

THE GREEN ECONOMY



SAM KNOX

INVEST NI



Hydrogen - The Past, Present and Future

The Past



Biomass Wood Chip



Pellet Boilers



Solar PV



Onshore Wind



Offshore Wind



Hydrogen production and storage

The Present - Policies, Key Targets and Market Drivers

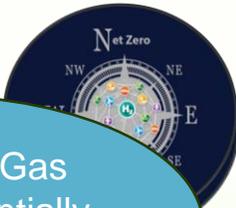


The Present- Market Drivers



- Carbon Reduction Roadmaps required for Government Tenders over £5m
- Large companies are required to submit Scope 3 reporting to government
- All businesses on large company supply chains to report Scope 1 and Scope 2 Emissions
- Future fuels – Shipping
- Security of Supply
- Drive towards the Net Zero economy

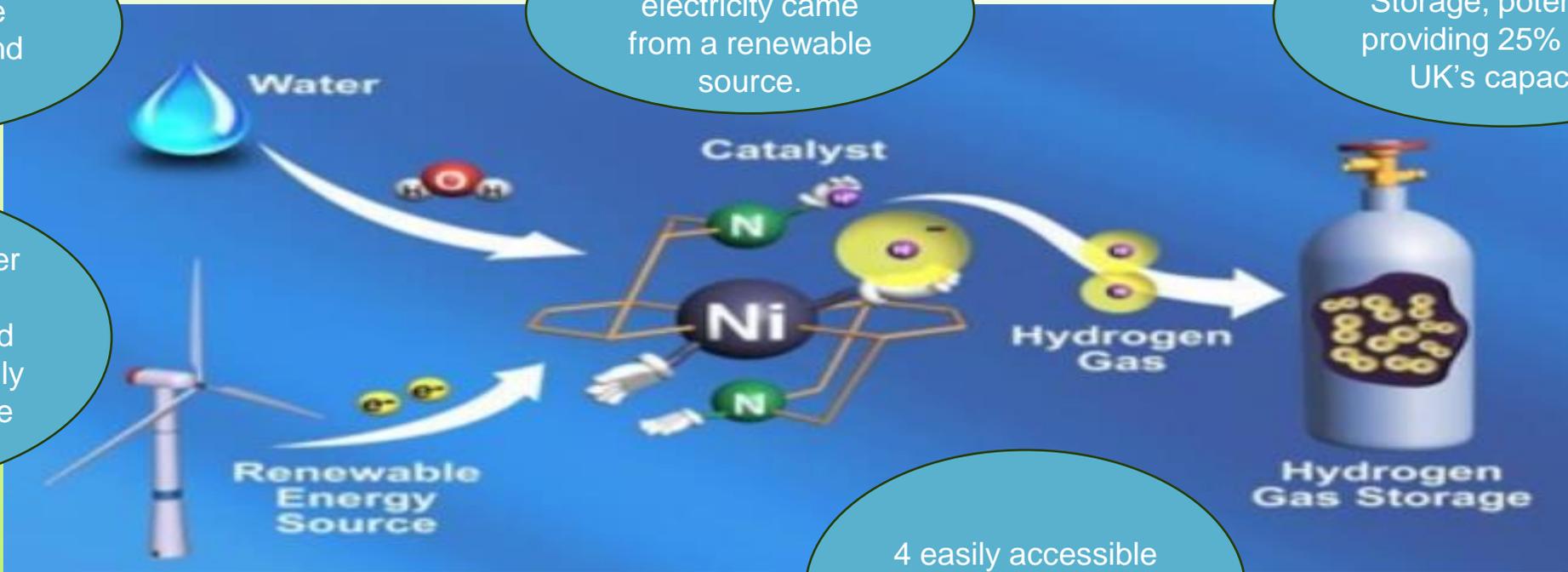
The Present - NI's potential to develop the Hydrogen Economy



Natural resources of **water** available from underground aquifers

In 2022, 51% of all electricity came from a renewable source.

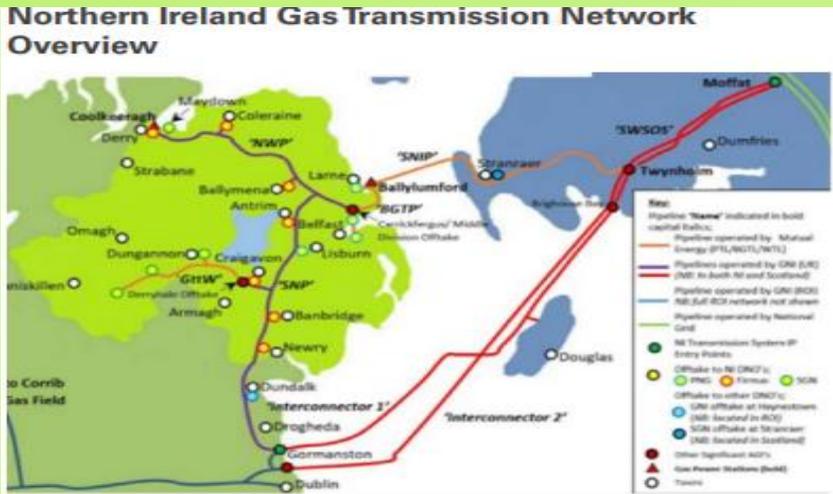
Salt Cavern Gas Storage, potentially providing 25% of the UK's capacity



