





# Update from BEIS on hydrogen in the UK

**Low carbon hydrogen is a nascent and fast moving area of energy policy. A relatively small part of the UK Government's 2017 Clean Growth Strategy, hydrogen featured as a key pillar in the Net Zero Strategy published in October, and UK Government support for hydrogen now totals over £1billion.**

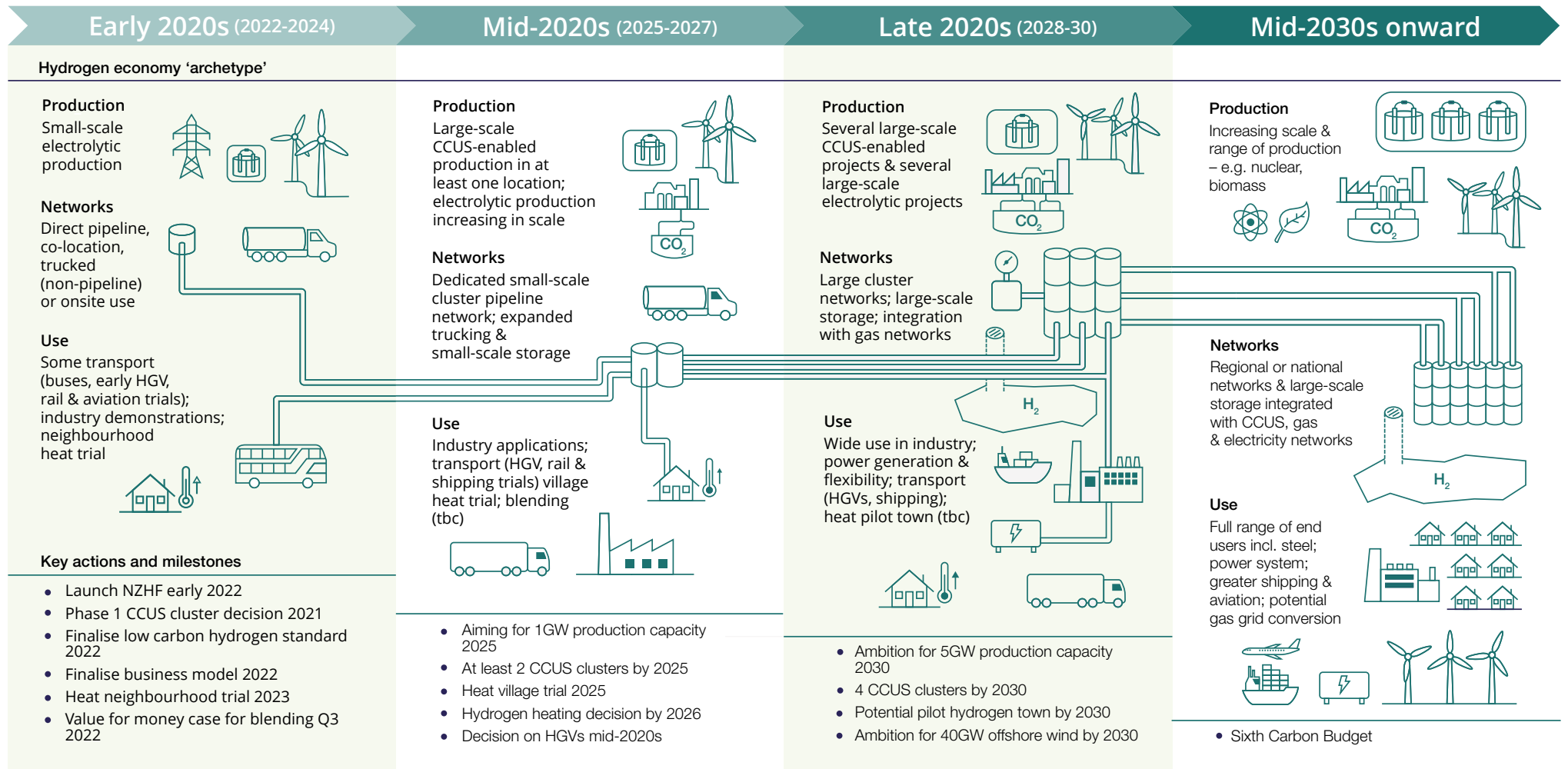
In August, the UK Government published the first ever UK Hydrogen Strategy, alongside key policy detail on its support for low carbon hydrogen production across the UK.

