Hydrogen East

# H2 News Hub

## Issue 17

H2 East

April 2022

## Top stories

Welcome to issue 17 of **Hydrogen East**'s Sector Review, where we take a look at important publications and developments over the month of March (2022).

In light of Russia's invasion of Ukraine, the **European Commission** has signalled its intent to make Europe independent of Russian fossil fuels "well before 2030". This will start with gas, with its **REPowerEU** plan laying the groundwork for this and including increased ambitions for hydrogen.

**Hydrogen East** has made the case for why Norfolk and Suffolk are the focus for the development of a low carbon hydrogen cluster, potentially the first of its kind in Britain.

**FlyZero** has unveiled a vision for a new generation of aircraft powered by liquid hydrogen in a report, which follows a 12-month study into the feasibility of zero-carbon emission aircraft, where it found aviation can reach net zero through a combination of developing sustainable aviation fuel and green liquid hydrogen technologies.

Elsewhere, a year on from its publication, the government has published a progress report on the **North Sea Transition Deal**, which has seen production emissions fall 11%, as well as developments in a number of areas. Our summary specifically focuses on updates for carbon capture, usage and storage (CCUS) and hydrogen.

## Contents



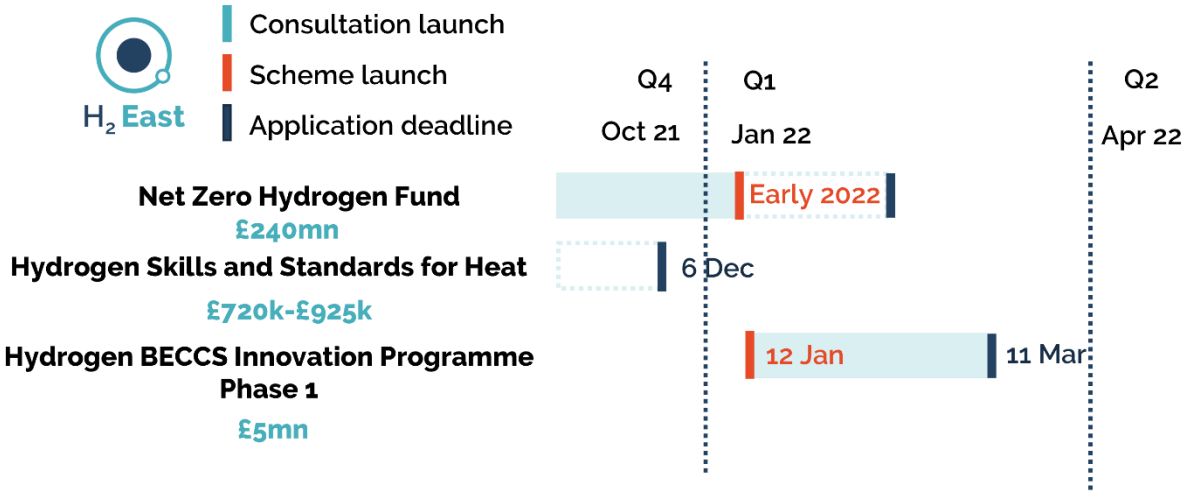
## Upcoming webinars

**5 Apr** – **I-SEE & University of Bath:** The Future of Sustainable Hydrogen Energy | **6 Apr** – **HyDeploy:** Customer Perceptions of Hydrogen | **22 Apr** – **Clean Hydrogen Joint Undertaking:** Safety Planning and Management in EU hydrogen and fuel cell projects | **29 Apr** – **Network-H2:** Hydrogen Storage and Transport Acceleration | **29 Apr** – **IMechE:** Low Carbon Hydrogen Plant Digital Twins