On average, 23% per annum of energy generated from wind is unused. Potentially 185Gwh of available Green Energy

4 easily accessible ports due to small geographic area

A modern gas network, connected to Ireland and Great Britain, capable of transporting hydrogen



These factors in addition our world-renowned reputation for Engineering & Manufacturing makes NI an ideal location for Hydrogen production.



The Present - Key Assets and Infrastructure - Ports



Belfast Harbour

- ✿ A trust port since 1847
- ✿ Only facility of its type in the Irish sea
- ✿ 2,000-acre estate
- ✿ Home to over 700 firms/23,000 workers
- ✿ D1 Offshore Wind Terminal was the UK's first dedicated port facility for the offshore wind sector and directly delivered 66% of all offshore wind farms developed in the UK up to 2018



Larne Harbour

- ✿ Centre for generator manufacture and repair
- ✿ Regular ropax ferry from Larne to GB
- ✿ 7nm from main shipping route
- ✿ 5 Berths



Foyle Port

- ✿ Deep Water Port, with 440m of Quayside
- ✿ Capable of handling vessels over 62,000 tons and 215m in length
- ✿ 24/7 Piloting services
- ✿ 157-acre site in total, with 35 acres subject to Permitted Development Planning

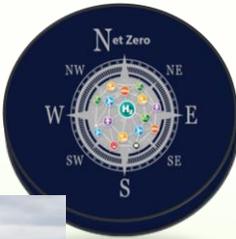


Warrenpoint Harbour

- ✿ NI's 2nd largest port by tonnage
- ✿ 60 acres, 7 berths and 70 employees
- ✿ Turbine storage capabilities, Project Lift 144t project completed in January 2023



The Present — Hydrogen Storage in NI



Islandmagee Salt Caverns

- ✿ Located in Islandmagee on the Antrim Coast,
- ✿ Consist of 7 underground salt caverns,
- ✿ Capacity of storing up to 500 million cubic metres of gas or hydrogen
- ✿ Equates to 25% of the UK's natural gas storage capacity
- ✿ Can support the growing demand for renewable energy generation in the UK and Ireland

Hydrogen Activity in NI

Past & Current Projects

GENCOM

- Belfast met
- Energia
- HyEnergy Consultancy
- Interreg Atlantic
- Area
- NUI Galway
- Pure Energy Centre

Ballylumford Power-to-X

- B9 Energy Ltd
- Islandmagee Energy
- Mutual Energy
- Net Zero Technology Centre

Belfast Maritime Consortium

- Ards & North Down Borough Council
- Artemis Technologies
- Belfast City Council
- Belfast Harbour
- Belfast met
- Catalyst
- Condor Ferries
- Creative Composites
- InvestNI
- Power NI
- QUB
- Spirit AeroSystems
- Ulster University

i4C Hydrogen Training Academy and Integrated Green Hydrogen Hub

- Mid and East Antrim Council
- Belfast met
- Energia
- EP UK Investments
- Firmus Energy
- Northern Regional College
- QUB
- Translink
- Ulster University
- Wright Bus

HySkills

- EIFI TECH
- Erasmus+
- South-West College

Centre for Advanced Sustainable Energy (CASE)

1. Breakthrough safety technologies for hydrogen vessels
2. Developing a type IV polymer composite tank for hydrogen storage
3. Hydrogen generation infrastructure to support fuel-cell fleet

Belfast Power to X

- B9 Energy
- Belfast City Council
- EIFI TECH
- Firmus Energy
- Mutual Energy
- Northern Cyrogenics
- Northern Ireland Water
- QUB
- The Strategic Investment Board
- Translink

H2 & O2 Pilot

- B9 Energy Ltd.
- CPH2
- Lagan MEICA
- Northern Ireland Water

Translink Zero Emission Bus Programme

- Wright Bus
- Translink
- ChargePoint
- Ryze Hydrogen
- Logan Energy

SeaFuel

- Action Renewables
- HyEnergy Consultancy
- Interreg Atlantic Area
- NUI Galway

Green Seas Consortium

- Artemis Technologies
- Mott MacDonald
- NIE Networks
- PowerNI
- QUB
- Ulster University

Northern Ireland Hydrogen Transport (NIH2 Transport)

- Energia
- HyEnergy Consultancy
- Translink



The Future - Driven by IF's

IF we:

