H2 News Hub

Issue 13

H$_2$ East

December 2021

Top stories

In issue 13 of **Hydrogen East**'s Sector Review, we take a look at important publications and developments over the month of November (2021).

The Hydrogen Taskforce relaunched as **Hydrogen UK** to support the industry through its next phase of activity, and published a report, setting out how it plans to support the UK to move from strategy to delivery and deliver on key objectives, namely making business models available and developing the necessary policy and regulatory frameworks.

The **East Coast Hydrogen** project has continued to take shape, with the consortium behind it launching its feasibility study, showing the 15-year programme can exceed the government's 2030 hydrogen target on its own – connecting 7GW by that date.

Elsewhere, the **Energy and Utilities Alliance** has sought to track the upfront capital costs faced by customers when considering installing new low carbon heating solutions for their homes, with it finding that customers typically face a five-fold cost increase to install a heat pump, compared to a hydrogen-ready boiler.

This month's H2 News Hub also covers the **Hydrogen Council** calling for urgent policy action to fully unlock hydrogen's benefits, and findings from the **Re-Stream Project**, which uncovered potential for the re-use of oil and gas infrastructure in Europe for transporting hydrogen and CO2.

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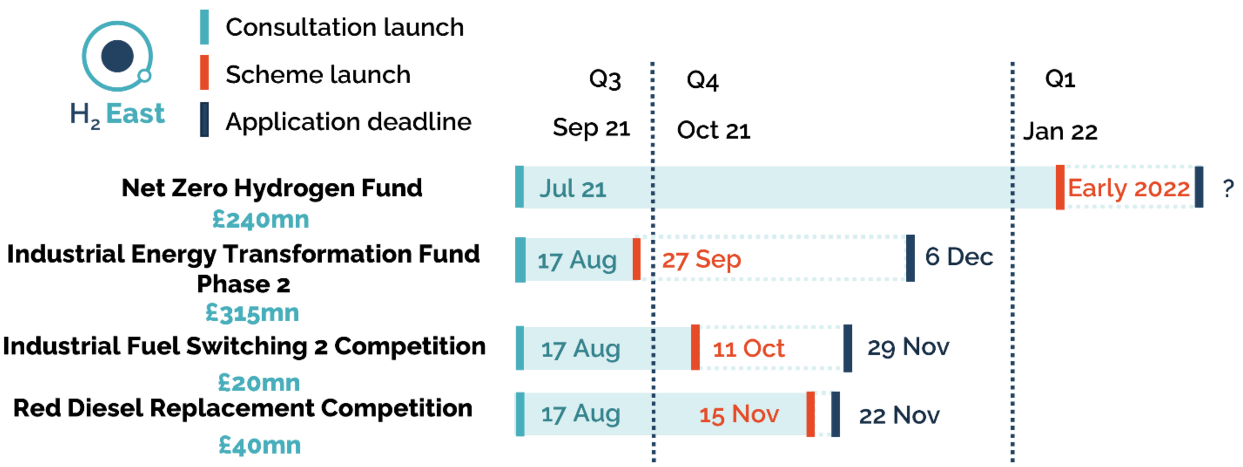
Upcoming webinars

2-3 Dec – **Reuters Events:** Hydrogen Economy Europe | **3 Dec** – **NGG:** Supporting regional hydrogen transitions | **7 Dec** – **WEF:** Transitioning the Upstream, The Future of Oil & Gas, CCUS & Hydrogen | **8 Dec – Cenex:** Reviewing the Standards for Hydrogen Transport | **8 Dec** – **NGG:** Operating the network | **9 Dec** – **Delta-EE:** Five insights from across the emerging clean hydrogen sector | **14 Dec** – **NGG:** FutureGrid 2021 Progress Report | **14 Dec** – **Transport East:** Transport Strategy Consultation