## Funding tracker

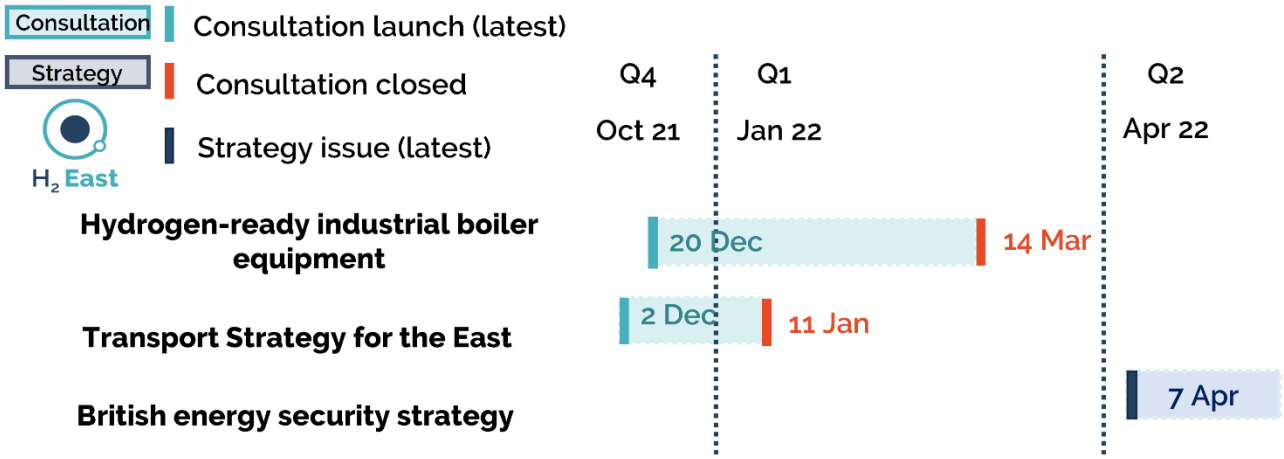
There are a number of funds already available for developers, local authorities and innovative organisations. These cover both feasibility studies and demonstrator projects.

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.



# Europe to embrace hydrogen in shift from Russian gas

The European Commission has set out its plans to make Europe independent of Russian fossil fuels "well before 2030", starting with gas, following Russia's invasion of Ukraine.

Figure 1: An overview of the REPowerEU plans to cut Europe's dependence on Russian gas

(Source: European Commission)


On 8 March, it published an outline for REPowerEU, a joint European action plan for more affordable, secure and sustainable energy, which also sets out measures to respond to rising energy prices and replenish gas stocks for next winter. With the EU importing 90% of its gas consumption, Russia accounts for half (45%) of this, and also makes up 25% of oil imports and 45% of coal imports, respectively. Therefore, in light of Russia's aggression against Ukraine, the Commission declared the case for an accelerated clean energy transition to have never been "stronger or clearer".

Through REPowerEU, it is proposing to increase the resilience of the EU-wide energy system through two pillars of reducing the use of fossil fuel in homes at a faster pace, and diversifying gas supplies through Liquified Natural Gas (LNG) and pipeline imports from non-Russian suppliers, as well as larger volumes of biomethane and renewable hydrogen. Its 'Fit for 55' proposals, if fully implemented, will ensure annual fossil gas consumption is cut by 30%, or 100bn cubic metres (bcm), by 2030, though REPowerEU will take things even further, removing 155bcm of fossil gas – equivalent to the volume imported from Russia in 2021. Almost two thirds of this reduction is possible within a year.

For hydrogen specifically, 'Fit for 55' has already set a target of 5.6mn tonnes of renewable hydrogen by 2030, saving 9 to 18.5bcm of gas. REPowerEU is proposing to add a further 15mn tonnes (mt) through a Hydrogen Accelerator (see Figure 1), adding 25-50bcm of savings by 2030, with 10mt being imports and an additional 5mt of hydrogen produced in Europe. Other forms of fossil-free hydrogen, such as nuclear-based, are expected to play a role in substituting natural gas. It will develop the regulatory framework to promote a European market for hydrogen and support the development of an integrated gas and hydrogen infrastructure, hydrogen storage facilities and port infrastructure. It will also support pilot projects on renewable hydrogen production and transport in the EU neighbourhood.

Elsewhere, when it comes to decarbonising industry, REPowerEU could accelerate the deployment of innovative hydrogen-based solutions, as well as cost-competitive renewable electricity in industry sectors. An Innovation Fund will be brought forwards to support the switch to electrification and hydrogen, with an EU-wide scheme for carbon contracts for difference (CfD). The Commission is now pledging to work with Member States to identify the most suitable projects to deliver on these objectives, building on extensive work that has already been undertaken through national Recovery and Resilience Plans.

**Oil and Gas Authority becomes North Sea Transition Authority**

The Oil and Gas Authority (OGA) has changed its name to the North Sea Transition Authority (NSTA), marking a "natural next step" in its evolving role.

On 21 March, the NSTA assured it will remain focused on security of supply and stewarding the energy transition, though explained its new name reflects the new context within it is operating and its growing role in the energy transition. Last year saw the OGA revise its strategy, placing net zero at the heart of its work, as well as the launch of the North Sea Transition Deal itself, setting out a programme of work to reach net zero and the role for the UK's oil and gas industry.

