SEAFUEL

Sustainable integration of renewable fuels in local transportation

WP 6
Northern Ireland Hydrogen Sustainable Energy and Climate action Plan (SECAP)

Project Details

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Deliverable Details

Component	
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Title of Deliverable	
Partner Responsible	
Partners Involved	
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Dissemination level – Confidentiality

PU	Public, to be freely disseminated, e.g. via the project website	**X**
CO	Confidential, only for members of the consortium including the Commission/EACI Services	

H_2 Sustainable Energy and Climate Action Plan – Northern Ireland

Introduction

Since the mid-2000s, the UK has been revolutionising its energy systems. Coal, oil and gas had been a staple of the country's energy portfolio since the 1960s but a shift in mindset led to coal's market share dwindling from 30% in 1990, to less than 5% in 2019 – achieving a 67 day coal-free period in 2020 - over two months of no coal-fired power generation for the first time in 138 years. Coupling this with large deployments of renewable energy capacity (primarily wind and solar), as well as the roll out of wider energy efficiency initiatives, renewables now make up 43% of the UK's domestic power generation (2020) – accounting for more electricity generation than fossil fuels for the year.

In terms of hydrogen, the UK had been slow in coming forward with an integrated future energy plan. Whilst major European economies, such as France, Germany and the EU, were committing billions in funding towards greening their economies, the UK was seemingly silent until November of 2020 when they announced their 10 Point Plan for a Green Industrial Revolution – designed to help the country recover from COVID-19 related issues as well as supporting green growth and progress towards a net-zero economy. The plan includes targets such as the deployment of 40GW offshore wind and 5GW of low-carbon production by 2030. The UK's supply focus for this hydrogen, confirmed by the release of an official strategy in August 2021, will be initially via deployment of blue hydrogen production technologies – seen as an ideal to achieve large-scale low-carbon hydrogen quickly – and utilised in industrial clusters, such as those exist in the North East and North West of the country.

Northern Ireland (NI) has seen considerable ramp-up in deployed renewables over recent years, particularly wind energy, which now accounts for almost half of the country's electricity consumption. NI is also starting to see the deployment of fledgling hydrogen projects, including hydrogen bus projects, and MW scale electrolysis projects. However, a lack of industry based within the region, compared to the rest of Britain, has left NI down the UK's priority list for hydrogen deployment. Through the creation of a roadmap for the region, the SEAFUEL project is helping the NI to realise its hydrogen potential and has provided an assessment of local energy matrices and their hydrogen readiness in order to produce a set of recommendations designed for policy makers. This document represents a complementary summary of suggested actions complete with respective timeframes.

Should more information be required please see the complimentary document entitled 'Hydrogen Roadmap – Opportunities for Northern Ireland'. If or the roadmaps for other SEAFUEL regions - South West England, Tenerife, West of Ireland and Madeira.

Actions

The SEAFUEL Project has collected a group of hydrogen focused policies and actions organised into eight areas.

1 – Hydrogen production
2 – Storage, transport and distribution
3 – Decarbonisation of transport
4 – Decarbonization of Industry
5 – Decarbonisation of electricity and heat production
6 – Synthetic fuels and other uses
7 – Employment, requalification and vocational training
8 – Cross-cutting actions

Besides the general actions separated into the above sections, and given the West of Ireland roadmapping activities undertaken, SEAFUEL has produced a set of specific local hydrogen actions for the region, developed according to its specific geographic and economic

Action	**Implementation period**
Promote the production of a hydrogen strategy for Northern Ireland with a focus on the region's resource strength.	2022-2023
Introduce hydrogen produced from intermittent renewable sources energy supply and applications, contributing to the replacement of fossil fuels, and to national targets for the incorporation of green hydrogen into the wider energy sector, whilst simultaneously improving energy efficiency.	2025-2050
Promote pilot projects for the installation of a network of green hydrogen refuelling points produced from renewable sources. Including the establishment of a hydrogen highway along both the east and west coast of Ireland.	2022-2050
Promote and support the creation of infrastructure for the supply of cleaner energies to ships, including electricity in ports (cold ironing), green hydrogen and green shipping. Improving the energy efficiency and emissions of maritime transport (passengers and goods) and diversification of energy sources.	2022-2050
Use learnings from other UK-based projects to investigate the potential to inject hydrogen into the natural gas grid in blends or dedicated pipelines.	2022-2035
Promote the production of hydrogen from renewable energy sources to address the energy dependency issues and large-scale fuel poverty seen within the region.	2022-2050
Promote the training of technicians and specialists to respond to market needs in the fields of decarbonization, including computational modelling, AI, *big data analysis,* renewable energy, energy efficiency, service digitization, intelligent energy management systems, intelligent power grids, advanced biofuels, green hydrogen, electric mobility, sustainable construction, NZEB buildings, sustainable agriculture, irrigation systems, eco-driving and fleet management. This training should involve leading academic centres of excellence based within the region such as Belfast Met University.	2022-2050
Promote cooperation with other regions and energy projects on a community, regional and national level. As well as participation in R&D programmes in the fields of low-carbon economy, energy efficiency, renewable energy, storage, green hydrogen, advanced biofuels, renewable	2022-2030