Laying the foundations for a hydrogen economy fit for net zero, Carbon Budget 6 and beyond, the strategy sets out how the UK is taking a 'twin track' approach to hydrogen. This means supporting a variety of production methods, including electrolytic and CCUS-enabled hydrogen, to deliver the level of hydrogen needed to meet net zero and the interim ambitions from the Prime Minister's Ten Point Plan. This includes a 5GW target for low carbon hydrogen production by 2030.

The Strategy also featured a comprehensive roadmap, co-created with industry, for the development of the wider hydrogen economy over the 2020s.

## Supporting policy and activity: what needs to be in place to deliver?





**Hydrogen Economy 2020s roadmap**



A series of consultations were launched alongside the strategy, including a consultation on a hydrogen business model to incentivise the production and use of low carbon hydrogen; a consultation on the £240m Net Zero Hydrogen to provide projects with the required financial boost for construction to begin; and a consultation on design options for a UK standard that defines 'low carbon' hydrogen. These consultations closed in October and government will publish responses in Q1 2022.

The Net Zero Strategy followed in the Autumn, setting out an economy-wide plan for how British businesses and consumers will be supported in making the transition to clean energy and green technology. This included up to £140m to establish the Industrial and Hydrogen Revenue Support scheme, which will accelerate industrial carbon capture and hydrogen, bridging the gap between industrial energy costs from gas and hydrogen and helping green hydrogen projects get off the ground.

Hydrogen also featured notably at COP26. With the launch of the Glasgow Breakthrough Agenda at the World Leader's Summit, 33 countries signed up to a Hydrogen Breakthrough goal to have affordable renewable and low carbon hydrogen globally available by 2030. The UK Government, along with international partners, also launched the Clean Hydrogen Mission discussion paper (open for public consultation until 9 December 2021), which sets out key R&I priorities and sector challenges which need to be tackled globally to increase the cost-effectiveness of clean hydrogen to the end-user.

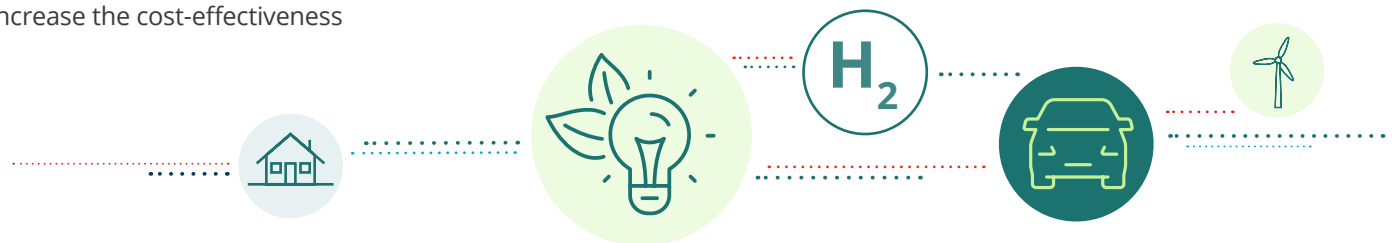
UK businesses are well positioned to take advantage of the opportunities that low carbon hydrogen presents and COP26 showcased UK leadership across the sector. Businesses from Scotland, Wales and Northern Ireland set out their stall and showcased a range of real world applications, from hydrogen powered trains, diggers and cars to domestic appliances.

Looking ahead to 2022, momentum continues as government and industry work together to implement the Hydrogen Strategy and deliver on its key commitments. This includes publishing detail on a hydrogen production strategy; a sector development action plan; the launch of the £240m Net Zero Hydrogen Fund and next steps on a Hydrogen Business Model.

The UK Government looks forward to continued collaboration with industry, and partners at home and abroad, to realise the potential of hydrogen in a net zero future.

