

Hydrogen Activities in Northern Ireland

Ian Williamson

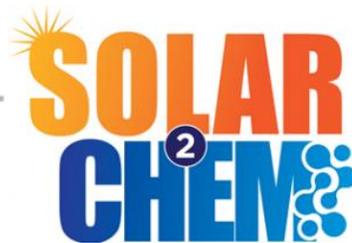


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Consultancy



HyEnergy Consultancy – Who are we?

- A specialist hydrogen consultancy
 - Unite the hydrogen and energy communities by supporting the delivery of new and clean solutions.
 - Our goal is to ensure systems and technologies gain commercial acceptance by delivering low cost, clean, onsite energy solutions.
 - Worked with a variety of stakeholders – industry, regional public sector organisations and national governments.
- Our work includes:



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€100m+

of funding and
investments secured

25

Key Customers

50

Years of Hydrogen
Sector Experience

What is going on in NI and ROI?

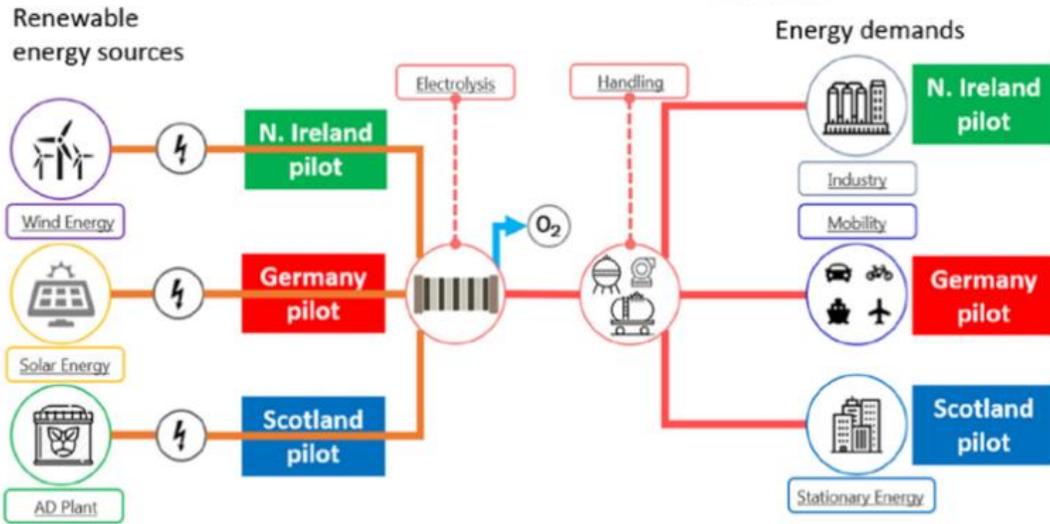
- GenComm
- SEAFUEL
- The Hydrogen Utilization & Green Energy Project (HUGE)
- Hydrogen Mobility Ireland
- Community Hydrogen Forum (CH₂F)
- National University of Ireland Galway (NUIG) Hydrogen Thinkpiece 2030



- GENERating energy secure COMMunities through smart renewable hydrogen
- €9.3 million project that begun in 2016
- Demonstrate the use of hydrogen as a safe, clean and reliable energy storage technology for communities
 - Build three pilots for H2 energy storage
 - Create technical and economic models
 - Develop online decision tool
 - Create Community H2 Forum