Funding tracker

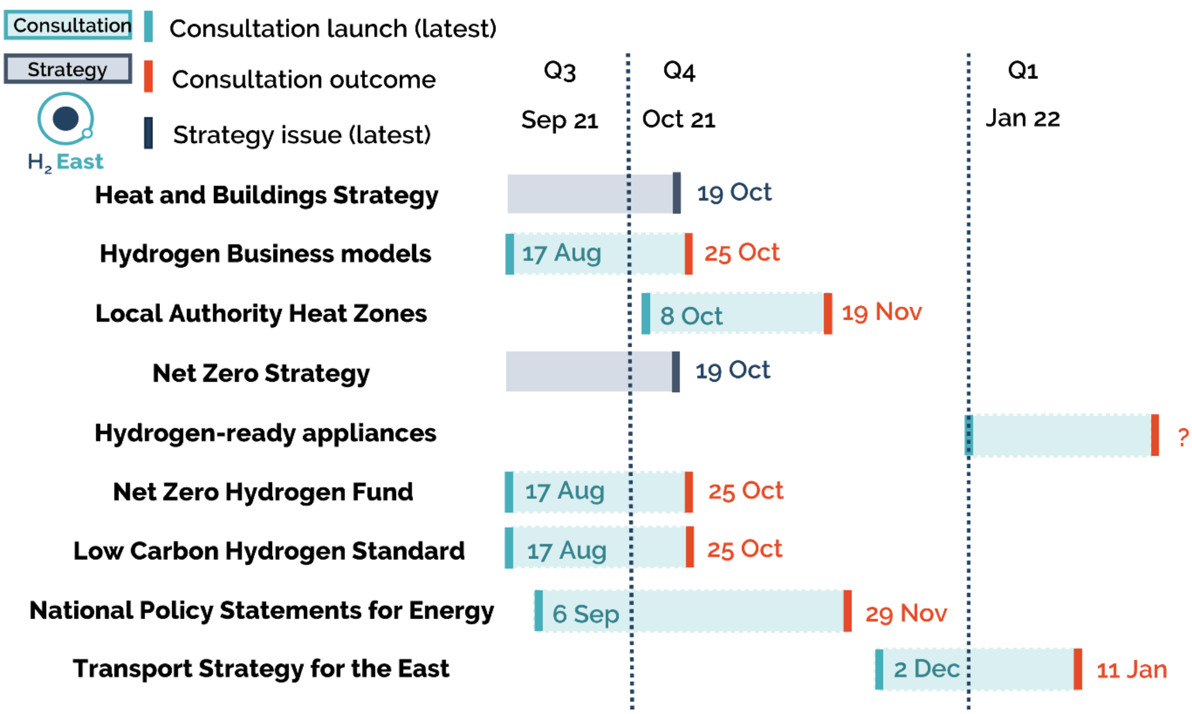
There are a number of funds already available for developers, local authorities and innovative organisations. These cover both feasibility studies and demonstrator projects.

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.

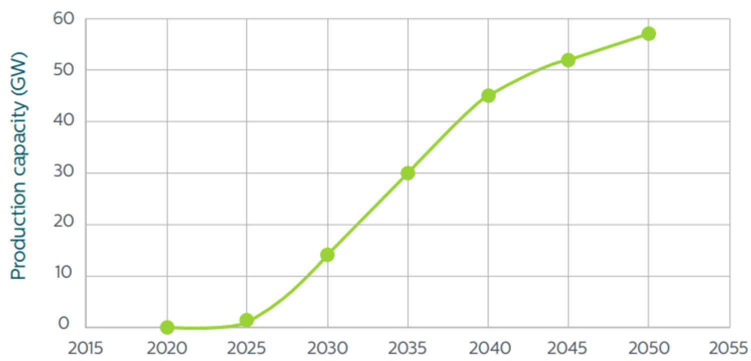


Hydrogen UK to support industry through next phase of activity

With the UK's hydrogen sector now on the cusp of large-scale commercialisation, the Hydrogen Taskforce has relaunched as trade association, Hydrogen UK, with new structures and services to support the industry through this next phase of activity.

Figure 1: Hydrogen UK's suggested timeline for hydrogen deployment for the UK to meet its net zero commitments

(Source: Hydrogen UK)



Launching on 24 November, it published a report, setting out how it plans to support the UK to move from strategy to delivery and deliver on a number of objectives to this end, including making business models available, developing the necessary policy and regulatory frameworks and developing the necessary training and support for a hydrogen workforce. It detailed how while the UK's hydrogen sector has made progress since the launch of the Hydrogen Taskforce, there is still "much to be done" for hydrogen to play a leading role in the delivery of the net zero target.

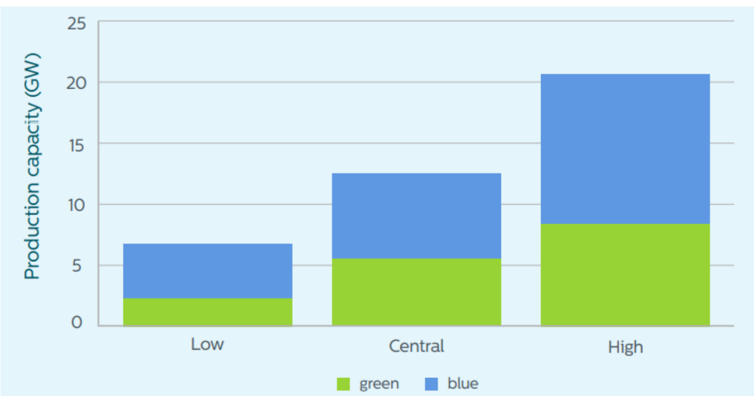
For example, the UK's 2030 target of 5GW of hydrogen production capacity equates to around 33TWh. When considering that by 2050, the UK could need as much as 475TWh of hydrogen, this leaves a gap of 442TWh having to be delivered over the space of 20 years. Furthermore, it noted much of this capacity should be targeted to be in place by 2040, to ensure supporting infrastructure can then be delivered.