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### BEIS Press Team





## EI-H2 exciting decarbonisation plans

**As the climate continues to change and greenhouse gas (GHG) emissions keep increasing, global warming effects become ubiquitous, pressing the need for more effective actions and further implementation of green energy technology.**

Ireland faces a challenge to decarbonise over the next decade and with that comes many opportunities and challenges. The production of hydrogen from excess wind capacity will play a significant role in Ireland's decarbonisation, given that Ireland could be generating 8 GW of offshore wind by 2030.

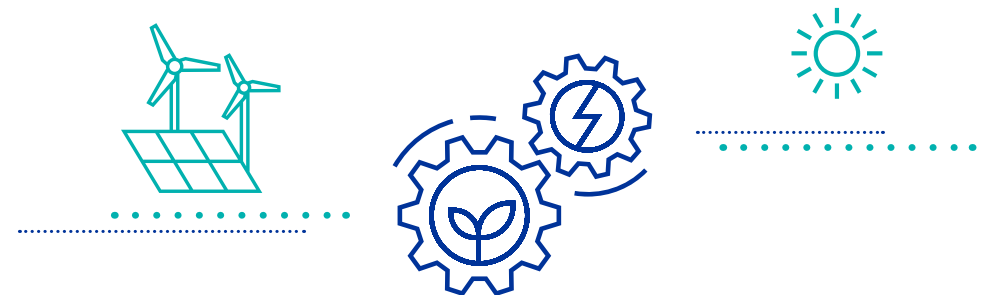
EI-H2 is working on Ireland's first Green Hydrogen facility, engaging with stakeholders and progressing environmental surveys to enable a planning application for a 50MW electrolysis plant in Aghada, County Cork. When operational, this plant will mean a reduction of 63,000 tonnes of carbon emissions annually for Ireland.

Upon completion, the site will be one of the biggest green energy facilities of its kind in the world. Over 85 full-time direct and indirect jobs will be created with a project cost expected to be in the region of €120m.

EI-H2 chose Cork's Lower Harbour for its first site given its strategic location. The facility is designed to assist commercial customers struggling to reduce their carbon output, who will increasingly need environmentally sound and sustainable energy alternatives.

The technology being planned for the Aghada site allows for surplus electricity from renewable generation, particularly offshore wind, to be utilised in a process of electrolysis to break down water into its component elements of hydrogen and oxygen. The Aghada site will aim to provide over 20 tonnes of green, safe hydrogen per day to the commercial market.

EI-H2 has also partnered with Zenith Europe in a joint venture to develop a 3.2 gigawatt (GW) green energy facility at Bantry Bay to produce green hydrogen and green ammonia. The project will involve the engagement of key stakeholders in conducting a detailed feasibility study. The new facility, when fully operational, has the potential to reduce Irish carbon emissions by 2.4 million tonnes per year, which represents the equivalent of the carbon emissions of a quarter of all Irish homes. It will operate alongside Zenith Energy's existing Bantry Bay Terminal, and will be one of the largest of its kind in the world. Ireland needs to think big to realise its green potential and this project is of the scale required to develop this new industry.





The proposed electrolysis plant site at Aghada

Pearse Flynn is the founder of EI-H2 and has said that “Ireland is on the cusp of a genuine green revolution”. He established EI-H2 with a mission to decarbonise our country and alongside his experienced team is looking to develop domestic ways of making a real difference.

There is also potential to export green hydrogen in the future using a fleet of environmentally friendly ships. By 2050, green hydrogen will account for 80% of the shipping industry’s energy demand, the vast majority of which will be in the form of green ammonia. The same product will meet an estimated 60% of the aviation sector’s energy demand.

EI-H2’s CEO, Tom Lynch, who has an extensive track record in the energy sector both in Ireland and overseas said that Ireland has incredible potential as an emerging leader in green hydrogen. Tom strongly believes that the use of green hydrogen can present Ireland with a realistic and simple way of decarbonising and meeting its Net Zero targets in a meaningful way.

The future looks bright and at EI-H2 we are looking forward to engaging with all relevant authorities and individuals as we plan a greener future.