The NSTA's work will include leading studies to assess the potential for hydrogen power and carbon storage in hubs such as Bacton and driving offshore energy integration to build closer links between oil and gas, and renewables, and reduce carbon emissions from oil and gas production. Other workstreams will include stewarding ongoing production from oil and gas fields; monitoring industry greenhouse gas emissions in line with the North Sea Transition Deal; and, as the licensing authority for carbon storage, stewarding projects through their development, and supporting the government's CCS deployment pathway.

**Hydrogen innovators offered chance to pitch to investors**

Innovate UK KTN is offering innovators with hydrogen generation, storage and distribution solutions the chance to pitch to potential investors.

Its competition, launched in March, is seeking innovators developing solutions that support the production, storage and distribution of green hydrogen which, if they were to be scaled, could have a significant impact on reducing carbon emissions. To be successful, solutions must have a place in a net zero carbon world of 2050 and be rooted in defendable, scientific innovation.

The investors, all of which are active in hydrogen – Zero Carbon Capital, IQ Capital, Chrysalix, CEMEX Ventures, and AP Ventures – will consider partnering for grant bids, or demonstration and pilot projects, as well as making a direct investment. The programme will also offer successful applicants the chance to link with organisations that provide insights and connections, could support testing and demonstration of new technologies, connect with other supply side innovations, as well as potential future large scale users of hydrogen. Proposals that will not be considered are those in the areas of SaaS, websites, big data, AI, apps and digital marketplaces. The deadline for applications is 24 April at 23:59.

**Shell plots multi-billion UK energy investment**

Shell UK is planning on investing between £20-25bn into the UK energy system over the next decade, according to its UK Country Chair.

Writing on LinkedIn on 23 March, David Bunch explained that the majority (75%) of this investment will go towards low and zero carbon products and services, such as offshore wind, hydrogen and electric mobility. The aim of this investment, which is subject to board approval, will be to push the UK closer to net zero, ensure security of supply and stimulate economic growth and jobs.

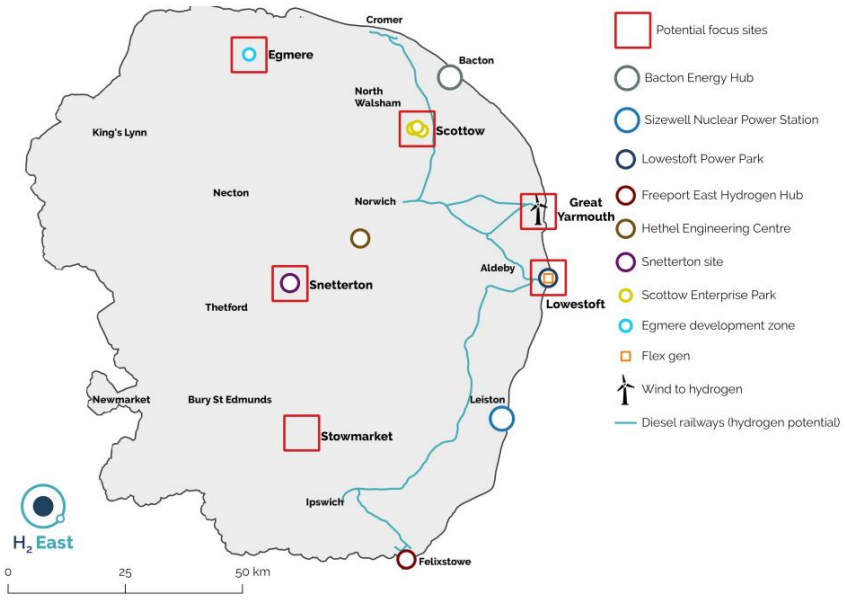
Bunch stressed the need for urgency across government to deliver the enabling policy and business case frameworks for Shell to deliver such investment. These should address the supply and demand side of the energy transition, in areas including hydrogen and CCS, while a stable political discourse is also needed. Bunch added that more detail will be set out on Shell UK's plans in the months ahead.

# Hydrogen East makes case for low carbon hydrogen cluster

Hydrogen East has outlined why Norfolk and Suffolk is the focus for the development of a low-carbon hydrogen cluster, potentially the first of its kind in Britain.

Figure 2: Hydrogen East and potential selected hydrogen projects in Norfolk and Suffolk

(Source: Hydrogen East)




On 7 March, it published a paper, summarising how it proposes to support development of a regional distributed low-carbon hydrogen cluster in the East of England. The proposal, specifically, centres on a core electrolyser project or projects at key sites in Norfolk and Suffolk, close to facilitated demand cases, based mainly around different large vehicle classes. Under this approach, several geographically approximate small electrolysers could be developed, with supporting infrastructure added as regional demand grows.

