Hydrogen East

H2 News Hub

Issue 2

H2 East

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Top stories

In the second issue of **Hydrogen East**'s Sector Review, we take a look at important publications and developments over the month of December (2020).

The government's long-awaited **Energy White Paper** was published, setting out its plans to deliver a clean energy system and support hundreds of thousands of green jobs, with kick-starting a hydrogen economy a core component of that vision.

Hydrogen East held a webinar on Suffolk Hydrogen and the Net Zero Challenge, featuring a range of speakers from Sizewell C, EDF Energy and Policy Exchange on the opportunity for hydrogen across the region and the North Sea.

The **Climate Change Committee** set out how the UK can cut emissions by 78^ compared to 1990 levels for less than 1% of GDP in its **Sixth Carbon Budget report**, with low carbon hydrogen and carbon capture and storage both heavily featured.

The Scottish government laid out its plans to become a leading "Hydrogen Nation" with the release of its **Hydrogen Policy Statement** and an accompanying Scottish Hydrogen Assessment, which suggested a Scottish hydrogen economy could be worth £25bn by 2045.

Contents

Upcoming webinars

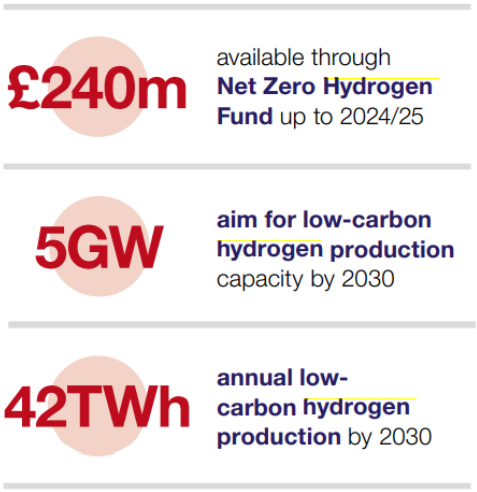
6 January – **Westminster Energy, Environment and Transport Forum:** Developing major infrastructure projects in the UK | **21 January** – **Energy Innovation Network:** Hydrogen: The Next Opportunity | **27 January** – **HyNet North West:** Unlocking a low carbon hydrogen economy

Kick-starting hydrogen economy key to UK energy vision

The government has published its long-awaited Energy White Paper, setting out its plans to deliver a clean energy system and support hundreds of thousands of green jobs.

Figure 1: Overview of the government's hydrogen pledges/targets

(Source: BEIS)



The paper, published on 14 December, builds on the Prime Minister's recent 10-point plan for a Green Industrial Revolution, sets out measures that will lead to emissions cuts of up to 230MtCO2e in power, industry and buildings, while supporting up to 220,000 jobs per year by 2030. This would include long-term roles in major infrastructure projects for power generation, carbon capture storage (CCS) and hydrogen.

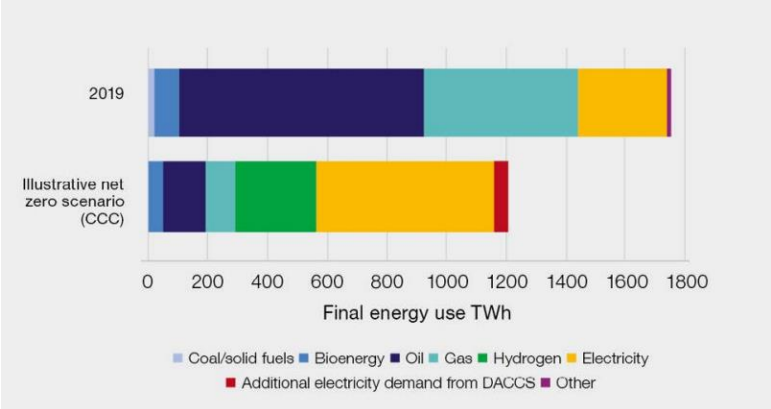
Kick-starting a hydrogen economy was highlighted as a core part of the paper, with government reiterating its desire to work with industry to deliver 5GW of hydrogen production capacity by 2030. This would be supported by a £240mn net zero Hydrogen Fund and the publication of a dedicated Hydrogen Strategy in "early 2021", while next year will also see government consult on its preferred model for a commercial framework – to be introduced in 2022 – which allows project sponsors to finance clean hydrogen projects.