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**Catherine Sheridan**  
Chief Operating Officer  
EI-H2



# CASE steps into the hydrogen arena

**The Centre for Advanced Sustainable Energy (CASE) is an industry lead research centre seeking to decarbonise our energy needs whilst growing our local economy. Working with researchers across Queen's University (QUB), Ulster University (UU) and Agrifood and Biosciences Institute (AFBI) and funded through the Invest NI Competence Centre programme we have invested in excess of £7 million in novel renewable energy research across the Marine, Bio Energy and Energy Systems sectors over the last decade.**

Latterly research into green hydrogen production has demonstrated an increasing potential to shift our economic growth away from the reliance on imported fossil fuels to a fully indigenous clean renewable energy mix. This view is supported at the highest political levels with the then Minister for the Economy, Diane Dodds stating that there is 'real potential for Northern Ireland to become a centre of excellence for the hydrogen economy'; a view supported by her successor Gordon Lyons.

However, the transition to different fuel systems is challenging; hydrogen is difficult to store and transport and significant investment is required for retooling our industry and developing training programmes to ensure we have the necessary skills to compete in hydrogen markets across the globe.

To help overcome these challenges CASE has recently funded a number of projects seeking to explore how green hydrogen can be safely integrated into our lives.

The following three examples are our first steps into this arena:

## 1. Breakthrough safety technologies for hydrogen vessels from Northern Ireland

An industrial collaboration of Artemis Technologies, Energia and CCP Gransden, working with researchers from UU, will develop novel technology for hydrogen storage in the marine and road transport sectors. This £200k funded project will develop a unique design utilising innovative materials that mitigate against the risk of explosion by allowing the controlled venting of hydrogen from storage tanks thus preventing the formation of explosive mixtures which history has shown can be devastating.

## 2. Developing a type IV polymer composite tank for hydrogen storage

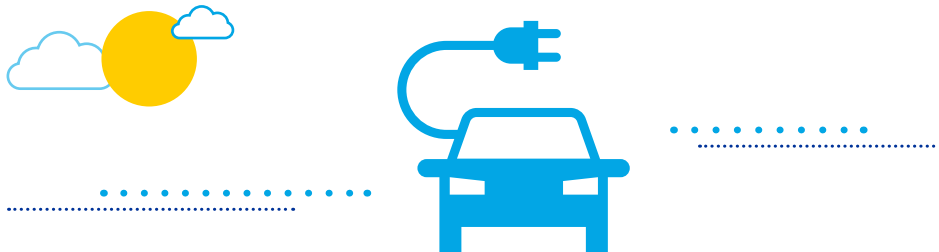
Researchers at the Polymer Processing Research Centre (PPRC) at QUB in partnership with Kingspan, B9 Energy and CCP Gransden will establish a leading design and manufacturing capability for the production of future type IV hydrogen storage vessels using £225k of CASE funding. This state-of-the-art integrated moulding process incorporating the insertion of metal fixtures and composite reinforcement to produce lightweight tanks for hydrogen transportation and storage will accelerate the development of a hydrogen economy in Northern Ireland.



### 3. Hydrogen generation infrastructure to support fuel-cell fleet

Translink has committed to delivering a Zero Carbon Metro Fleet by 2030, with the remaining fleet being Zero Carbon by 2040. The company's route to carbon reduction will involve the utilisation of Low Emissions Vehicles such as Hydrogen Fuel Cell and Battery Electric. Translink's first hydrogen fuel cell buses are powered by green hydrogen which is generated off-site, containerised and transported to the depot.