Norfolk and Suffolk have a series of factors that make them well suited for the development of such a cluster, including multiple opportunities for producing hydrogen from renewable and low carbon regional resources; nuclear development that offers potential opportunities both as a user and producer of hydrogen; and important projects already in development at Bacton and Felixstowe, which could see wider impetus on the hydrogen agenda in the region.

Although the region does not have significant industrial load, as other potential hydrogen clusters under discussion do, it does have a dispersed rural economy, presenting real challenges for electrifying transport. This means there are significant potential markets and use cases for hydrogen, especially for the region's larger land-based transport in various forms which will require alternative fuels. Other demand cases include rial, shipping and using hydrogen in conjunction with gas generation and flexible generation (flexgen) sites.

Considering these opportunities together, Hydrogen East judged them to provide a fertile base for a different type of clustering, linking up small, diverse projects, including electrolysers, that could then be progressively scaled as demand grows. Through geospatial mapping, more than 20 sites have been identified as having the potential to be repurposed for the pairing of solar and electrolyser projects. These include Lowestoft PowerPark, Egmere, Snetterton, Great Yarmouth, Stowmarket, several sites approximate to Felixstowe and various Anglian Water waste-water treatment works.

Many of these sites already have existing, unused electricity infrastructure, but are situated in relatively remote areas, meaning they offer opportunities to locate infrastructure away from local

residents, but have road access in a region with good solar yields. Furthermore, with capital cost reductions for electrolysers and hydrogen transport and storage surpassing forecasts, and the gap between the development costs of blue and other sources of hydrogen set to narrow rapidly as projects scale, there is a significant economic opportunity for the East of England, once government decides the form of hydrogen revenue support.

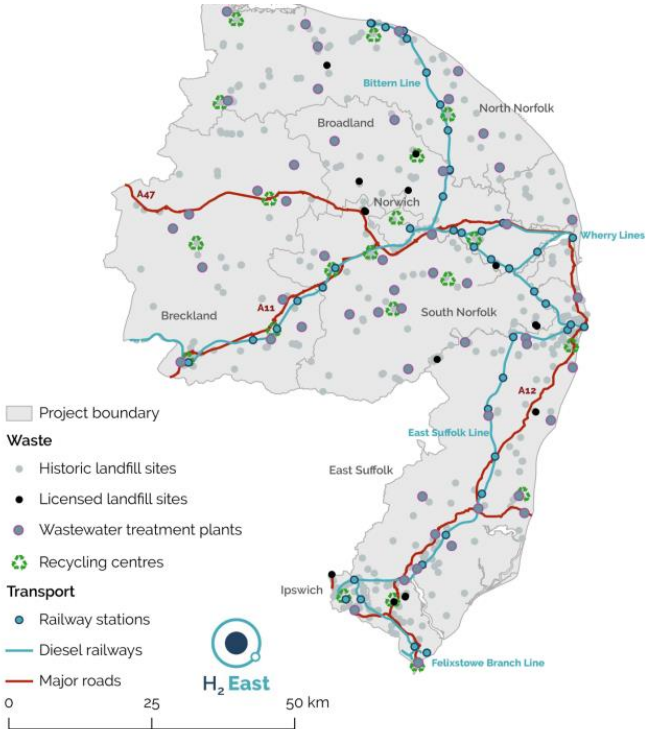
There are also early mover benefits to be had, due to the existing energy supply chain and skills established from the oil, gas and renewables sectors. Local communities and businesses will be able to benefit directly through investment and job creation, not just in hydrogen but other clean growth sectors too. Hydrogen East has calculated that, even on a conservative basis, there is the potential for more than 5TWh of demand in the New Anglia area as early as 2030, assuming active regional development, coordinated action and appropriate policy support.

Hydrogen East will now focus on validating whether the sites identified are suitable for development, along with examining potential local uses and timescales over which they could be realised in greater detail. It is seeking to take its analysis and thinking to key regional stakeholders and potential developers to build support for the project, initially covering the core areas of Norfolk and Suffolk, ahead of forming a consortium of potential producers and users to take the clean hydrogen project forwards.

Indications of interest and support to work alongside Hydrogen East on the project are now being sought, as are channels to promote the project concept and thinking, and supporters and consortium members to fund project development – at least until the government opens appropriate competitions for funding. This will ensure Hydrogen East can continue conducting its research programme without having to do external work, unless it brings value to the project.