Hydrogen will be among the clean alternatives the UK turns to in its shift from fossil fuels in multiple areas, including in buildings – the UK's second largest source of emissions at 19% – where, alongside improving energy performance, emissions from heating and cooling must fall.

The feasibility of using hydrogen for clean heat will require further testing and development, however, with government pledging to increase the funding available for testing and trialling projects. It stated a range of further R&D and testing projects are required, including an assessment of the options for major new hydrogen infrastructure. Government will also consult on the role of hydrogen ready appliances in 2021, continue to work with the Health and Safety Executive to enable up to 20% hydrogen blending on the network by 2023, and reaffirmed that it will work with industry to begin a

Figure 2: Illustrative UK final energy use in 2050

(Source: BEIS/CCC)



Hydrogen Neighbourhood trial by 2023, progressing to a potential Hydrogen Town by 2030.

In industry, where emissions must fall by 90% from today's levels by 2050, government is looking to establish the UK as a world leader in the deployment of CCUS and clean hydrogen, supporting up to 60,000 jobs by 2030. It signalled its ambition to capture 10Mt of carbon dioxide a year by 2030 and will invest up to £1bn to support the establishment of CCUS in four industrial clusters. Details on a revenue mechanism to bring through private sector investment in industrial carbon capture and hydrogen projects will arrive in 2021.

Figure 3: Estimated cumulative emissions savings to 2032 from the Energy White Paper

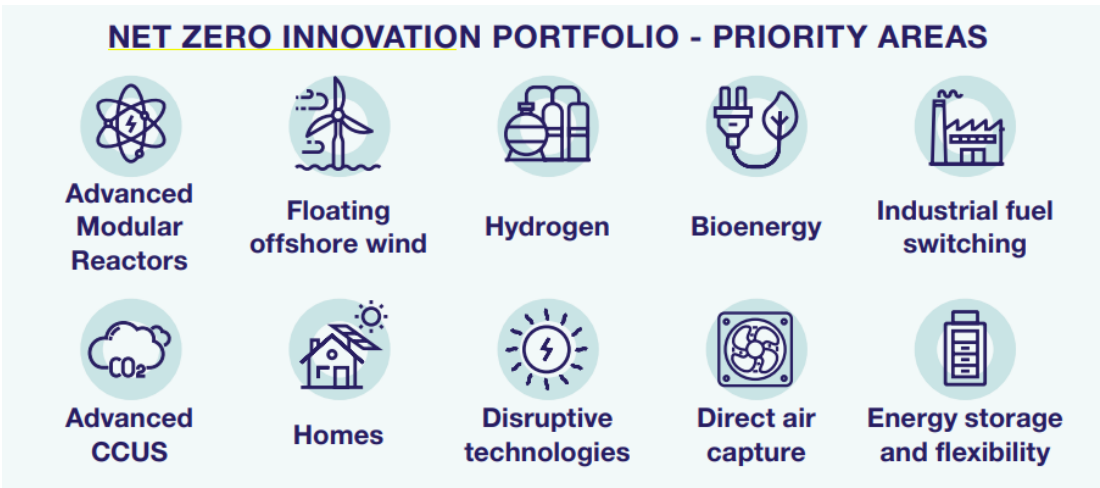
(Source: BEIS)

Delivering net zero by 2050 will also see the oil and gas sector in the UK transform, with government pledging to provide opportunities for oil and gas companies to repurpose operations away from unabated fossil fuels to abatement technologies, such as CCUS, or clean energy production, such as renewables and hydrogen. It acknowledged that the industry has the skills, technology and capital to unlock innovative solutions that could prove instrumental in delivering net zero and in 2021, with government pledging to agree a transformational North Sea Transition Deal with industry to work towards this.

Elsewhere, government will invest £1bn in a UK energy innovation programme to develop technologies of the future, such as advanced nuclear and clean hydrogen; identify and utilise synergies between hydrogen and the deployment of offshore wind; invest £20mn in 2021 for HGV freight trials pioneering hydrogen and other zero emission truck technologies; give greater consideration to decarbonising rail through battery and hydrogen on less intensively used parts of the network; and launch a £20mn Clean Maritime Demonstration Competition, supporting the UK design and development of clean maritime technology, including hydrogen.