Smart Hydrogen GenComm Pilot Plants



Ireland's First Green Hydrogen Supply Chain



27-MW Long Mountain Wind Farm, Co Antrim



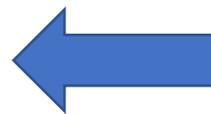
500-kW Areva electrolyser



2x 250-bar tube trailers

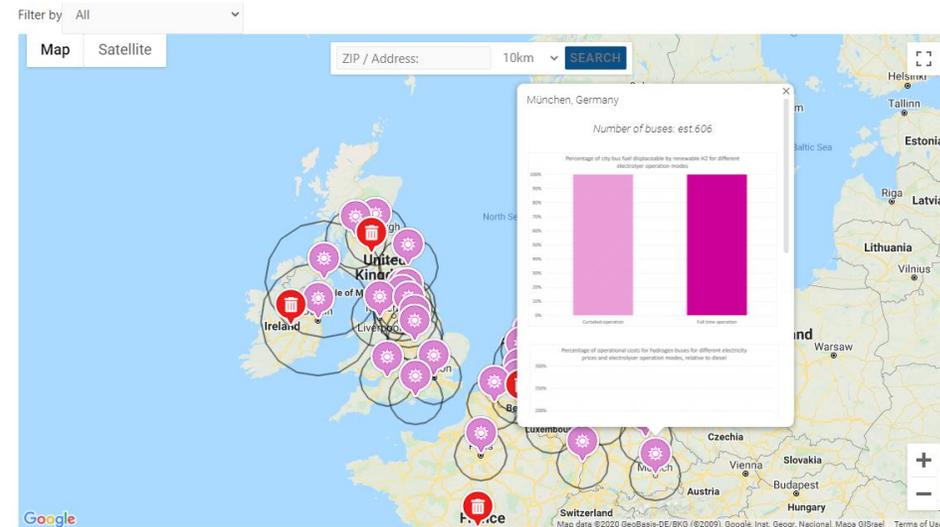


Bus fuelling depot, Belfast
Translink



3x Fuel Cell double-decker buses
WRIGHTBUS

- A place for hydrogen interested communities to find information and resources from sector leading experts
 - From teaching the very basics of hydrogen to helping you make to bespoke made tools





- Demonstrates the feasibility to power local transport using hydrogen
- Seawater desalinated and used in electrolysis
- No net carbon footprint
- Decarbonise isolated Atlantic regions with little grid connection
- Aran, Madeira and Canary Islands



1/PRODUCTION

Hydrogen is produced by electrolysis from sea water using renewable energies

2/FUELING STATION

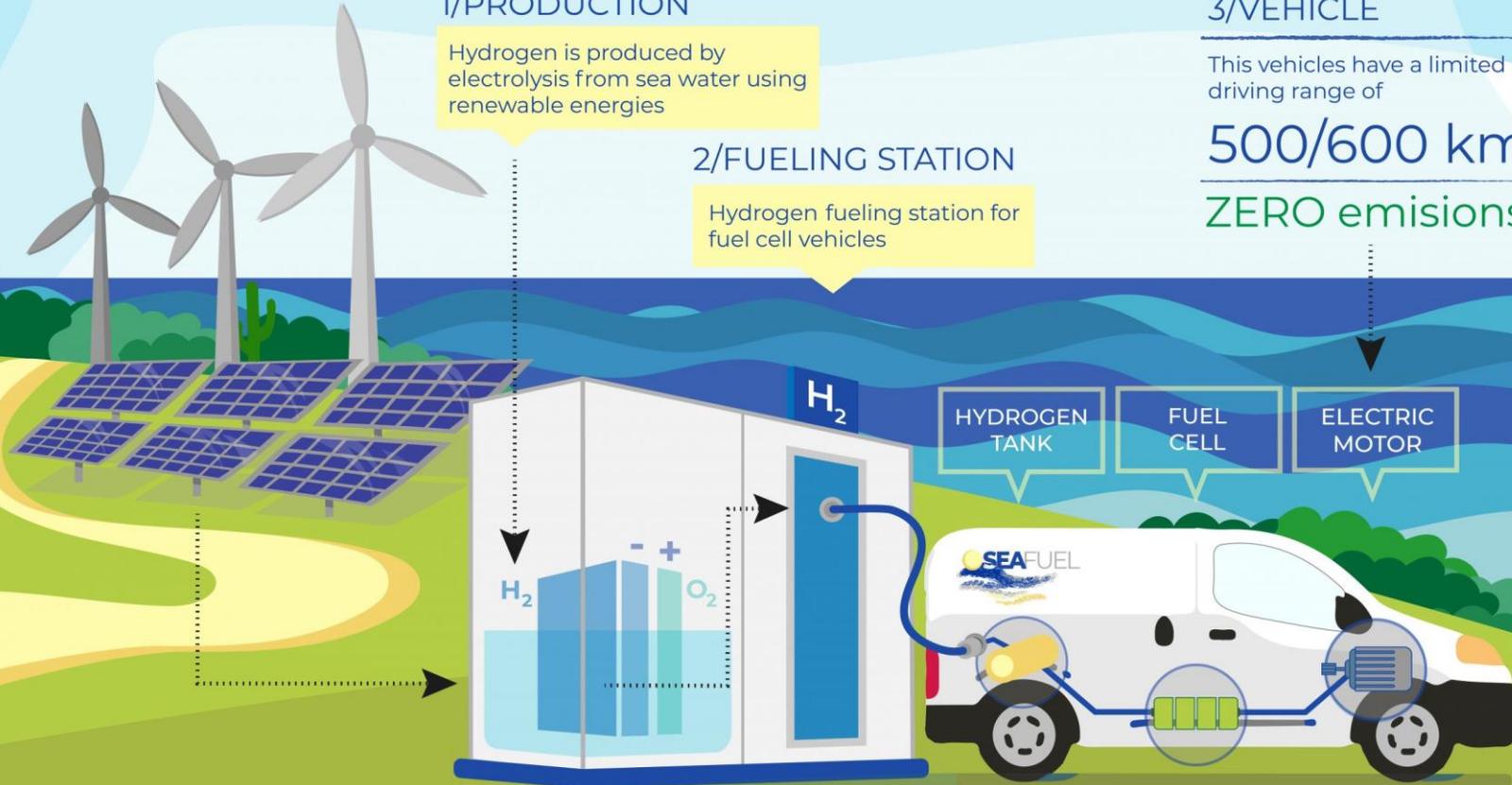
Hydrogen fueling station for fuel cell vehicles