Figure 3: Potential sites for a core Norfolk/Suffolk low-carbon hydrogen cluster

(Source: Hydrogen East)



**UK could be centre of excellence for fuel cell production**

The UK must learn from mistakes it made with batteries and make its mark on a global stage when investing in hydrogen, the Advanced Propulsion Centre (APC) has said.

On 22 March, the APC stressed the UK could dominate European fuel cell production and become a centre of excellence globally, as hydrogen continues to be offered up as a potential solutions with the world looking to end its reliance on fossil fuels for heat and transport. According to its analysis of the fuel cell and hydrogen tank systems, the most valuable components could be mass manufactured in the UK. This would reduce reliance on overseas markets and help to build sustainable UK-based jobs.

The APC is forecasting rapid growth in fuel cell platforms for light duty vehicles from 2030. This will happen as hydrogen refuelling networks expand and hydrogen as a fuel at the pump falls to $4-5/kg. The APC said it expects 14GW of on-board fuel stack power and 400,000 hydrogen carbon fibre tanks will be needed to meet the demands of FCEV production in the UK by 2035, equating to 140,000 vehicles. A clear role is also emerging for hydrogen combustion. This is especially the case in medium and heavy-duty sectors, with APC forecasting that come 2040, across Europe, 15% of new HGVs sold will be hydrogen combustion.

It highlighted how the UK produced 1.3mn vehicles in the UK in 2019, pre-pandemic, and 2.5mn light duty engines, worth estimated total of £8.5bn, with 80% of these exported to Europe. The APC is supporting projects for hydrogen combustion engines with Cummins and Dolphin N2, while it further noted that most manufactured vehicles in the UK are types of vehicle where power, utility, range and off-road capability are important and could benefit from a hydrogen powertrain. With export and trade tariffs demanding a certain level of local manufacturing, the APC is calling to localise the supply chain and anchor vehicle production in the UK.

APC CEO, Ian Constance, explained: "We already have 15% of the fuel cell value chain radiating from UK businesses but this could be as much as 65% just by expanding on current strengths [….] Investment will be needed to retain this leading position but we're sharing this insight in the hope it helps industry and government make long-term strategic decisions."

**Think tank set to advance nuclear role in hydrogen production**

A new working group is set to explore the role of nuclear power in the production of hydrogen for future energy systems.

Launched on 24 March, the Nuclear Enabled Hydrogen Working Group will assess opportunities to use nuclear thermal heat and electricity to produce zero carbon hydrogen. The group, set up by the UK Hydrogen and Fuel Cell Association, includes leading academics and experts from the UK's National Nuclear Laboratory (NNL), Burges Salmon and Petrofac. If their work is successful, producing hydrogen from nuclear could have a significant impact on the UK's goal of reaching net zero by 2050.

NNL and DNV already undertook work last year to explore the potential of nuclear in supporting the conversion of UK gas networks to hydrogen through the Nuclear Derived Hydrogen to Gas Networks collaboration. This will provide deeper evidence, helping to support upcoming government policy decisions on the role of hydrogen in buildings and heating, and will also be fed into the work of the UK HFCA working group.

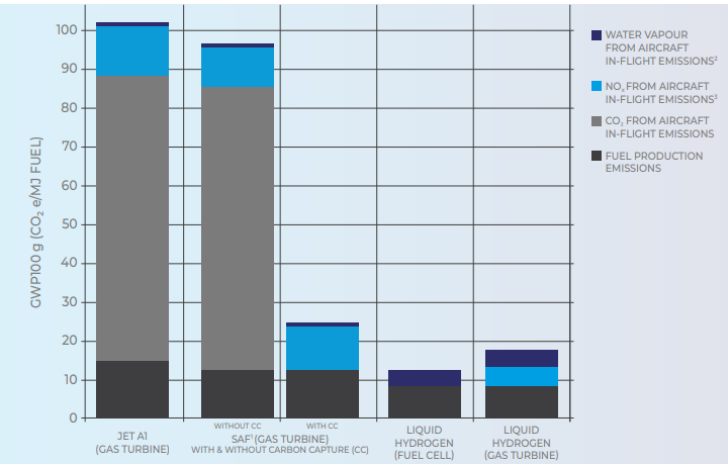
Allan Simpson, Chair of the group and NNL Technical Lead, explained: "We will look at evidence-based advice to widen the understanding of the role of nuclear hydrogen across the energy system […] This project is a key step in bringing nuclear enabled hydrogen into the public domain, demonstrating that a UK hydrogen network could have a wider range of options for hydrogen supply."