fuels, smart grids, agroforestry management, industry and other innovation-oriented research areas and sustainability.	
Promote increases in installed hydrogen production capacity to enable larger renewable energy deployments by acting as an energy storage mechanism in the long-term.	2022-2050
Investigate the potential for Northern Ireland to take on a hydrogen exporting position by oversizing production capacity due to considerable local resources.	2022-2050
Promote continued participation with other island-based hydrogen projects being undertaken within the EU for islands in the region with the view to share best practices and implement similar technologies.	2022-2050
Actively participate within public discussions surrounding the development of a whole-island hydrogen economy and encourage the deployment of congruent policy measures on both sides of the Irish border.	2022-2050
Promote the use of H_2 in heavy vehicles and ships to decarbonise the land and sea transport sector. Particularly heavy goods vehicles between Northern Ireland and Republic of Ireland and trains between Belfast and Dublin.	2022-2030
Use of wastewater, domestic and industrial, for hydrogen production.	2022-2050
Continue to develop relevant components of the hydrogen value chain locally with the support of highly qualified industry and research personnel.	2022-2030

1- Hydrogen production

Action	**Implementation period**
Approve the necessary procedures for the licensing of hydrogen production installations given different configurations, including a simplified licensing mechanism for hydrogen production facilities when directly associated with an existing renewable electricity production centre.	2022-2024
Maintain a system of guarantees of origin for hydrogen.	2022-2023
Introduce regulation to support and expand the provision of flexibility in both location and operation of the electrolyser within the energy network.	2022
Maintain and enhance hydrogen production associated with solar and wind power plants, evaluating the implementation of a process replacement of *feed-in tariffs* by incentives for hydrogen production and/or use, where it applies.	2020 onwards
Promote and support the production of hydrogen associated with wastewater treatment facilities. Optimisation of the water quality used in electrolysis to enable and maximise the use of wastewater. Develop applications and business models for water ejected from the electrolysis process.	2022-2026
Promote the adaptation of existing licensing procedures – environmental, water, industrial, municipal resources – enabling the implementation of hydrogen production projects.	2022-2024
Survey and map the potential for distributed deployment of electrolysers identifying the sites with greater potential.	2022
Design support for the development of new hydrogen production projects, fostering the emergence of new innovative technologies.	2020-2027
Promote and encourage hydrogen production, combining centralised industrial-scale projects and decentralised opportunities, of varying size, associated with the different sectors.	2020-2030
Implement further hydrogen support mechanisms, including for the sale of hydrogen, to create an incentive for hydrogen production without increasing energy costs paid by consumers.	2021-2030
Study and adopt tax benefits or positive discrimination for green hydrogen.	2022-2030
Promote hydrogen production associated with renewable energy communities.	2022-2030
Promote greater interdependence between electrical and natural gas systems, in a coupling sector logic, planning ever-increasing integrated system investments.	2022-2030
Encourage and support R&D of electrolysis by promoting the improvement of income and expansion of production capacity, promoting synergies between academia and the business community to enhance its production on an industrial scale.	2022-2030