3/VEHICLE

This vehicles have a limited driving range of

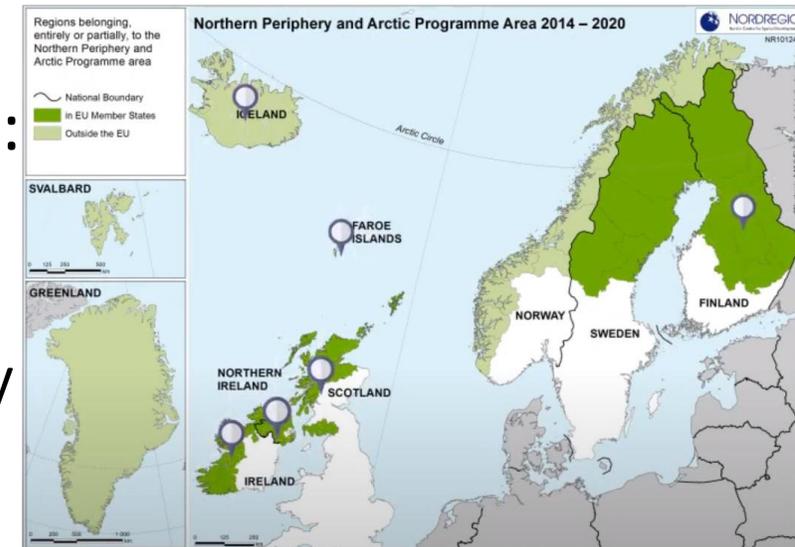
500/600 km

ZERO emissions





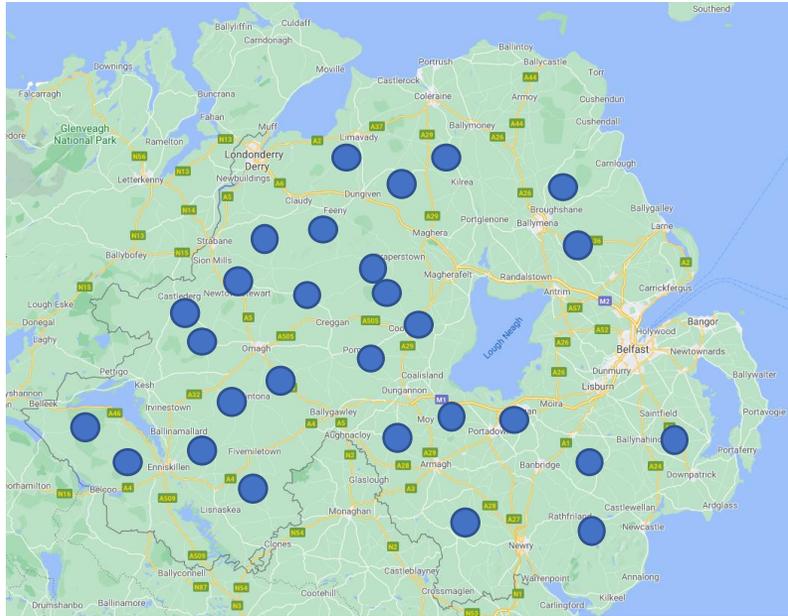
- €1.4 million 3-yr project funded by the Northern Periphery and Arctic Programme
- Focus to raise awareness of green hydrogen for rural communities
- Common challenges of these regions:
 - Low Population Density
 - Low Accessibility
 - High transport cost and service delivery
 - Low Economic Diversity