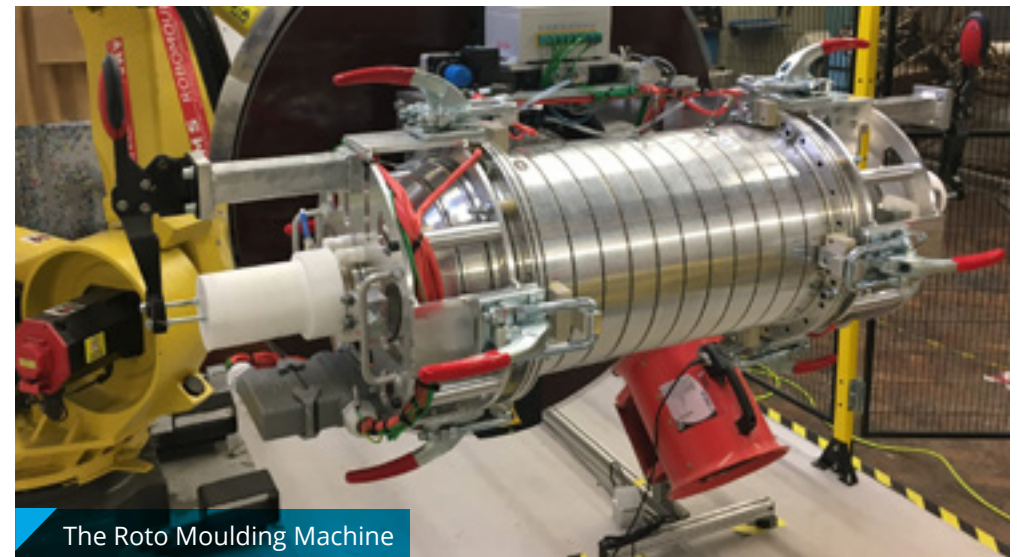
Working with project partners Firmus Energy and B9 energy and researchers at QUB this £77k project will develop a value-based framework to enable the identification and analysis of the necessary infrastructure to support the operation of hydrogen fuel cell buses and trains. This value-based framework will provide optimal cost effective solutions whilst augmenting the many co-benefits for all stakeholders. Adoption of this approach in conjunction with cost benefit analysis may expedite the high-level business case process for the implementation of the various methods of hydrogen generation, storage, procurement and route logistics.



CASE understands that the road to future success in decarbonising our lives and economy will only be achieved by effective collaboration across all sectors and we will continue to collaborate with other research organisations, new industrial sectors, government and the wider civil society in pursuit of this goal.

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**By Martin Doherty**  
Centre Manager,  
CASE



The Roto Moulding Machine





# Future Hydrogen Economy Supports feature in i4C Centre Plans for Mid and East Antrim

**Mid and East Antrim Borough Council is currently progressing plans for the i4C Innovation and Cleantech Centre - a major project co-funded through the Belfast Region City Deal that will help support the Borough's position as a choice location for businesses operating in cleantech and the hydrogen economy.**

Increasing the level of innovation activity is key to underpinning the future of economic growth in the Borough in the post-Covid recovery period. In this regard, innovation in the field of clean or green technology (cleantech/ greentech) offers an opportunity for local businesses as the UK moves towards net zero. The need to create solutions for environmental and climate change challenges was emphasised at the recent COP 26 conference in Glasgow.

The i4C proposal involves the construction of a new hub building at the Saint Patrick's Barracks

regeneration site located adjacent to the Northern Regional College (NRC) campus in Ballymena, County Antrim. The centre - scheduled to open in 2026 - includes for a range of accommodation types, from SME incubation space, to Grade A office and co-working space, as well as meeting and event spaces designed to encourage open innovation and collaboration.

A key sub component of the i4C proposal is the iLAB workshop (Innovation Laboratory) that will focus on SME R&D and commercialisation and skills training activity. This staffed workshop includes a fully equipped industry makerspace, a digital ICT AR/VR suite, and a cleantech demonstration and training suite. It will provide a platform to enable low-cost access and support to local businesses and entrepreneurs to develop, test and commercialise their ideas using the latest technology, with an emphasis on their innovation journey and practical training needs.

The supports at i4C and the iLAB will ultimately lead to growth in higher value jobs in key sectors such as energy, renewables and the hydrogen economy.



i4C Building Concept,  
Kennedy Fitzgerald architects



i4C will be managed by a delivery partner with specialisms in innovation and cleantech and will bring other providers and expertise into the i4C ecosystem including education sector partners like Northern Regional College (NRC) and the universities or other competency or catapult centres. Likewise, it will allow for a series of collaborations such as via the GENCOMM hydrogen project partnership managed by Belfast Metropolitan College or with industry partners such as EPUK, Wrightbus and others to develop test-beds and prototypes.



From left: Mr Graham Whitehurst, MTF Chair, Mayor of Mid and East Antrim, Councillor William Mc Caughey and Mr Neil Collins, MD, Wrightbus.

The opening of the i4C centre in 2026 is some time away hence Council has set its ambition to establish and scale up the iLAB and hydrogen economy offerings in advance of this.