Figure 4: An overview of the government's energy innovation programme

(Source: BEIS)



Networks ready to back hydrogen in efforts to supercharge decarbonisation

The UK's energy network operators have unveiled their #NetworksTenPointPlan for a green industrial revolution, with hydrogen among the key focus areas.

On 10 December, the Energy Networks Association (ENA) outlined how following the Prime Minister's recent 10-point plan – regarded as the "most significant policy intervention" for the energy industry in almost a decade – the energy networks will be the foundation on which it is realised. Therefore to meet net zero targets and deliver the PM's green industrial revolution, there is a need to go "further and faster" with the networks setting out how they will be "supercharging" decarbonisation.

Hydrogen will play a key role in this, with network operators already supporting electric and hydrogen buses and pledging to support more hydrogen and further electrification of public transport in all its forms, including trains powered by hydrogen. Green innovation to assess how hydrogen and further electrification can be used in shipping and aviation is underway, while projects to use excess wind to produce hydrogen are being explored.

On hydrogen specifically, the networks stressed that efforts to position the UK "at the top of the global race" must continue, with a series of green innovation projects underway, including Hy100, Hydeploy and H21. The networks added that a "hydrogen bonanza" will help a green economic recovery by creating jobs and cutting carbon emissions, ensuring the UK is able to remain a world leader in green industrial strategy. The plan also acknowledged that with blue hydrogen forecast to have a clear and important role within the UK's future energy mix, this will make carbon capture critical.

Project to explore potential for "hydrogen super-hub" in Southampton

SGN and Macquarie's Green Investment Group (GIG) are set to explore the Port of Southampton's potential as a hydrogen super-hub as part of a new project.

On 14 December, SGN outlined how the Southampton Water Project will scope the sites suitability as a centre of excellence for hydrogen production and distribution, as well as carbon capture, utilisation and storage (CCUS) and other green technologies. The main aim of the project is to support and facilitate the decarbonisation of local industry and transport, paving the foundations for the full decarbonisation of SGN's network in the south of England.

As one of six major industrial clusters identified by the government, Southampton has heavy industrial sites, one of the country's major ports, pipelines and heavy transport which, SGN said, makes it an ideal starting port for the introduction of hydrogen of the south, while a network of decommissioned gas distribution pipes in the area could provide efficient and cost-effective carbon transport as part of a CCUS solution.

With around 2.6mn tonnes of CO_2 emitted in and around Southampton each year, a scheme including CCUS technology could result in a substantial reduction in those emissions, with local hydrogen production delivering further cuts.

ScottishPower targets green hydrogen with new business

ScottishPower has created a new business division, dedicated to delivering green hydrogen.

Announced on 21 December, it will aim to help provide a green solution to high temperature industrial processes, food and drink, and heavy transport. It is now looking to work with a range of organisations, including distilleries, the steel industry, petrochemicals and ammonia users, with the first green hydrogen projects set to be announced in 2021.

ScottishPower expects that the work of its new business will make a substantial contribution to the government's target of 5GW of low carbon hydrogen production in 2030.

Hydrogen East holds Suffolk hydrogen and Net Zero webinar

On 16 December, Hydrogen East held a virtual webinar on Suffolk hydrogen and the Net Zero Challenge. A range of speakers from Sizewell C, EDF Energy and Policy Exchange presented at the event on the opportunity for hydrogen across Suffolk and the North Sea.

Nigel Cornwall, Founding Director at Hydrogen East, opened the session with a progress and policy update. He set out the ambition shown in the Prime Minister's Ten Point Plan and Energy White Paper, with plans for 5GW of hydrogen production by 2030, hydrogen for heat trials and investment into transport demonstrations across road and shipping.