2- STORAGE, TRANSPORT AND DISTRIBUTION

Action	**Implementation period**
Regulate hydrogen injection into natural gas networks, including the identification of potential injection points.	2022-23
Promote hydrogen injection into natural gas networks by establishing mandatory incorporation targets.	2022-23
Foster demonstration projects that allow best practices surrounding hydrogen gas grid blending to be shared openly, whilst simultaneously developing a regulatory *sandbox.*	2022-2025
Carry out a comprehensive survey and characterisation to identify investment need of the natural gas network to achieve the levels of safety and reliability required to enable injection of hydrogen.	2022-2025
Promoting the adaptation of existing planning and investment instruments for transport and distribution networks to include hydrogen.	2022-2030
Develop methodologies for testing, regulating and inspection of hydrogen equipment, components and systems for transport, distribution and storage. As well as necessary safety standards such as leak research methodologies, leak verification, tightness and security.	2022-2025
Foster and support the development of measurement systems that will allow accurate indication of flows and volumes for different concentrations of gas mixtures in the networks. Promote synergies between the academic and the private sector with a view to production on an industrial scale.	2022-2025
Promote hydrogen storage solutions, including large-scale underground storage, through the assessment of their potential and any associated structural conditions of identified storage locations.	2022-2030
Promote the use of hydrogen as an energy storage mechanism, including by injection into the gas networks.	2022-2030
Ensure active participation at CEN *(European Committee for Standardization*) in the main committees on hydrogen.	2022-2030
Design targeted calls to support the development of new hydrogen storage and pipeline transmission projects, fostering the emergence of new innovative technologies.	2022-2027

3- DECARBONIZATION OF TRANSPORT

Action	**Implementation period**
Continue to adapt current regulations to enable an efficient rollout of hydrogen mobility into the transport sector.	2022-2024
Provide clear and concise regulations regarding the installation of hydrogen refuelling stations, featuring both off-site and on-site hydrogen production.	2022-2023
Promote and support the implementation of hydrogen mobility, and associated infrastructure, for return-to-base fleets and public service/transport fleets.	2022-2030
Promote the use of green hydrogen in public transport fleets and road transport by encouraging replacement of existing vehicles with hydrogen alternatives, as well as establishing a minimum hydrogen obligation.	2022-2030
Promote the use of green hydrogen in taxi fleets, privately owned fleets, and businesses of shared mobility.	2022-2030
Boost the transport and component industry by promoting and incentivising the use of local technology and products enabling the adoption of hydrogen mobility and the conversion of vehicles.	2022-2030
Continue participation in standardisation discussions relating to hydrogen mobility and refuelling infrastructure on a regional, national and continental level.	2022-2050
Promote studies on public perception, impact on employment, health and safety and regional/local development.	2022-2023
Design targeted calls to support the development of new projects for the decarbonisation of transport, fostering the emergence of new innovative technologies.	2022-2027

4- DECARBONIZATION OF INDUSTRY

Action	**Implementation period**
Promote and encourage the replacement of natural gas and fossil fuel-based feedstocks with green hydrogen and green feedstocks (e.g. green steel).	2022-2030
Continue to adapt current regulations to enable the rollout of hydrogen production, storage and supply systems co-located with industrial applications.	2022-2023
Define safety standards and regulations for hydrogen related equipment on an industrial scale (Production, storage, and distribution).	2022-2023
Promote the decarbonisation of cogeneration using natural gas replacing with, renewable alternatives, including hydrogen.	2022-2030
Support the implementation of industrial-scale pilot projects for the introduction of blue/green hydrogen in the various subsectors(refining, chemical, metallurgical, cement, mining, etc.), contributing to the total decarbonisation of this sector.	2022-2030
Promote and support the repurposing/replacement of existing infrastructure to enable the use of alternative hydrogen-based production processes.	2022-2030
Promote and support local production of green hydrogen through the reuse of wastewater.	2022-2030
Investigate and encourage the implementation of local hydrogen production projects involving the capture and use of CO_2 in industrial processes.	2022-2030
Encourage R&D activities for the development and demonstration of 100% hydrogen-based heat production technologies for industrial applications.	2022-2025
Design calls targeted at supporting the development of new projects for the decarbonisation of the industry through hydrogen, fostering the emergence of new innovative technologies.	2022-2027