- Utilise our natural resources
- Government, academia and industry work together
- Develop new business models
- Develop commercial demonstration projects for confidence to market
- Understand the funding landscape
- Develop shovel ready projects to influence funding calls
- Work with Academia to research and development new technologies
- Identify best practice technologies for the benefit of the Northern Ireland economy
- Train more technicians and engineers to meet future demand
- Access supply chain opportunities for the manufacture of components

The Future - Hydrogen cost and potential for NI

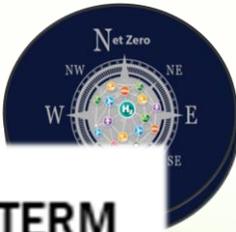
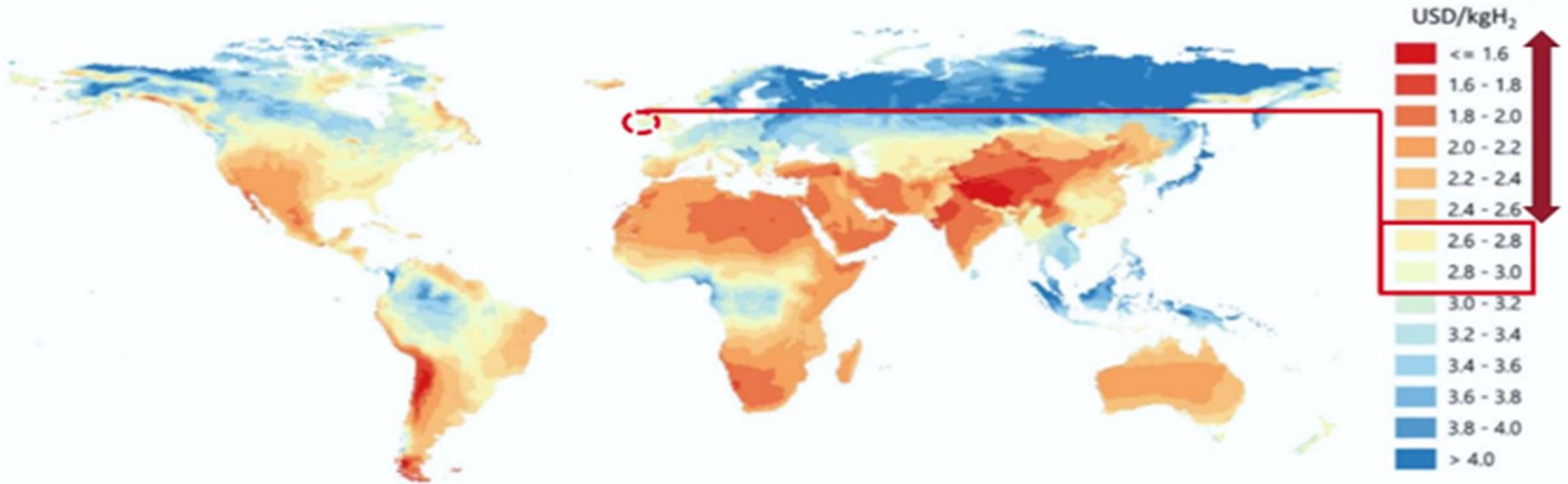


FIGURE 13. HYDROGEN COSTS FROM HYBRID SOLAR PV AND ONSHORE WIND SYSTEMS IN THE LONG TERM



Source: IEA - *The Future of Hydrogen* ³⁹

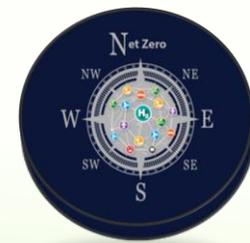
The Future - Hydrogen cost and potential for NI



Bulk hydrogen storage could allow the following:

- Immediate 20% hydrogen injection into the natural gas network at entry point.
- Carbon Dioxide emissions mixed with hydrogen to manufacture methanol
- The emergence of new businesses by utilising methanol for the production of net zero fertilisers, polymers and plastics etc

The Future - Hydrogen Potential for NI



Prepare for the future now:

- Investigate uses for hydrogen deployment in your business
- Understand the best business model
- The technology to be deployed
- Understand the Regulations
- Technology Delivery times
- Understand the Economic model

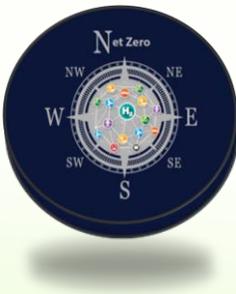


The Future - Support Available

Support is available to Invest NI Client Companies:

- Free energy, technical surveys and feasibility studies to develop projects
- Development of carbon reduction roadmaps for Scope 1,2 and 3 reporting
- R&D Innovation Vouchers
- Programme for R&D
- Trade Programme

Investigate the emerging business opportunities by listening to our webinars on the Invest NI website at: <https://www.investni.com/support-for-business/video-tutorials/green-economy-tutorial-series>



THANK YOU

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