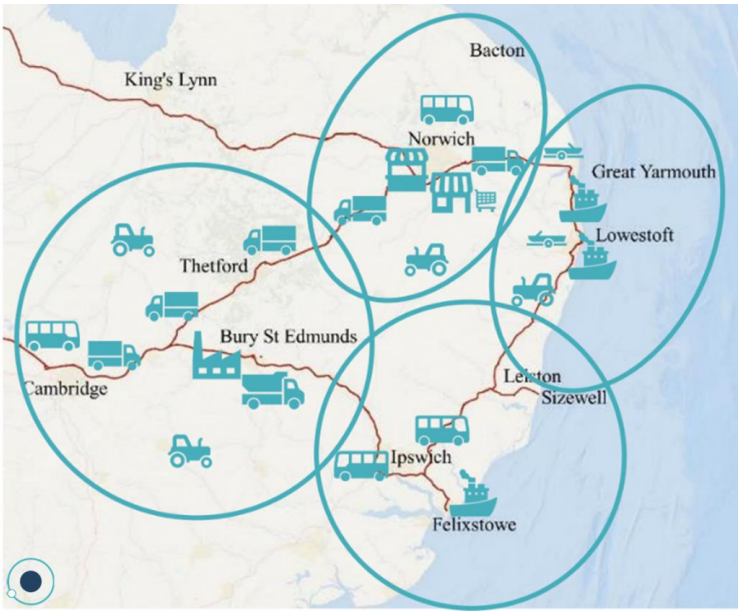
Reference was made to the Committee for Climate Change's recently published Sixth Carbon Budget which outlined targets of 90TWh of annual hydrogen production by 2035, mandating of hydrogen-ready boilers by 2025 and 250 hydrogen refuelling stations by 2040. He went on to demonstrate the integration of additional reports into Hydrogen East's plans and thinking in respect of the National Infrastructure Strategy, Net Zero North Sea, Future of the North Sea and Reimaging a Net Zero North Sea publications.

Presentation of Sizewell C's issued expressions of interest was then given by Shekhar Sumit, Programme Manager at Sizewell C. Options being explored included hydrogen production through a 2MW electrolyser in East Suffolk and a Direct Air Capture installation at the prospective Sizewell C power plant.

In respect of electrolyser development, three lots were outlined covering installation, operation and maintenance, hydrogen demand and project management. The submission deadline was confirmed as 8 January 2021.

Figure 5: East Anglia hydrogen cluster approach

(Source: Hydrogen East)



Charlotte Farmer, Analyst at Hydrogen East, went on to give an overview of its Hydrogen East's 'demand aggregation' model and associated mapping. Its model takes a bottom-up approach to identifying local demand and solutions through place-based and whole-system analysis (Figure 1). The vast application for hydrogen utilisation across East Anglia was outlined, covering

public and private road transport, agriculture, construction, rail, industrial processes, power generation, port-side operations, marine and domestic heating.

A visual demonstration of these applications across Suffolk was given by Michael Brown, Analyst at Hydrogen East. The prime opportunity at ports for hydrogen demand was flagged through a look at the confluence of the local road and rail network. Opportunity was also flagged for biohydrogen development, hydrogen grid injection, hydrogen integration with offshore wind and reducing emissions from large food and drink, waste, data and aviation centres across the region.

The webinar continued with a summary of the Future of the North Sea report from Ed Birkett, Senior Research Fellow at Policy Exchange. The report outlined the North Sea potential by 2050 and identified six key barriers to maximising this potential, including: spatial planning; environmental regulation; routes to market; investment in low-carbon networks; cross-border collaboration; and capturing economic benefits. Solutions to overcoming these barriers included creating a UK Seas Authority to coordinate marine development, introducing tailored support for hydrogen and CCS by mid-2021 and investing in coastal communities to capture Net Zero economic benefits.

An overview of Net Zero Leiston, a project drafting a Net Zero route map for a small town in East Suffolk, was given by Joseph Butler, Finance and Project Development Analyst at EDF Energy. Leiston's current emissions were found to be 12,000 tonnes of carbon dioxide per year. At the current rate of emission production, Leiston would use up its carbon budget in less than eight years. Insights from a draft version of its route map were given and showed a Net Zero target of 2030 and adoption of renewable energy technologies, hydrogen use, energy efficiency and tree planting. Its route map is expected to be released by early-2021.