This is why scaling up hydrogen production faster throughout the 2020s can be advantageous, Hydrogen UK explained. Increasing the 5GW production target would help to reduce the costs of meeting net zero and the Sixth Carbon Budget, with the report going on to map out a series of alternative scenarios for UK hydrogen deployment in 2030.

Under its low scenario, 7GW of capacity is deployed, resulting in 29,700 jobs, £7.2bn in GVA and 13.7MtCO2e of annual carbon abatement, while its central scenario sees 14GW of capacity in place by 2030, creating 58,500 jobs, £14.2bn in GVA and leading to 16.9MtCO2e of annual carbon abatement.

Figure 2: Production capacity in 2030

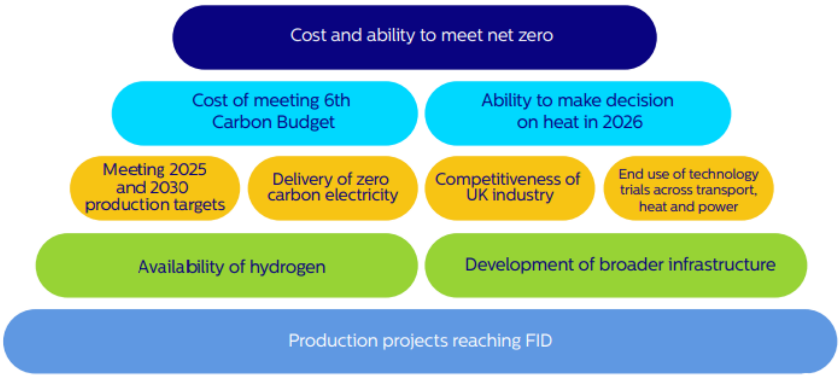
(Source: Hydrogen UK)



Both of these scenarios are based on sensitivity analysis of end-use sector technologies. Its high scenario, meanwhile, assumes that projects in the UK pipeline deliver

Figure 3: Dependencies associated with the UK hydrogen business models

(Source: Hydrogen UK)



100% of their 2030 targets, which unlocks 22GW of capacity, 96,800 jobs and £23.6bn in GVA, while abating 29.1MtCO2e of carbon annually.

From here, it went on to make a series of recommended next steps for industry and government to come together on, to ensure hydrogen in the UK can move successfully from strategy to delivery. To scale production rapidly, it called for hydrogen business models to be made available to producers by mid-2022 at the latest. While noting the government's recent consultation in this area to be welcome, Hydrogen UK stressed the key is now to move swiftly to implementation as while the availability of business models is not sufficient alone, it is a prerequisite to unlocking the wider hydrogen value chain.

There is also a need for detailed and distinct policy and regulatory frameworks to stimulate demand in end-use sectors, as well as to provide links between supply and demand through establishing mechanisms that can unlock capital investment in distribution and storage infrastructure.

It noted that up to 5TWh of hydrogen storage will likely be required by 2030 and considering storage assets have long lead times, developing support mechanisms to enable investment in them should be a key priority. Furthermore, early-stage projects will also need dedicated infrastructure to transport hydrogen from the point of production to early-stage end-users, however there is currently no mechanism in place that enables networks to invest in such infrastructure. This is something a new regulatory regime should rectify.

Another key area on a path from strategy to delivery will be to develop the necessary training and support to ensure the UK has the skilled workforce it needs to deliver on its hydrogen ambitions. This will require a cohesive, coordinated, forward-looking drive to expand on and develop the UK workforce's hydrogen skills as, while it already has many of the necessary skills, there is a need for upskilling in areas specific to hydrogen.

This skills gap must be addressed with some urgency, owed to it taking a minimum of two years from the beginning of learning and practical experience for a worker to then be sufficiently skilled to add value to the market. The report suggested lessons are learned from similar major infrastructure programmes.

Efforts are also needed to ensure that nobody is left behind through this transition, by working with a wide range of stakeholders to build a hydrogen society. To this end, Hydrogen UK is running a campaign – *Building a Hydrogen Society* – which aims to promote a better understanding of the benefits that low carbon hydrogen can offer the UK. As well as this, it is reaching out to decision makers, MPs, local authorities and other opinion leaders and offering to work with them to make the case for hydrogen in a low carbon UK.