## FlyZero makes case for liquid hydrogen aircraft

FlyZero has unveiled a vision for a new generation of aircraft powered by liquid hydrogen.

Figure 4: Global warming potential over 100 years for aircraft by fuel and propulsion type

(Source: FlyZero)




On 17 March, it published a report - following a 12-month study into the feasibility of zero-carbon emission aircraft - in which it set out how aviation can achieve net zero by 2050 through developing sustainable aviation fuel and green liquid hydrogen technologies. Furthermore, there is a major potential economic boost for the UK should it seize the initiative, allowing it to grow its market share in civil aerospace to 19% from 12%, increase the sector's GVA to the economy to £36bn from £11bn today, and expand the number of aerospace jobs from 116,000 to 154,000.

The study saw the likes of batteries, hydrogen and ammonia compared, with green liquid hydrogen deemed the most viable, capable of powering large aircraft through fuel cell, gas turbine and hybrid systems. Liquid hydrogen is also set to become cheaper, as well as greener, than power to liquid (PtL) sustainable aviation fuel (SAF) by the mid-2030s. Should 50% of the commercial fleet be hydrogen-powered by 2050, cumulative CO2 emissions from aviation around the world could be reduced by 4 gigatons (Gt) and 14Gt by 2060. This would also require hitting targets of having midsize hydrogen-powered aircraft operating by 2035 and hydrogen-powered narrowbody aircraft in service by 2037.

Considering industry and aviation can only afford one fleet refresh before 2050, technology acceleration is crucial. There is a window of opportunity to introduce zero-carbon emission aircraft, with FlyZero's modelling deeming it to be feasible to design and fly an experimental aircraft across the Atlantic by 2030, powered by hydrogen as turbines. Accelerating large commercial aircraft was highlighted as the optimum route to decarbonising aircraft, owed to it being less commercially risky as it allows for infrastructure development to focus on fewer, albeit larger international hub airports.

On the technological breakthroughs required, it identified hydrogen fuel systems and storage, hydrogen gas turbines, hydrogen fuel cells, electrical propulsion systems, aerodynamic structures, and thermal management as key areas. New aircraft certification policies and new health and safety regulations will also be needed for hydrogen-powered aviation.

It went on to make a series of recommendations, including calling on industry and government to work internationally to bring large zero-carbon emission aircraft to market as soon as possible; for critical technologies to be progressed to technology readiness level 5-6 by 2025; and the creation of a cross-sector hydrogen technology centre with open access facilities to facilitate research into fundamental hydrogen behaviour, requirements for safe handling standards and regulations, material properties and test specifications to address the UK's limited hydrogen-related skills and testing capabilities.

**New CCUS Hub platform launched**

The Oil and Gas Climate Initiative (OGCI) has launched "The CCUS Hub", a new platform to share learnings and identify new hubs.

On 3 March, the OGCI announced the launch of the web-based platform, which has been designed to support regulators, emitters and potential hub developers that are interested in setting up carbon capture and storage (CCUS) hubs globally. Such hubs can reduce costs and accelerate industrial decarbonisation through creating collective CO2 transport and storage infrastructure for multiple emitters in a specific region.

The CCUS Hub platform has three parts, including a CCUS Hub Search, which is an interactive map tool, identifying 279 potential CCUS hubs in 56 countries, matching clusters of CO2 sources with possible storage locations, along with estimates of cost per tonne. It also has a CCUS Hub Playbook, offering practical lessons from people behind the most advanced CCUS hubs, with this searchable by theme or profile, and Hubs in Action, which provides overviews of six emerging CCUS hubs that were part of the OGCI's initial KickStarter initiative.

The platform will be overseen by an advisory board of key partners, including BCG, the Clean Energy Ministerial-CCUS, Global CCS Institute and IEAGHG. The overriding aim of the OGCI is for the CCUS Hub to become a place for everyone involved in setting up CCUS hubs to meet, learn and share experiences.

**New green hydrogen project eyed for Teesside**

EDF Renewables UK and Hynamics have unveiled plans for a pioneering green hydrogen project in Teesside.

On 9 March, EDF Renewables announced that alongside Hynamics – a hydrogen specialist subsidiary of the EDF Group – it will be investing significantly in its Teesside operation, supporting local and national government aspirations to regenerate Tees Valley through decarbonisation investment. This includes plans for a green hydrogen production centre in the vicinity of the former Redcar steelworks.