A final presentation was given by Johnathan Reynolds, Managing Director at Opergy and Founding Director of Hydrogen East, on the Strength in Places funding application for the Suffolk and Norfolk Research and Innovation on the Sustainable Energy Coast (SuNRISE Coast) project. The project's three strategic themes are:

- **data integration** across the Southern North Sea (SNS) and its coast, including creation of a SNS Data Observatory
- **economic, environmentally sustainable multi-use** of the SNS, through creating business opportunities in aqua-tech and piloting co-benefit scenarios such as combining seaweed and shellfish farming, creating biodiversity havens and delivering coastal resilience, and
- **catalysing future sustainable energy technologies and infrastructure**, including coastal grid network solutions, embedding circular economy principles and seawater desalination, hydrogen production and chemical extraction.

The project will be given notification of award in April 2021, and would run for five years from September 2021.

Nigel Cornwall wrapped up the event by looking forward to the building hydrogen momentum in East Anglia and the upcoming Hydrogen Strategy. He outlined details of **Hydrogen East's next event on 2 February** covering its Bacton SNS 2.0 workstream and other energy and Net Zero transformation projects in Norfolk.

To access the event slide deck and recording, click here.

IRENA sets out green hydrogen guide to policy making

The International Renewable Energy Agency (IRENA) has published guidance to green hydrogen policy making in a bid to address some of the main barriers to uptake.

IRENA highlighted low-cost renewable electricity, ongoing technological improvements, government objectives for net zero energy systems, and the benefits of greater system flexibility as all being factors behind green hydrogen's momentum, with it emerging as a key element in achieving net zero emissions from heavy industry and transport. However, despite these advantages, there are barriers that remain and are preventing green hydrogen's full contribution to the energy transformation.

They include high production costs and a lack of dedicated infrastructure. Citing an example, IRENA noted that there are only 5,000km of hydrogen transmission pipelines in the world, compared to 3mn km for natural gas. Energy losses are another issue, with green hydrogen having energy losses at each stage of the value chain. Around 30-35% of the energy used to produce hydrogen through electrolysis currently is lost. There is also a lack of value recognition with no green hydrogen market, nor any green steel, green shipping fuel or any valuation of the low greenhouse gas emissions green hydrogen can deliver.

As green hydrogen transitions from a niche player to a widespread energy carrier, an integrated policy approach to overcome initial resistance, reach a minimum threshold for market penetration and beat barriers will be needed, IRENA explained. It identified four central pillars to guide this, beginning with the need for national hydrogen strategies, with countries told to define their level of ambition for hydrogen. It also includes the setting of policy priorities for green hydrogen, which can support a wide range of end-uses, and guarantees of origin, with carbon emissions needing to be reflect over hydrogen's whole lifecycle. Origin schemes should include clear labels for hydrogen and hydrogen products to increase consumer awareness and facilitate claims of incentives.

Green hydrogen developers join forces to drive down costs

World leaders in green hydrogen have joined forces to launch a global coalition targeted at delivering a 50-fold scale-up in green hydrogen production by 2026.

The Green Hydrogen Catapult, unveiled on 8 December, is targeting 25GW of renewable-based hydrogen deployment by 2026. The companies involved, which include ACWA Power, CWP Renewables, Envision, Iberdrola, Ørsted, Snam and Yara, will work towards this target by developing project capacity, supporting the design of specific tools to solve early market challenges, and sponsoring targeted collaboration to accelerate access to clean air, new green jobs, supply chain resilience and economic growth using green hydrogen.

Another key aim of the initiative will be to reduce costs to below $2/kg (£1.49/kg).Citing analysis from the Hydrogen Council, the $2/kg (£1.49/kg) figure was highlighted as a potential tipping point for green hydrogen, one that could see it and its derivative fuels become the energy source of choice across multiple sectors.

The founding partners will now collaborate to accelerate the necessary technology, component manufacturing and construction advancements, market development and flow of investment needed to align production and use of green hydrogen with a trajectory that displaces fossil fuels at a rate consistent with achieving net zero by 2050 and limiting global temperature increases to 1.5 ˚C. It expects investment of around $110bn will be needed, delivering over 120,000 jobs and simultaneously contributing to the Covid-19 recovery.

Government actions key to hydrogen adoption

Net zero targets cannot be achieved without green hydrogen, according to a report.

In late December, the Edison Group published a paper, *The Hydrogen Economy – Decarbonising the Final 20%*, in which it set out how while renewable power and battery storage will address sections of the transport and power sectors, gaps remain where hydrogen can fill in. This would be in hard to reach sectors, such as steelmaking, residential and commercial heating, long-distance road freight, shipping and aviation, where hydrogen's high energy to mass ratio and low losses during transportation and storage make it an ideal fit.