The first major milestone will be the launch of the Hydrogen Training Academy (HTA) pilot phase in early 2022 that will eventually become a mainstay in the iLAB training offer from 2023 onward.

This HTA represents a £700,000 project led by Council, and driven by a public-private partnership including NRC, Belfast Met, Queen’s University Belfast (QUB), Ulster University (UU) and the University of Birmingham (UB). The HTA project was recently awarded £511k funding from UK Government’s Communities Renewal Fund and will deliver a range of crucial entry-level training for industry sectors, such as energy, transport, gas, manufacturing and engineering.

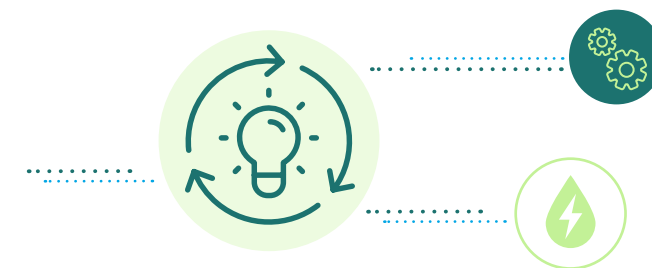
The HTA pilot phase will see 30 participants take part in a ‘Train the Trainer’ course, delivered by academics from UB and their accredited ‘KnowHy Training’ provision. NRC and Belfast MET will draw upon the learning from this phase to develop and accredit two Level 3 courses for delivery to young people and employees across the hydrogen industry. Similarly,

QUB and UU will also collaborate to develop a Level 7 postgraduate certificate in Hydrogen Power and UU will significantly increase its provision on two of its Hydrogen CPD courses.

Ultimately the collaborative nature and scale-up focus of the HTA, iLAB and i4C will mean Council and its partners will be in an ideal position to seize economic opportunities in the clean and green economy through provision of support for skills training and education and provide an inclusive resource to benefit all in Northern Ireland.

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**By Frank Mc Grogan**  
 Strategic Project Officer  
 Mid and East Antrim Council





# Belfast Met TQ Campus – final stop on the Planet Mark Zero Carbon Tour of Northern Ireland

**Belfast Met TQ campus was one of the locations for a recent Planet Mark UK wide tour set up to illustrate the actions the business community are taking to address the climate crisis. The Planet Mark team of experts are on a mission to build a sustainable, brighter future for us and the planet. People who engaged with the tour left with an understanding what net zero carbon means, why it is important and how organisations can align with net zero targets. On the week long tour of Northern Ireland, (September 27-October 1), the zero carbon Planet Mark battle bus stopped off at various key locations highlighting key NI projects, companies and initiatives as part of their quest to cut carbon emissions by 50% by 2030.**

Organisations were told they can reduce carbon to help them become more competitive and reduce waste for instance. The Planet Mark team help organisations with what they can do around sustainability, ie: choice of

vehicles, and how they package food. The aim of the tour was to collect zero carbon stories from around the UK including Northern Ireland and then proceed to tell the stories to leaders at COP 26, the UN Climate Change conference from November 1-12, 2021 in Glasgow.

On Monday 27 September the Planet Mark team visited Translink Milewater Service Centre at Milewater Road, Belfast. This is the site of the first new hydrogen refuelling station in Northern Ireland.

Later on Monday a number of interviews were carried out at the Salthouse Eco-hotel in Ballycastle including with Michael Cecil, Chair of the Rathlin Community and Development Association who highlighted their community innovation showcase solutions for GreenH2 as the catalyst for sustainable tourism 360° Destination Green©

On Tuesday September 28 the team stopped off at the Wrightbus factory in Ballymena. Neil Collins, MD of Wrightbus was interviewed about their hydrogen bus production.

As part of the innovative Green Hydrogen production a case study on the GenComm project was conducted with Programme Manager Paul McCormack.