Detailed plans for Tees Green Hydrogen are set to be released later in the year, though the plan is to use electricity from the nearby Teesside offshore wind farm, along with a new 49.9MW solar farm. The latter would be constructed near Redcar and power the hydrogen electrolyser. A consultation on the solar development will take place later in March. The electrolyser will be 30-50MW in size during its initial phase but designed in such a way that it can scale to over 500MW, correlating with emerging demand. The project would supply local business customers with hydrogen to support decarbonisation efforts and cut industrial pollution.

**Nel plans to ramp up electrolyser production capacity**

Nel has signalled its intention to increase its electrolyser production capacity in response to the EU raising its ambitions for renewable hydrogen.

On 9 March, Nel confirmed it is ready to add the electrolyser production capacity required in Europe and abroad, when needed by the market. Its electrolyser plant in Herøya can provide 500MW of capacity to the market, but has the potential to expand to 2GW. Nel CEO, Jon André Løkke explained the facility reaching new production records every week, with a site selection process for additional production capacity in Europe set to commence as well.

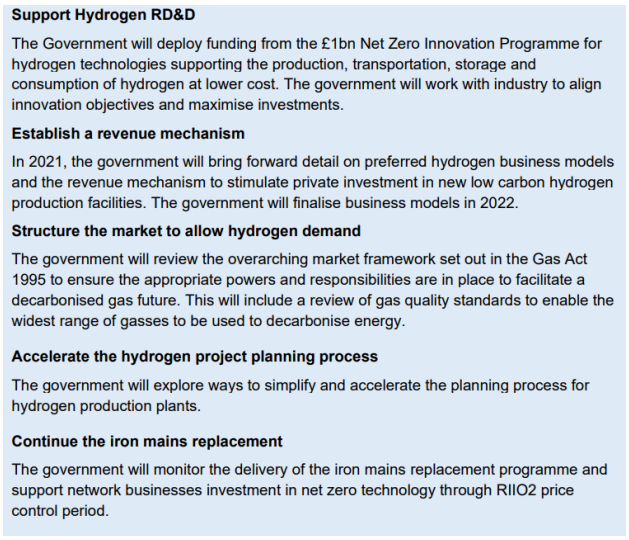
Løkke said: "We are committed and ready to deliver on the promise to help make Europe the first climate-neutral continent in the world. It's time to turn Europe's hydrogen ambition into a reality. We need a clear and predictable regulatory framework which provides certainty and appropriate incentives for renewable hydrogen technologies."

## Government reports on North Sea Transition Deal progress

Marking a year since the North Sea Transition Deal was agreed, the government has published a report, highlighting its progress and further priority areas moving forwards.

Figure 5: An overview of the government's commitments to support a transition to hydrogen in the original North Sea Transition Deal

(Source: BEIS)



**Support Hydrogen RD&D**

The Government 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. The government will work with industry to align innovation objectives and maximise investments.

**Establish a revenue mechanism**

In 2021, the government will bring forward detail on preferred hydrogen business models and the revenue mechanism to stimulate private investment in new low carbon hydrogen production facilities. The government will finalise business models in 2022.

**Structure the market to allow hydrogen demand**

The government will 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. This will include a review of gas quality standards to enable the widest range of gasses to be used to decarbonise energy.

**Accelerate the hydrogen project planning process**

The government will explore ways to simplify and accelerate the planning process for hydrogen production plants.

**Continue the iron mains replacement**

The government will monitor the delivery of the iron mains replacement programme and support network businesses investment in net zero technology through RIIO2 price control period.

On 21 March, it published a report, *North Sea Transition Deal: One Year On*, where it set out how production emissions have been reduced by 11%, as well as noting progress on carbon capture and hydrogen. On carbon capture, it drew on how the active participation of the oil and gas industry in developing it is a key element of the North Sea Transition Deal. It pledged to invest in CCUS to support net zero strategy commitments to establish at least two industrial clusters by the mid-2020s and four by 2030. HyNet North West and the East Coast Cluster have since been selected for Track-1 of the cluster sequencing progress.

It further noted how the Industrial Decarbonisation and Hydrogen Revenue Support scheme will fund low carbon hydrogen and industrial carbon capture business models, while government will announce the revenue envelope for CCUS-enabled hydrogen and industrial carbon capture in 2022. This will allow contracts to be awarded for up to 1GW of CCUS-enabled hydrogen and 3MtCO2 per year of industrial carbon capture from 2023.