As it stands, neither renewable hydrogen nor fossil-based hydrogen with carbon capture are cost competitive with solely fossil-based hydrogen. Costs for renewable hydrogen are falling, though, with investment in hydrogen technology and capacity accelerating over the last year. Electrolyser costs have fallen 60% over the last 10 years and the report forecast that, in regions with cheap renewable electricity, electrolysers will be competitive with fossil-based hydrogen by 2030, with the cost of fuel cells also anticipated to fall. However, these reductions will only be realised if governments provide investment in infrastructure, R&D as well as an enabling regulatory framework to explicitly encourage hydrogen adoption and deliver the scale required to drive down costs.

Scotland targets its first hydrogen powered train

Arcola Energy is to lead a consortium tasked with delivering Scotland's first hydrogen powered train, which will be demonstrated during COP26, held in Glasgow, in November.

On 29 December, it was announced that Scottish Enterprise, Transport Scotland, and the Hydrogen Accelerator, based at the University of St Andrews, had appointed Arcola to lead a group of industry leaders in hydrogen fuel cell integration, rail engineering and functional safety in developing the train. As well as the eventual demonstration at COP26, a key objective of the project is to create opportunities for the Scottish rail supply chain through skills development and industrialisation of the technology.

Arcola will develop the technology platform for the train's new powertrain, with its existing A-Drive platform extended to meet rail safety and compliance requirements. This will allow the consortium to substantially cut development time and cost, leading to the delivery of a complete hydrogen powered solution in 10 months. Arup is among the project partners and will use learnings from the project to develop a roadmap to roll out hydrogen trains and support the decarbonisation of Scotland's rail network.

British Airways joins forces with ZeroAvia to speed switch to hydrogen aircraft

British Airways has partnered with ZeroAvia in a project to explore how hydrogen-powered aircraft can play a leading role in the future of sustainable flying.

On 12 December, British Airways explained that the collaboration will see ZeroAvia embedded in the heart of the airline, with the team working remotely alongside mentors and experts to explore the transformational possibilities of a switch to zero emission hydrogen to power the airline's future fleet.

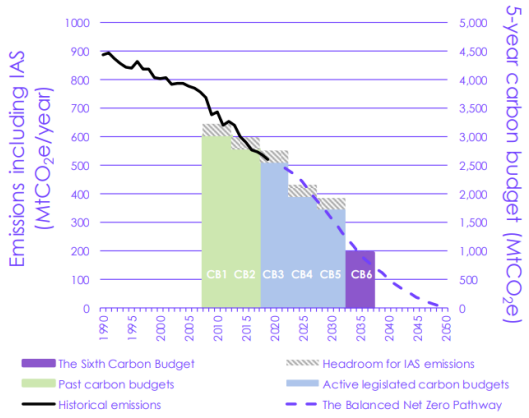
The partnership is part of British Airways' parent IAG's Hangar 51 accelerator programme, which is working with start-ups and scale-ups from around the world to provide them with an opportunity to develop and test their products on real world business challenges on a global scale. At the programme's conclusion, research and learnings from the process will be shared, with the two teams considering how the partnership should progress over a longer term basis.

CCC sets out role for hydrogen and CCS in net zero charge

In the next 15 years, the UK can cut emissions by 78% compared to 1990 levels for less than 1% of GDP, according to the government's climate advisors.

Figure 6: The recommended Sixth Carbon Budget

(Source: CCC)



On 9 December, the Climate Change Committee (CCC) published its report for the Sixth Carbon Budget (2033-2037) where it stressed the UK faces a "decisive decade" of progress and action on climate change in the 2020s. By following the CCC's recommended budget, "well over half" of the required emissions reductions to 2050 could be achieved. A major low carbon investment programme would be required, led by government, though largely funded through the private sector, reaching £50bn each year from 2030 to 2050.