Following a visit on the 29th to the Guildhall in Derry city and on the 30th to Stormont Parliament buildings, the final stop on the tour On Friday October 1st was at the Belfast Metropolitan College TQ campus to capture the leading role Further Education is playing in the global hydrogen revolution



From left Chris Corken, Head of Dept, Science, Engineering and Construction, Belfast Met, Louise Warde Hunter, Belfast Met Principal and CEO and Andrew Griffiths, Director of Community and Partnerships, Planet Mark team



Commenting on the visit of the Planet Mark team and the zero carbon bus Belfast Met Principal and Chief Executive Louise Warde Hunter stated: *'This week long awareness event is very welcome to help explain and demonstrate what zero carbon actually means. Through our ground breaking work including leadership of the European wide GenComm project we have developed new and specialised industrial links in the hydrogen economy as part of our journey to net zero. Our work with industry, public authorities and other partners is helping create a hydrogen economy for Northern Ireland, creating environmental, commercial and economic advantage.'*

Chris Corken, Head of Department of Science, Engineering and Construction, Belfast Met stated: *'Our GenComm programme aims to develop a sustainable energy matrix for the North West Europe region by creating three renewable hydrogen facilities across Europe. We want to empower communities to implement hydrogen based energy matrixes to sustainably satisfy their energy demands. We would like to thank the Planet Mark team for this opportunity to highlight our success as we look forward to sharing this also with world leaders at COP26.'*



The Planet Mark Zero Emissions team with members of the GenComm Steering Committee at Belfast Met TQ campus



## Companies Hydrogen Pledge welcomed at COP26



**The World Business Council for Sustainable Development (WBCSD) and the Sustainable Markets Initiative (SMI) announced on Industry Day at COP26, November 9 the pledges of 28 companies to drive growth in the demand for, and supply of, hydrogen.**

This new initiative, comprising of these companies – H2Zero – will accelerate the use and production of hydrogen as an essential part of the future net-zero energy system.

Pledges across three categories – demand, supply and financial or technical support – have been made by 28 companies representing different sectors from mining to energy, vehicle and equipment manufacturers, and financial services.

The Hydrogen Council estimates that in 2030, the decarbonisation potential for hydrogen could equate approximately 800 million tonnes per annum (mtpa) of carbon dioxide (CO<sub>2</sub>) emissions avoided. The pledges announced on November 9 equate to nearly one quarter of this total.

On the demand side, the pledges – which total 1.6 mtpa of lower-carbon intensity hydrogen – focus on replacing grey hydrogen, currently used widely in the refining, chemical and fertilizer sectors, or diesel fuel used in heavy industries such as mining. This would reduce carbon dioxide emissions by more than 14 million tons a year – the equivalent to the annual emissions of more than six million cars in Europe.

On the supply side, the pledges add up to more than 18 mtpa of lower-carbon hydrogen. This would avoid about 190 million tons a year of CO<sub>2</sub> emissions, if it replaces grey hydrogen, natural gas for industrial heat and petroleum fuels in transportation. This would be the equivalent of nearly the combined annual emissions of The Netherlands and Tunisia.





*“The uncertainty over supply and the lack of commitment for demand are two challenges associated with the development of hydrogen as part of the global energy system,”* said Ben Van Beurden, Chief Executive Officer of Shell and Chair of the Hydrogen Taskforce at SMI. He continued: *“We brought companies together to tackle this status quo and send a strong signal to markets and governments for hydrogen to reach its full potential.”*

Claire O Neill, Senior Advisor at WBCSD and former COP26 President Designate said: *“Our hope is that these combined pledges spark investments in supply and inspire other users to transition to hydrogen. To further accelerate the development of the hydrogen market, we are encouraging more companies to join this effort and make pledges. We stand ready to work with any company from any sector who is interested in driving progress towards a net-zero, nature positive and equitable future for 9+ billion people to live, within planetary boundaries, by 2050.”*

Transforming the global energy system will require unprecedented collaboration between the private and public sectors. Policymakers are required to create a stable investment framework that will accelerate the deployment of clean hydrogen, creating numerous opportunities for employment and economic development.

SMI recently published policy recommendations to accelerate the adoption of hydrogen fuel cells specifically for transportation, while WBCSD recently published a set of policy recommendations to accelerate the deployment of hydrogen with the lowest possible carbon intensity. The deployment and rapid scaling up of hydrogen will be crucial to helping countries and businesses alike meet their net-zero emissions commitments by 2050.





## For more information

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