As for hydrogen, the Deal committed government and industry to supporting the deployment of hydrogen production capacity in the UK. The Hydrogen Strategy has since been launched, along with funding in the shape of £100mn to support heavy industry switching to low carbon fuels and the £60mn Low Carbon Hydrogen Supply 2 Competition. A Hydrogen Regulators Forum has also been established, focusing on activity needed in the 2020s to identify, prioritise and implement any changes to the existing non-economic regulatory framework to support the growth of a hydrogen economy.

Further hydrogen developments include consultations being published on the proposed design of the £240mn Net Zero Hydrogen Fund; a hydrogen business model; and UK standard for low carbon hydrogen. Hydrogen production projects are being planned through the CCUS Clusters, while under the Industrial Decarbonisation and Hydrogen Revenue Support scheme, up to £100mn will be provided to award contracts of up to 250MW of electrolytic hydrogen production capacity in 2023, with more in 2024.

Looking ahead, it identified ten priority actions to pursue, including establishing a Supply Chain Roadmap, helping sector suppliers diversify into areas including CCUS and hydrogen; enabling carbon capture projects with the Transport and Storage Regulatory investment model finalised in 2022; and enabling low-carbon hydrogen projects. A Hydrogen Sector Development Action Plan will be released in 2022, setting out how government and industry will ensure the UK has the supply chains, skills and investment to maximise the economic benefits to the UK of developing a low-carbon hydrogen economy.

**OGE and RWE outline plans for hydrogen backbone in Germany**

OGE and RWE have set out plans to ramp up the hydrogen economy in Germany as quickly as possible to as it looks to decarbonise and diversify its energy supply.

On 24 March, the pair announced plans for the jointly developed national infrastructure concept, $H_2$ercules, which will be able to cover two thirds of the hydrogen demand from German industrial centres by 2030. It will speed up the process of building a German hydrogen industry and infrastructure, connecting electrolysers, storage and import facilities in the north of the country with industrial consumers in the west and south, and with additional import routes under development in the south and east, it will allow $H_2$ercules to become the backbone of a hydrogen infrastructure that links the North Sea coast with southern Germany.

The project is set to require a €3.5bn investment, though considering most of $H_2$ercules will use converted existing natural gas pipelines, it can be implemented far quicker and more cost effectively overall than if the infrastructure had to be constructed from scratch.

RWE will construct new electrolysers with a collective capacity of up to 1GW by 2030. It will also import large volumes of hydrogen and build hydrogen ready gas-fired power stations with a capacity of at least 2GW, close to the planned $H_2$ercules route, and for its gas storage systems near the Dutch border to connect into the hydrogen pipeline. This will be key to creating flexible green backup capacities. OGE's role, meanwhile, will be to ensure green hydrogen can reach customers as it converts existing natural gas pipelines for hydrogen transport and builds new ones. A pipeline network of around 1,500km will be created, fitting into the Germany-wide hydrogen network planning.

$H_2$ercules will open up opportunities to connect Germany to major import routes, including through pipelines in Belgium and the Netherlands initially, ahead of Norway at a later stage and southern and eastern Europe. It could also connect through import terminals for green molecules in northern Germany in future, meaning the project could play a key role in establishing a European hydrogen market.

**Gigawatt scale green hydrogen floating wind sites targeted for Celtic Sea**

ERM Dolphyn and Source Energie are to develop gigawatt scale green hydrogen floating wind sites in the Celtic Sea.

Announcing the plans on 23 March, ERM detailed how the Celtic Sea offers significant opportunities for offshore energy development, in a strategic area, close to major energy demand centres. The Crown Estate is already in the process of carrying out a consultation process to identify suitable areas for offshore floating wind licenses, while Source Energie has been working to identify medium and long-term sites for development for "some time".

In linking up with ERM, the joint ambition is to capitalise on the opportunity the Celtic Sea offers and develop floating wind sites that produce green hydrogen. The first of these sites, "Dylan", is already under development with 2027-28 eyed as a target deployment date. It is situated 60km off the Pembrokeshire coast, west of Milford Haven and was chosen following a phased site selection process.

Both parties considered the location to be ideal, owed to it offering good energy generation conditions, including average wind speeds of more than 10m/s, strong expansion potential, and a number of viable low impact pipeline routes to areas of existing and growing hydrogen demand. Further expansion would see more than 2GW of energy generated, enough hydrogen to make a material impact on local and national decarbonisation targets and heat around 1mn homes, with no carbon emissions at point of use. A full-scale development would also deliver several thousand jobs and training opportunities.

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