It outlined four key steps, commencing with take-up of low carbon solutions as high carbon ones are phased out. This would involve all new cars, vans and boiler replacements in homes and other buildings being low-carbon in the early 2030s. Mandating of hydrogen-ready boilers is recommended from 2025, with gas boiler installations banned in new-builds from 2033 except in areas anticipated to receive gas from a 100% hydrogen grid or too expensive to electrify. Industry will use renewable electricity or hydrogen instead of fossil fuels, or capture its carbon emissions.

An expansion of low-carbon energy supplies will lead to UK electricity production becoming zero carbon by 2035 as offshore wind becomes the "backbone" of the UK energy system. By 2050, low-carbon hydrogen will have scaled up to become almost as large as electricity production is today. Hydrogen will also be used as shipping and transport fuel, in industry, and in buildings as a replacement for natural gas for heating.

The report further highlighted the importance of developing and scaling up new options for industrial decarbonisation, such as carbon capture and storage (CCS) and low-carbon hydrogen, over the next decade and mapped out a series of key outcomes and milestones to target up to 2050. Ahead of COP26 next year, a hydrogen strategy and consultation on hydrogen business models are needed, while by the end of 2022, CCUS business models need to be decided on for power, hydrogen and manufacturing and construction, with business models established for both electrification and hydrogen-use in manufacturing.

The mid-2020s will see the construction of a low-carbon hydrogen plant to demonstrate hydrogen production at scale at 1GW of capacity. By 2030, the UK would see CCS and low-carbon hydrogen across five industrial clusters, capturing and storing at least 10 MtCO2 per year and producing 30TWh a year of low-carbon hydrogen. Other targets include a commercial roll out of low-carbon ammonia and hydrogen starting in shipping, with at least one cluster and a switch to 25TWh of manufacturing energy to electricity or hydrogen, over the course of the 2030s. There would also be widespread roll out of CCS, including on energy-from-waste plants. By 2050, low-carbon electricity, hydrogen and bioenergy provide all of the UK's energy, in combination with CCS, whilst low-carbon technologies and behaviours continue to roll out at scale.

Think tank calls for managed transition for North Sea oil and gas

Following Covid-19, a think tank has called for the oil and gas industry to be reshaped to help achieve net zero and restore nature in Scotland and across the UK.

On 3 December, IPPR published a report, *Net Zero North Sea*, in which it set out the need for a "managed transition" for the oil and gas industry, which has been among those hardest hit by the pandemic. It called for a long-term plan that reduces oil and gas extraction from UK waters in the coming years; builds bridges out of the sector for workers and businesses set to be affected; and provides the right investment and support for the wider communities that will also be impacted. It recommended a net zero deal, feeding into the government's commitment to developing an oil and gas sector deal, that set targets and caps for oil and gas extraction and outlines plans for investments in new low-carbon industries.

Recommended key components of this include that the UK and Scottish governments set clear five-yearly targets to reduce oil and gas production, consumption and exports in line with net zero targets and that, where possible, local councils in affected areas are funded to purchase oil and gas assets to be transformed into community owned projects. It emphasised that the Scottish and UK governments should work with local councils to explore the repurposing of oil and gas infrastructure for technologies such as hydrogen and carbon capture and storage.

Aberdeen looks to move ahead with hydrogen hub

Aberdeen City Council is inviting expressions of interest to explore potential delivery options to achieve its ambition of a hydrogen hub in Aberdeen.

On 24 December, it released a Prior Information Notice (PIN) through Public Contracts Scotland for the Production, Supply and Distribution of Renewable Hydrogen to Aberdeen. The council is aiming on entering into a joint venture agreement, or consortium opportunity, with an investment and delivery partner, or partners, to bring forward the Aberdeen Hydrogen Hub and realise the commercial opportunity that hydrogen could provide to the city.

Through the Aberdeen Hydrogen Hub, the city would have an initial requirement to supply its bus and public sector fleets, with demand at 500kg per day. This would be projected to rise to 3.5 tonnes per day of hydrogen by 2030 to meet potential transport uses along with heat and industry applications.

Reducing electrolyser costs key to cost-competitive green hydrogen

Reducing the cost of electrolysers is key to making green hydrogen a cost competitive solution, according to the International Renewable Energy Agency (IRENA).