World leaders target hydrogen as part of "Breakthrough Agenda"

COP26 saw over 40 world leaders, including the US, India, EU and China, sign up to a "Breakthrough Agenda" modelled on the UK's Net Zero Strategy.

As COP26 opened in early November, Prime Minister, Boris Johnson, launched an international plan to deliver clean and affordable technology everywhere by 2030, with hydrogen among its targeted technologies. Those signing up to it represent more than 70% of the world's economy and every region, with the overriding aim to make clean technologies the most affordable, accessible and attractive choice for all globally in the most polluting sectors by 2030. It will see countries and businesses coordinate and strengthen their climate action each year to dramatically scale and speed up the development and deployment of clean technologies and drive down costs this decade, with the first five goals – collectively covering more than 50% of global emissions – including a commitment to make affordable renewable and low carbon hydrogen globally available by 2030.

It also includes a drive to make clean power the most affordable and reliable option for all countries to meet their power needs efficiently; to make zero emission vehicles the new normal and accessible, affordable and sustainable in all regions; to ensure near-zero emission steel is the preferred choice in global markets, with efficient use and near-zero emission steel production established and growing in every region; and to have climate-resilient, sustainable agriculture as the most attractive and widely adopted option for farmers everywhere, all by 2030. It was highlighted how delivering on these first five breakthroughs could result in 20mn new jobs globally, while adding over $16tn across both emerging and advanced economies.

Part of the plan will see countries and businesses work closely through a range of leading international initiatives to accelerate innovation and scale up green industries. For hydrogen, this includes the Breakthrough Energy Catalyst programme. This is aiming to raise $3bn in concessional capital to catalyse up to $30bn of investments to bring down clean technology costs and create markets for green products for green hydrogen, as well as Direct Air Capture, long-duration energy storage and sustainable aviation fuel.

GH2 aims to accelerate a green hydrogen revolution

The Green Hydrogen Organisation (GH2) has signalled its ambition to accelerate a green hydrogen revolution and outlined how it intends to spearhead these efforts.

This has included launching a collaborative effort with government, industry and civil society at COP26 to develop a Green Hydrogen Standard. This standard will provide certainty and transparency to investors and other stakeholders that green hydrogen is as green as it claims to be, conforming to the highest standards on emissions, environmental, social and governance performance targets, and the sustainable development goals (SDGs).

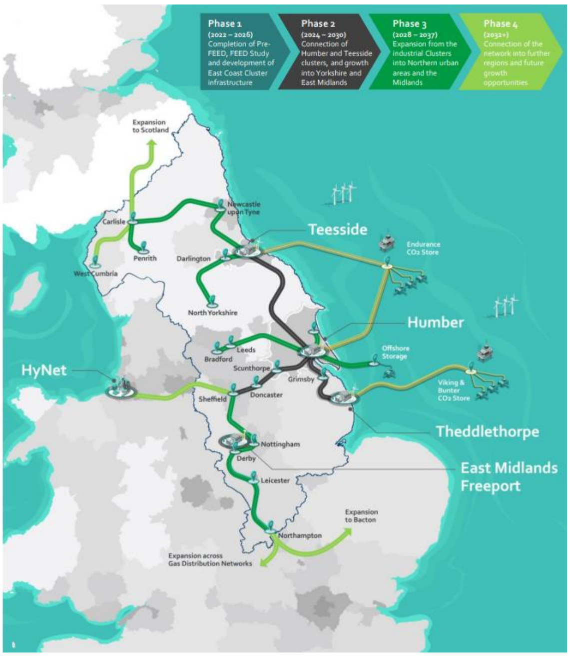
Elsewhere, in the lead-up to the first-ever Green Hydrogen Global Summit and Assembly, set to be held in Barcelona in May 2022, co-hosted by the Spanish government, GH2 is aiming to put a Green Hydrogen Development Plan in place, launch a Green Hydrogen Charter, and host a Green Hydrogen CEO Roundtable. The development plan will bring together governments of developing countries, international finance institutions and other development actors to build, share and promote development policies and enable a rapid acceleration in the production and use of green hydrogen to meet SDGs. The charter, meanwhile, will be a set of principles where committed governments can come together to share best practice and ensure their national hydrogen strategies prioritise green hydrogen, while the roundtable will be a forum for industry leadership and collaboration along the green hydrogen supply chain.

East Coast Hydrogen can exceed government's hydrogen goal

East Coast Hydrogen can connect 7GW of hydrogen production by 2030 on its own, a report has revealed, exceeding the government's 5GW target through a single project.