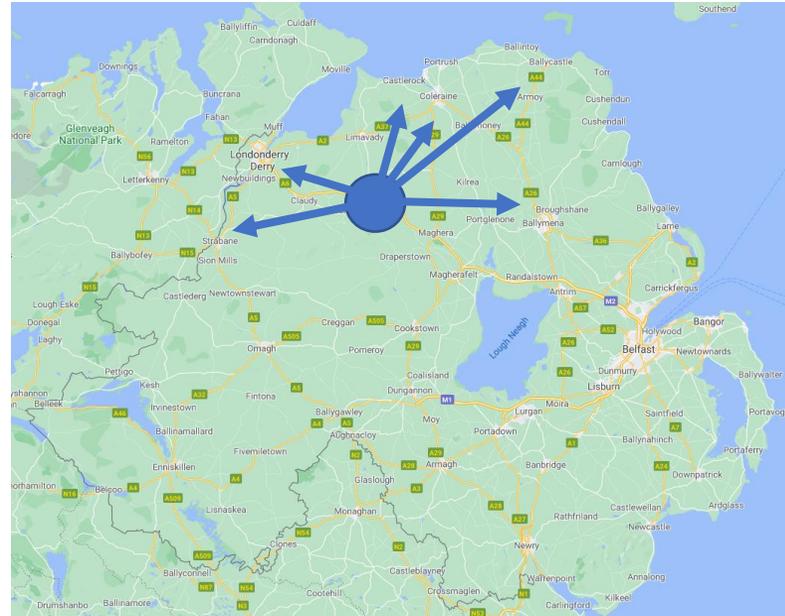


- Timeline of 2019 to 2030
 - ROI Focused initiative with an all-island dimension
- Aims:
- Developing strategies to deploy hydrogen-powered transport in Ireland
 - Set out business case for industry actors to invest in profitable mobility
 - Understand policies required for market growth

NI H2 Thinkpiece - 2030 Hydrogen Scenarios

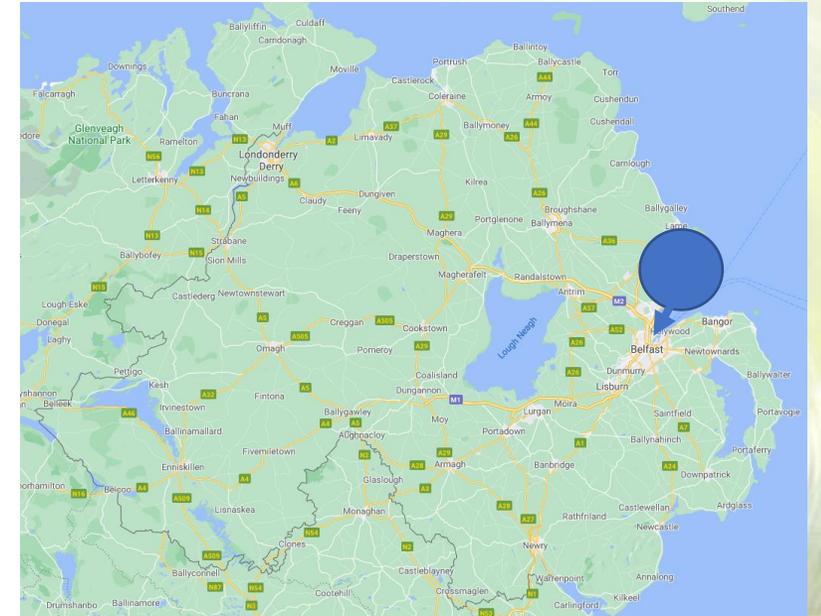


Scenario 1: distributed H₂ electrolysis, transport to nearest bus network or grid injection point



Scenario 2: Regional H₂ electrolysis in Northwest, followed by:

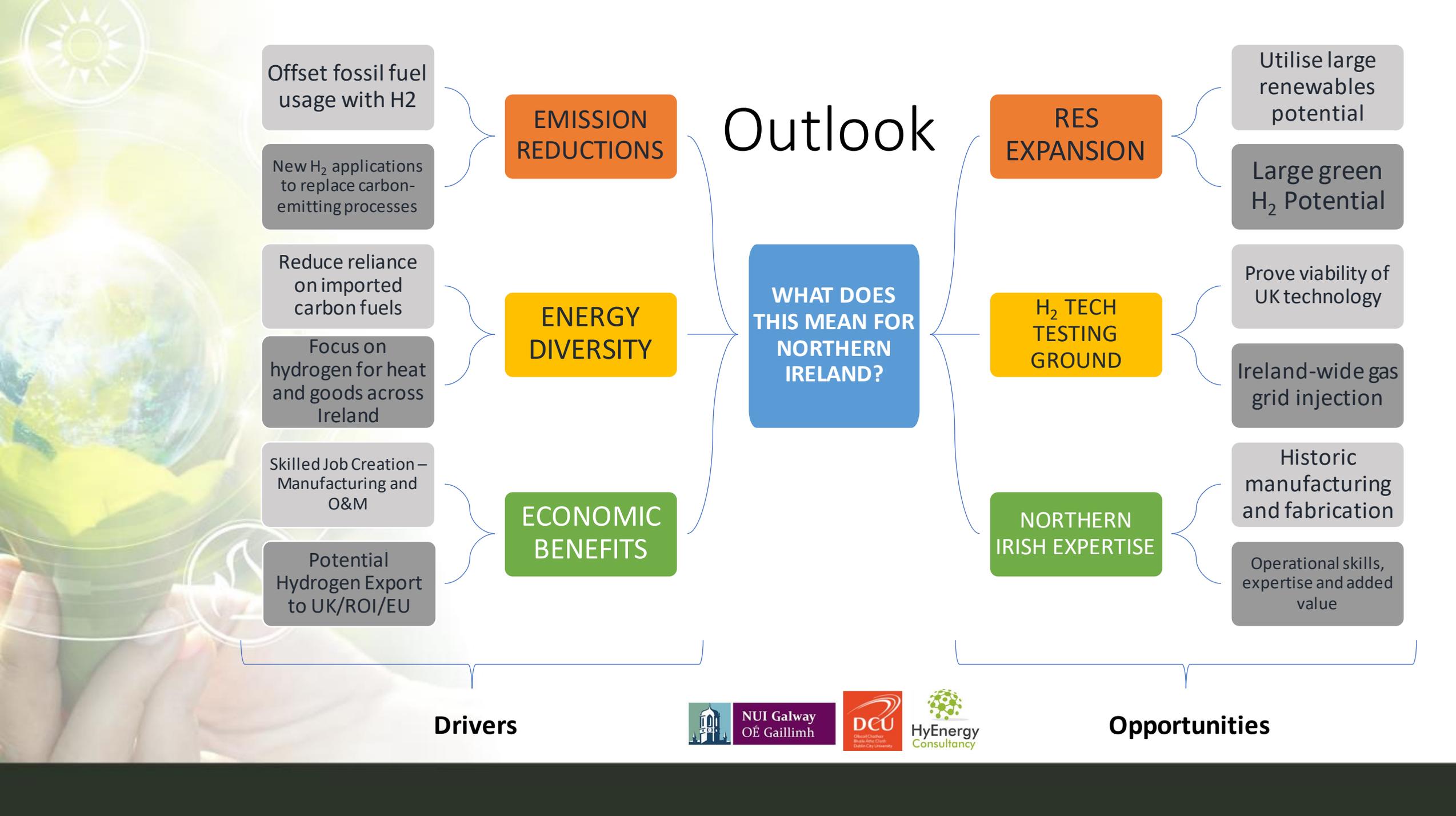
- **2a:** Transport to Derry/Londonderry to fuel 90 buses & 150 trucks
- **2b:** Injection to natural gas grid to meet 10% of regional demand



Scenario 3: Centralised H₂ production near Belfast, followed by:

- **3a:** Transport to Belfast to fuel 210 buses & 350 trucks
- **3b:** Injection to natural gas grid to meet 10% of Greater Belfast demand





Offset fossil fuel usage with H2

New H₂ applications to replace carbon-emitting processes

Reduce reliance on imported carbon fuels

Focus on hydrogen for heat and goods across Ireland

Skilled Job Creation – Manufacturing and O&M

Potential Hydrogen Export to UK/ROI/EU

EMISSION REDUCTIONS

ENERGY DIVERSITY

ECONOMIC BENEFITS

Outlook

WHAT DOES THIS MEAN FOR NORTHERN IRELAND?

RES EXPANSION

H₂ TECH TESTING GROUND

NORTHERN IRISH EXPERTISE

Utilise large renewables potential

Large green H₂ Potential

Prove viability of UK technology

Ireland-wide gas grid injection

Historic manufacturing and fabrication

Operational skills, expertise and added value

Drivers

Opportunities



NUI Galway
OÉ Gaillimh



DCU
Dún Dealgán
Dublin City University



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All-Island H2 Potential

- Both Ireland and Northern Ireland have enormous untapped renewable energy resources
- Modern, increasingly interconnected electricity grid can accommodate high RES-E & SNSP
- The modern, shared interconnected gas grid can be primed for hydrogen injection at a relatively low cost
 - Reduce reliance on imported fuels and help bring household expenditure on energy down (NI has highest UK regional cost)
 - Shared codes and standards
 - Shared storage systems
- Shared mobility infrastructure projects?
 - Hydrogen refuelling stations both sides of the border
 - Enables island-wide transportation corridors
 - Renewal of rail rolling stock with H₂ trains



NUI Galway
OÉ Gaillimh





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Thank you

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