5- DECARBONIZATION OF ELECTRICITY AND HEAT PRODUCTION

Action	**Implementation period**
Promote the use of hydrogen for energy production (electricity and heat), hydrogen for powering buildings, and community energy schemes.	2022-2030
Explore and take advantage of the energy storage potential of hydrogen in a complementarity relationship between sectors.	2022-2030
Continue to adapt current regulations to enable the use of hydrogen for combined electricity production and heat in industry, buildings and energy communities.	2022-2023
Promote the decarbonisation of natural gas plants in a gradual and sustained way with a view to their total decarbonisation by 2050. This should incorporate minimum hydrogen obligations.	2022-2050
Perform preliminary analysis on the adequacy needs of household equipment that enable the integration of hydrogen according to the defined hydrogen injection targets in the networks. (e.g. heating, boilers, fuel cells)	2022-2025
Promote the replacement or repurposing of equipment which could lead to the integration of higher levels of hydrogen.	2022-2050
Promote demonstration projects for fuel cells within buildings (for the combined production of electricity and heat), including conducting public perception studies and tests on the use of equipment by consumers.	2022-2025
Encourage R&D in the level of electricity production and at the level of production electricity decentralised by cogeneration in batteries high-temperature fuel, using green hydrogen produced and stored locally.	2022-2030
Design targeted calls to support the development of new decarbonisation projects for electricity and heat production; promoting of the emergence of new innovative technologies.	2022-2027
Encourage the implementation of 100 % renewable city pilot projects, where hydrogen emerges as a complementary solution for total decarbonisation energy consumption.	2022-2030
Include hydrogen as a potential option when assessing the level of security of supply assessments national energy system (electricity and natural gas).	2022-2030

6- SYNTHETIC FUELS AND OTHER USES

Action	Implementation period
Promote and encourage the production of synthetic fuels (liquid or gaseous) based on green hydrogen, including the capture, storage and use of CO_2.	2022-2030
Define safety standards and regulations to produce synthetic fuels from green hydrogen.	2022-20230
Promote the use of hydrogen in the production of advanced biofuels from various waste feedstocks.	2022-2030
Carry out a foresight assessment of synthetic fuel production potential from hydrogen, in addition to other forms of energy, and how they can contribute to the decarbonisation of the economy - particularly in sectors with fewer options (e.g., aviation), identifying potential projects to be implemented in the coming years.	2022-2025
Encourage R&D activities in the production of new synthetic fuels with green hydrogen as a feedstock, including the capture, storage and use of CO_2.	2022-2030
Design targeted calls to support the development of new hydrogen derived fuel production projects fostering the emergence of innovative new technologies.	2022-2027

7- EMPLOYMENT, REQUALIFICATION AND VOCATIONAL TRAINING

Action	Implementation period
Identify skills gaps required to meet the needs of emerging hydrogen markets.	2022-2023
Promote the skills mapping needs for various jobs and different aspects of the use and application of hydrogen.	2022-2024
Promote alignment and strengthening of school education to deliver future resources for different production technologies and the wider hydrogen value chain.	2022-2024
Using the sector skills- and person-gap information generated, produce studies with academic institutions on how available re-training/re-skilling could affect employment figures.	2022-2024
Launch a strategic energy transition vocational training plan, including specific modules relating to hydrogen, also aligned with other decarbonisation strategies.	2022-2025
Establish a collaborative vocational training network for the energy transition and renewable energies. Also, consider the establishment of a regional centre of excellence in these fields.	2022-2025
Update education courses and the qualifications available to reflect new sector and industrial needs.	2022-2025
Disseminate and promote the attractiveness of vocational training in the areas of implementation of the different technologies and value chains of hydrogen.	2022-2030

8- CROSS-CUTTING ACTIONS

Action	**Implementation period**
Implement R&D activity around the components of the hydrogen value chain.	2022-2025
Promote hydrogen life-cycle assessment studies for various production pathways, including environmental, social and economic impacts.	2022-2024
Promote the realisation and implementation of projects for evaluation, design, and development of new business models (value chain: production-distribution-consumption).	2022-2025
Boost international cooperation around hydrogen, through memoranda of understanding and other forms of cooperation.	2022-2030
Ensure participation in the main national, European, and international forums around hydrogen, including the European Clean Hydrogen Alliance, Hydrogen Energy Ministerial and the Clean Energy Ministerial.	2022-2030
Encourage the participation of regional and national companies and institutions in forums and relevant initiatives in the field of hydrogen at the national, European and international level.	2022-2025
Stimulate the growth of new industries and companies that develop components of the hydrogen supply and use chain value.	2022-2030
Stimulate the replacement of carbon-intensive activities with, lower emission, hydrogen alternatives in applicable sectors.	2022-2030
Develop materials and guidelines for training purposes on procedures related to the production, handling, transport, and use of hydrogen in the various sectors.	2022-2030
Promote, collaborate, and support the development of new skills and qualifications related to the production, handling, transportation, and use of hydrogen in the various sectors.	2022-2030


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