Figure 4: An overview of East Coast Hydrogen and its phases

(Source: East Coast Hydrogen Consortium)



On 30 November, the East Coast Hydrogen Consortium launched its feasibility report, detailing the "unmissable opportunity" the 15-year programme represents for government and the private sector to work together in delivering the UK's decarbonisation targets. It will use the natural assets of the North of England and build on hydrogen production in two of the UK's largest industrial clusters in the North East and North West, resulting in significant private sector investment into the UK's industrial heartlands, while also serving as a blueprint for the conversion of the national gas grid to hydrogen. Over 7GW of hydrogen production is planned for 2030, along with 800km of total repurposed and dedicated new-build hydrogen national and local transmission pipelines and 10TWh of hydrogen storage capacity in the region.

It will support up to 39,000 commercial and industrial sites being supplied with low carbon heating and process fuel, see up to 24% of the UK's annual industrial and commercial gas demand being decarbonised through East Coast Hydrogen, and up to 11MtCO2 commercial and industrial emissions avoided annually through fuel switching from gas to hydrogen. It will also see up to 4.4mn domestic properties switched to a low carbon heating solution, with up to 17% of annual UK domestic gas demand decarbonised through East Coast Hydrogen and up to 9MtCO2 domestic emissions avoided annually from switching to a hydrogen gas supply.

Further benefits include the delivery of 9,000 jobs at its peak in 2026, in relation to hydrogen, satisfying 100% of the government's target for 2030. It will require over £850mn investment for the conversion and construction of new transmission pipeline infrastructure, while investment in a net zero compliant gas grid will safeguard continued supply chain spend in the gas industry within the East Coast, which totalled over £1bn in 2020.

East Coast Hydrogen will proceed in four phases, the first of which will involve the completion of pre-FEED and FEED study, as well as the development of East Coast Cluster Infrastructure, leading to the connection of the Humber and Teesside clusters in the second phase. Further expansion will follow in the third phase from the industrial clusters into Northern urban areas and the Midlands. The network will then connect into further regions and future growth opportunities in its fourth phase, including Bacton.

In the first quarter of 2022, the pre-FEED study will commence, while East Coast Hydrogen will look to align with the East Coast Cluster and Project Union to ensure coordinated deployment of hydrogen infrastructure, establish an Industrial Hydrogen Users Group, and engage with consumer groups in 2022 on domestic conversion.

bp plots major green hydrogen project in Teesside

bp has confirmed plans for a new large-scale green hydrogen production facility in the North East of England.

On 29 November, bp announced its ambitions for HyGreen Teesside, which could deliver up to 500MWe of hydrogen production by 2030. It will be developed in multiple stages, with bp eyeing the start of production for 2025 with an initial phase of 60MWe of installed hydrogen production capacity. It will match production to demand and build on experience in an effort to drive down costs, with a final investment decision set to be made in 2023.

bp is working alongside industry, local administration – such as Tees Valley Combined Authority – and the UK government in an effort to increase the pace of decarbonisation in transport. HyGreen Teesside will fuel the development of the region into the UK's first major hydrogen transport hub, paving the way for large-scale decarbonisation of heavy transport, airports, ports and rail in the UK.

Glasgow set to host first-of-a-kind hydrogen storage project

The government has awarded funding to what will become the UK's largest power-to-hydrogen energy storage project.

On 22 November, BEIS announced that £9.4mn had been awarded to the Whitelee green hydrogen project. This will see the UK's largest electrolyser developed and situated alongside Scottish Power's Whitelee Windfarm, producing and storing hydrogen to supply local transport providers with zero carbon fuel. It will help to create high skilled jobs, while driving progress towards decarbonising the UK's transport sector.

The project has been developed by ITM Power and BOC, together with Scottish Power's hydrogen division. It should be able to produce enough green hydrogen per day – around 2.5 to 4 tonnes – to provide the equivalent of enough zero-carbon fuel for 225 buses that are travelling to and from Glasgow and Edinburgh each day.

The government also announced that an additional £2.25mn in funding will support the development of hydrogen skills and standards in the UK. This funding, through the Net Zero Innovation Portfolio, will see the British Standards Institution (BSI) develop technical standards for hydrogen projects, and a consortium including Energy and Utility Skills and the Institution of Gas Engineers and Managers to establish new standards and training specifications to facilitate the training of hydrogen gas installers.

NNL and DNV link up on hydrogen gas network project

The National Nuclear Laboratory (NNL) and DNV are join forces to explore the potential of nuclear for the conversion of UK gas networks to hydrogen.

Announced on 26 November, the Nuclear Derived Hydrogen to Gas Networks collaboration will provide deeper evidence to support upcoming policy decisions the government is set to make on the role of hydrogen in buildings and for heating by 2026. As part of the Advanced Nuclear Skills and Innovation Campus pilot, it is being funded by BEIS to promote academic and industrial innovation in Advanced Nuclear Technologies.