In late December, IRENA published a report, identifying strategies for reducing electrolyser costs through continuous innovation, performance improvements and upscaling – from megawatt to multi-gigawatt levels. Green hydrogen will prove critical as more countries pursue deep decarbonisation strategies, the report set out, especially in harder-to-abate sectors. However, alongside regulations and market design, the cost of production is proving a major barrier to uptake. Despite falling renewable costs having an impact, green hydrogen remains 2-3 times more expensive than blue hydrogen, meaning greater efforts are needed, namely by tackling the cost of electrolysis facilities – the second largest cost component of production.

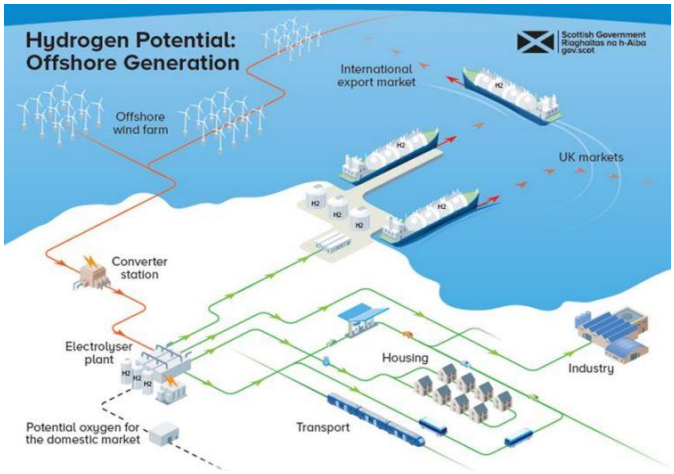
The report set out a series of strategies to reduce investment costs for electrolysis plants from 40% in the short-term to 80% in the long-term. Increased module size and innovation with increased stack manufacturing were found to have significant impacts on costs, as did increasing plant size from 1MW to 20MW, which could see costs fall by a third. Optimal designs can maximise efficiency and flexibility, while procurement of materials is also key, with scarce materials impeding electrolyser cost reduction and scale-up.

Scotland aims to be "major player" in global hydrogen market

The Scottish government has set out its vision for Scotland to become a leading "Hydrogen Nation" in the production of reliable, competitive, sustainable hydrogen.

Figure 7: Illustrative Hydrogen Export Hub

(Source: Scottish Government)



On 21 December, it published its Hydrogen Policy Statement, where it confirmed hydrogen as a key element of Scotland's decarbonisation plans, noting it had become increasingly clear that hydrogen will play a substantial part in the global shift to net zero. It also presents an economic opportunity, and considering Scotland's natural, human and physical assets, it is well placed to become a "major player" in the global market.

An accompanying Scottish Hydrogen Assessment suggested a Scottish hydrogen economy could be worth up to £25bn and support over 300,000 jobs by 2045 in the most ambitious scenario, where Scotland exports (94TWh) green hydrogen to Europe.

The Scottish government is therefore committed to supporting the strategic growth of a strong Scottish hydrogen economy as Scotland targets net zero by 2045. It will work to provide a supportive policy and regulatory environment to support hydrogen production and use, enabling Scotland to take a pioneering role in the growing global hydrogen industry. This will begin over the 2020s – devoted to demonstration, accelerating market demand and putting policy framework in place – with the Scottish government highlighting the importance of establishing low carbon hydrogen production at scale by the middle of the decade, linked to carbon capture and storage (CCS).

By 2030, the ambition is to have developed at least 5GW of renewable and low carbon hydrogen production capability, with the 2030s dedicated to production at scale. This will grow to least 25GW of renewable and low carbon hydrogen production capability by 2045, with the focus then on scaling up and global expansion, allowing production of the lowest cost green hydrogen for domestic use and export.

The Scottish government will commit £100mn in funding to development of a Scottish hydrogen economy over the next five years, with this implemented through its Hydrogen Action Plan – set for publication in early 2021. It is also committed to driving technological progress and advancing innovation through unlocking public and private funds for innovation development; supporting demonstration for key hydrogen technologies, such as fuel cells and electrolysers; and supporting the demonstration and deployment of hydrogen and its emerging role in the sustainable decarbonisation of key industry functions and processes, as well as in transport and heat in buildings.

Despite this, the Scottish government acknowledged that it cannot achieve its hydrogen ambitions alone and stressed the need to work with the UK government, with many of the regulatory and legislative levers required determined at a UK level.

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