliver a regulatory framework that allows for the blending of hydrogen into the gas grid and supports new hydrogen infrastructure; business models that enable hydrogen production to scale up and attract investment; the mandating of hydrogen-ready boilers and appliances as soon as possible; and a focus on skills and skill development across the hydrogen sector.

Aberdeen City Council teams up with BP to pursue hydrogen ambitions

Aberdeen City Council has announced BP as its preferred bidder for a partnership set to accelerate the city's ambitions of becoming a world-class hydrogen hub.

On 25 October, Aberdeen City Council detailed how the Aberdeen Hydrogen Hub concept will ensure the continued development of a hydrogen economy in the city, allowing for the creation of Scotland's first scalable green hydrogen production facility. Having been selected as preferred bidder following a robust tender process that began in June, BP will work alongside the council on the required front end engineering design (FEED) work, aiming to make a final investment decision on the selected development concept in 2023.

The first phase will see the delivery of a green hydrogen facility, targeting first operations from 2024, with options ranging from using power drawn from a new photovoltaic solar farm, green power purchase agreements and a private wire grid connection as a means of generating hydrogen for buses, heavy goods vehicles and large vans. Future phases will see production scaled through further investment, supplying larger volumes of hydrogen for rail, freight and marine, as well as heat and potentially for export.

The programme will support Aberdeen City Council's ambitions in creating a climate positive city and building inclusive growth by supporting hydrogen supply chain development, skills and training, and wider community benefits. Citing its own study, it found around 700 skilled jobs could be created in the hydrogen industry by 2030 through the hub, assuming it enables the export of renewable hydrogen.

Budweiser turns to hydrogen as part of plans to become carbon neutral

Budweiser Brewing Group has linked up with Protium to explore the deployment of green hydrogen at its Magor brewery in South Wales – one of the largest breweries in the UK.

On 19 October, Budweiser outlined how the project would see the first large-scale hydrogen generation system at a brewery built, producing more than 20MW of renewable energy and green hydrogen, marking an important step in the brewery becoming carbon neutral. The hydrogen itself would be used to fuel production and key logistics assets, namely HGVs and forklift trucks.

It already has wind and solar assets operating onsite, which would be used to produce the hydrogen at Protium's facility adjacent to the brewery, alongside Protium's own renewable power from the local area. It will include a battery, hydrogen storage unit and a hydrogen refuelling station for HGVs, saving around 15,500 tonnes of CO2e from 2027.

The project is set to be commercially operational from 2024 and will be one of the first deployments of the hydrogen purchase agreement (HPA) between both parties, creating the first commercial platform for the hydrogen economy by using long-term, zero emissions off-take agreements.

Daimler links up with BP to pioneer deployment of hydrogen infrastructure

Daimler and BP are set to work together to accelerate the introduction of a hydrogen network, supporting the decarbonisation of UK freight transport.

On 27 October, Daimler set out how both BP and itself intend to pilot the development of hydrogen infrastructure and introduction of hydrogen powered fuel cell trucks in the UK. Through a memorandum of understanding (MoU), BP will assess the feasibility of designing, construction and supplying a network of up to 25 hydrogen refuelling stations across the UK by 2030, which use green hydrogen. Daimler, meanwhile, is expecting to deliver hydrogen powered fuel cell trucks to UK customers from 2025.

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