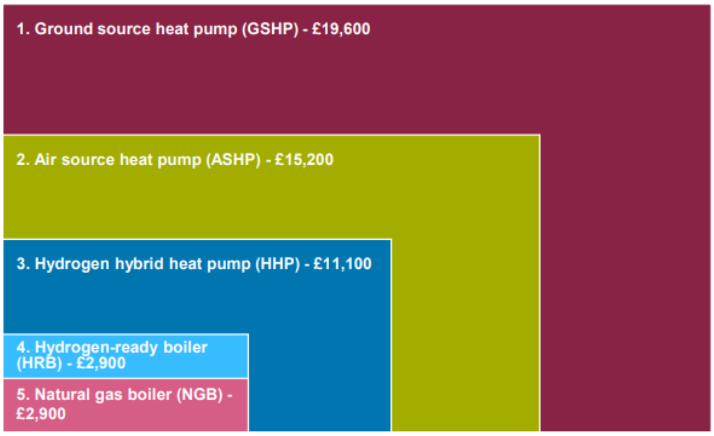
Nuclear's ability to drive hydrogen production at gigawatt scale could prove of great value, when considering the volumes required to convert national and regional natural gas networks. It will mark a key step in bringing nuclear derived hydrogen into the public domain through demonstrating how a UK hydrogen network could have a wider range of options for the supply of hydrogen.

EUA tracks "true cost" of green energy switch

Customers typically face a five-fold cost increase to install a heat pump, compared to a hydrogen-ready boiler, according to research from the Energy and Utilities Alliance (EUA).

Figure 5: Required total upfront installation costs (weighted averages)

(Source: EUA)



In mid-November, the EUA published *The Upfront Cost of Decarbonising Your Home*, in which it sought to analyse the upfront capital costs faced by customers when considering installing new low carbon heating technology solutions for their homes. It found that as well as having a higher cost than a hydrogen-ready boiler, the cost disparity faced by heat pumps also stems from the additional energy efficiency measures needed to ensure it operates efficiently and the need to fit heat distribution measures.

When considering only the costs a consumer would pay for the installation of heating solution equipment, heat pumps are consistently more expensive than hydrogen-ready boilers. Ground source heat pumps (GSHP) cost between £6,059 to £17,114; air source heat pump (ASHP) costs range from £4,859 to £10,054; and hydrogen hybrid heat pumps (HHP) vary from £9,992 to £11,566, depending on the type of property. In contrast, hydrogen-ready boiler costs range across property size from £2,206 to £3,763.

Furthermore, for an appropriately sized heat pump to operate at a level where it can deliver the required level of comfort, home upgrades relating to energy efficiency measures to improve insulation and heating distribution measures are both prerequisites.

Both increase the upfront capital costs of heat pumps, though this varies across property types, with their current level of energy efficiency a notable factor. ASHP costs grow to between £6,052 and £31,067, while the range rises for a GSHP to £7,252 to £38,127. It explained that acknowledging and overlaying the cost of energy efficiency measures across all heating technology solutions, given the fact they are recommended regardless of the choice made, helps to provide a more comparable cost basis for the technology types.

Yet, while this does see the costs for hydrogen-ready boilers and HHP rise to close the cost disparity somewhat, capital costs still remain higher for heat pumps. Hydrogen-ready boiler costs can potentially increase to as much as £21,993 for the largest and least efficient property type, though this still is well below what an ASHP or GSHP would cost.

In the case of heat pumps, there is also a need for a larger surface area of heat distribution methods to produce the same level of comfort, owed to them having a lower output temperature. This could include more radiators, larger radiators or underfloor heating. For radiator upgrades, the upfront capital costs vary once more across property size, from £1,193 in a flat to £2,783 in a larger property. Such upgrades, it was noted, are only needed for ASHP and GSHP, where the outlet temperature is lower. HHP and hydrogen-ready boilers have the same outlet temperature as existing natural gas boiler heating systems.

Gigastack Project moves closer to delivering hydrogen at industrial scale

The Gigastack Project has moved a step closer to delivering renewable hydrogen at an industrial scale, having concluded its second phase.

On 12 November, ITM Power, Phillips 66, Ørsted and Element Energy – the consortium behind the project – published a report, detailing how the second phase of the project has focused on accelerating the expansion of the UK's renewable hydrogen sector. It has involved taking feasibility stage concepts through to Front End Engineering Design for a 100MW electrolyser system, using renewable power from Hornsea Two, to provide renewable hydrogen to the Phillips 66 Humber Refinery.

Overall, Gigastack Phase 2 has involved two main tracks of work. In the first, ITM Power has progressed its next generation of electrolyser technology and moved into its Gigafactory in Sheffield. This represents a step change in ambition and capacity, allowing for electrolyser stack costs to fall 40% over the next three years.

Ørsted and Phillips 66, meanwhile, have developed the technical design for an industry-scale renewable hydrogen facility near Immingham. This has involved exploring the current policy and regulatory landscape, identifying barriers to developing large-scale renewable hydrogen production facilities, identifying potential solutions, and building a business case to map a pathway to an investable proposition. It found the potential to reduce the levelised cost of hydrogen by as much as 47% by 2030.

The main goal of the consortium here is to reach a final investment decision in the next 18 months, before working towards a commercial operating date in 2025, assuming there's a supportive policy environment. Over the next 12 months, the consortium will also be looking to work alongside the UK government to secure revenue support, agree specific deployment targets for renewable hydrogen and ensure the Gigastack deployment target of 2025 is achieved.

Scottish-German collaboration to unlock $20bn green hydrogen market

Scottish Enterprise has commissioned an international collaboration project – *Scot2Ger* – which is set to explore future export opportunities for Scotland's green hydrogen.

Announced in early November, the project will be led by Scottish Power, Wood, KPMG Germany and DS Consulting, and will examine how emerging and substantial demand for zero emission hydrogen from Germany could be met with green hydrogen from Scotland. Germany had already been identified as a potential export market for clean hydrogen from Scotland in a report released by Scottish Enterprise back in August. It is a market set to grow rapidly in the coming years, representing a majority share of a European hydrogen import market forecast to be worth around $20bn by 2030.

Scottish Power will be tasked with assessing renewable energy and hydrogen production capabilities in Scotland, with Wood considering engineering and distribution challenges, while DS Consulting and KPMG Germany focus on identifying customer demand and examining infrastructure and regulatory requirements. It will lead to the creation of a business case for an initial green hydrogen production facility in Scotland to be developed and operational in 2024.

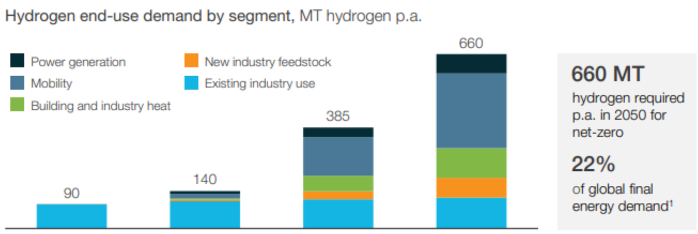
Decarbonisation ambitions in Germany have resulted in a drive to import green hydrogen by land and sea to support large-scale industrial and transportation demand, as well as satisfying customers such as heating equipment manufacturer, Viessmann, which is planning to convert its products to using 100% hydrogen instead of natural gas, and Hydrogenious, which has developed "LOHC" technology that enables hydrogen to be moved around by conventional means in the same way as petrol and diesel.

Investment ramp-up needed to realise hydrogen's potential

Investment has reached a critical threshold, with urgent, decisive policy action needed to fully unlock hydrogen's climate and societal benefits, a report has said.

Figure 6: Global hydrogen demand by segment

(Source: Hydrogen Council)



On 3 November, the Hydrogen Council published *Hydrogen for Net Zero*, highlighting that hydrogen can provide the lowest cost decarbonisation solution for over a fifth of final energy demand by mid-century, making it an essential solution to securing a 1.5°C future. The next decade could see global demand for renewable and low carbon hydrogen grow by 50%, translating into an annual CO2 emissions abatement equivalent of the total volume of CO2 emitted by the UK, France and Belgium. However, a significant scaling up of production, infrastructure and end uses is needed.

It outlined how with an annual abatement potential of 7GT in 2050, hydrogen would be capable of contributing 20% of the total abatement required in 2050. This would call for the use of 660mn metric tons (MT) of renewable and low carbon hydrogen by mid-century, which is equivalent to 22% of global final energy demand. Scaling through to 2030, therefore, will be critical to meet long-term targets and unlock cost efficient decarbonisation opportunities, with use of clean hydrogen by this point capable of abating as much as 730MT of CO2 annually.

By 2030, it estimated that 75MT of clean hydrogen will be needed, replacing 25MT of grey hydrogen in ammonia, methanol and refining; 60MT of coal used for steel production; and 50bn litres of diesel in ground mobility. This mix of renewable and low carbon hydrogen would require 200-250GW of electrolyser capability, 300-400GW of new renewables and 45-55MT of low carbon hydrogen production capacity and associated carbon infrastructure to store 350-450MT of CO2 a year.

With 260GW of renewable capacity commissioned in 2020, a step up in deployment is needed to meet rising electrification demand. It further noted that this deployment of clean hydrogen will not happen without the right regulatory framework being in place, with both governments and businesses needing to act. There is a need for sustainable policies, such as mandates and robust carbon pricing, the development of large-scale infrastructure and targeted support, and de-risking of large initial investments.

Such investments will pay off, it assured, with scaling hydrogen up key to reducing costs through economies of scale, making it available to end-users through the necessary infrastructure and ultimately, making hydrogen a competitive, available, cost-efficient decarbonisation vector.

In terms of how likely it is that the necessary scaling occurs, a significant gap to the net zero scenario remains, despite strong momentum across the globe. Over 520 projects were announced in 2021, translating to 18MT of clean hydrogen supply, as well as infrastructure and uses, totalling around $160bn. However, this accounts for just 25% of what is needed to achieve the deployment laid out in the report, leaving a gap of $540bn. Yet, when considering that the total figure of $700bn accounts for only 15% of cumulative investments in upstream oil and gas in the same timeframe, the report stressed this means that the required investment levels are possible.

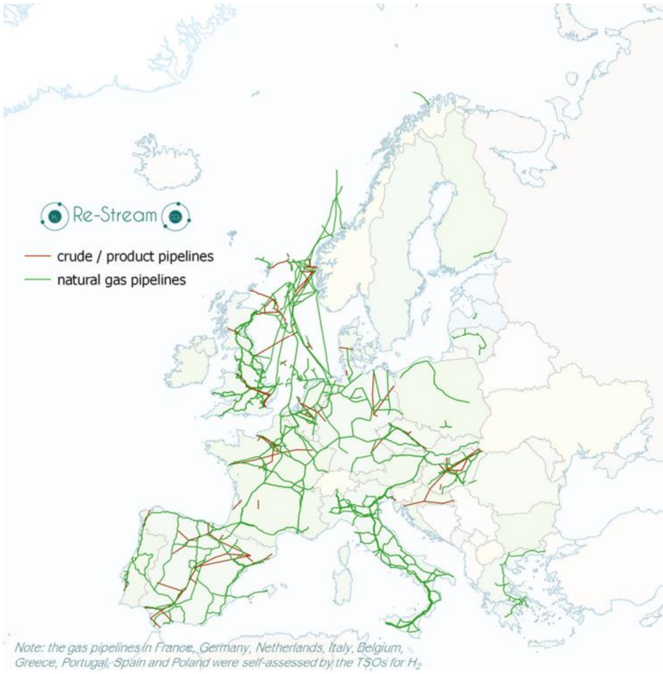
Europe's oil and gas infrastructure can be reused

A study has uncovered "significant potential" for the re-use of oil and gas infrastructure in Europe for transporting hydrogen and carbon dioxide.

The cross-industry Re-Stream project sought to identify and assess relevant oil and gas infrastructure, before defining which technical adaptations and investments would be required to unlock its potential for re-use for both CO2 and hydrogen. It found that re-using existing infrastructure can result in more cost-efficient deployment of carbon capture and storage (CCS) and hydrogen, reducing the costs of the energy transition in the process.

Figure 7: Crude/product and gas pipelines considered in the Re-Stream study

(Source: Re-Stream project)



The study, commissioned by Concawe, Gas Infrastructure Europe, the European Network of Transmission System Operators for Gas, and the International Association of Oil and Gas Producers, saw 67 pipeline operators participate, providing data to be analysed for around 58,000km of pipelines, as well as 24,200km assessed by the operators themselves as suitable for hydrogen re-use, representing a significant proportion of the oil and gas pipeline network in Europe.

Key findings included that existing pipelines can be re-used to transport CO2 for geological storage; over half of the existing offshore pipelines assessed would be suitable for transporting CO2 in the dense phase; and more than 70% of the existing offshore pipeline length is relevant for CO2 transport, with many long pipelines linking harbours to CO2 storage locations. For onshore pipelines, it found a minimum of 20% of the pipeline length shows "some business opportunities" for linking sources to sinks.

When it comes to hydrogen, once more a majority of offshore pipelines assessed were found capable of transporting it, with close to 70% of the onshore pipeline total length having the potential to be re-used as well, considering the current state of knowledge and standards. The remaining length of the pipelines was also deemed promising for re-use, though would call for either more testing, or an update to standards, to be reusable. It did note none of the pipelines analysed should be categorically excluded from re-use.

Based on these findings, it highlighted how re-use of existing pipelines can deliver cost reductions in comparison to having to build new ones. For both CO2 and hydrogen transport, cost reductions of 53% to 82% can be achieved. In offshore cases, this would see a reduction of 2MEUR/km, with the figure 1MEUR/km for onshore ones, with these cost reductions especially important during the initial phases of development for CCS and hydrogen infrastructure.

Hydrogen East

Contact us

mail@hydrogeneast.uk

www.hydrogeneast.uk

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