

# The Gas Industry in 2050 – What Will It Look Like?

*Energy Institute  
Symposium,  
January 29<sup>th</sup> 2025*



# Agenda



## Programme:

- 9.30am Welcome – Sam McCloskey, Chair of the Energy Institute NI Branch
- 9.40am Northern Ireland's Renewable Gas Landscape - Jonathan Martindale, Director of Business Development, Phoenix Energy.
- 10.00am Regulatory Enablement - Roisin McLaughlin, Utility Regulator NI
- 10.15am Cross Sectoral Drivers for an Anaerobic Digester Sector - Jonathan McFerran (DAERA)
- 10.35am Networking Tea/Coffee Break
- 10.45am An LPG perspective – Richard Alexander, Calor Gas
- 11.05am Importance of regional integrated solutions - Shane Rafferty, Gas Networks Ireland
- 11.25am Hybrid Heating Solutions - Dan Wilden, Alpha Boilers
- 11.45am Hydrogen Blending in Great Britain - Tim Harwood, Northern Gas Networks
- 12.05pm Panel Discussion
- 12.30pm Lunch

# Welcome Sam McCloskey NI Branch Chair

Simply Blue Group has developed multiple scenarios and discussed the approach with government. The base case is to secure a Submerged Land License (SLL) for up to a 2 GW project with the route to market being a domestic grid connection plus a Renewable Energy Park. The 2 GW scenario assumes that a PPA is secured for both the grid and renewable energy park at the same time.

# Northern Ireland's Renewable Gas Landscape

Jonathan Martindale, Phoenix Energy

Alternative scenarios have also been developed where a 2GW SLL is secured; however, a PPA for both the grid and REP cannot be obtained at the same time. A standalone 400MW domestic grid connection project followed by a second phase 1.2GW REP project have been developed.

Simply Blue Group is very confident in the domestic grid connection, which the government will facilitate, based upon their desire to have Canada's first project to kickstart the industry. This will "support research and innovation and to showcase the deployment of offshore wind technologies and the end-use application of offshore wind energy". Our current assumption is that this will consist of a 25-year Power Purchase Agreement (PPA) similar in nature to the existing 2022 Rate Base Procurement Program (~325MW) and 2024 Green Choice Program (~625MW) for onshore wind.

Simply Blue Group is cautiously optimistic in the REP scenarios; however, this is viewed as a longer-term prospect. This route to market will be based upon the market conditions for each project and the first phase of these projects being successful.

As an alternative to the REP, the export market opportunity will likely materialize; however, this will need to be further studied. The federal





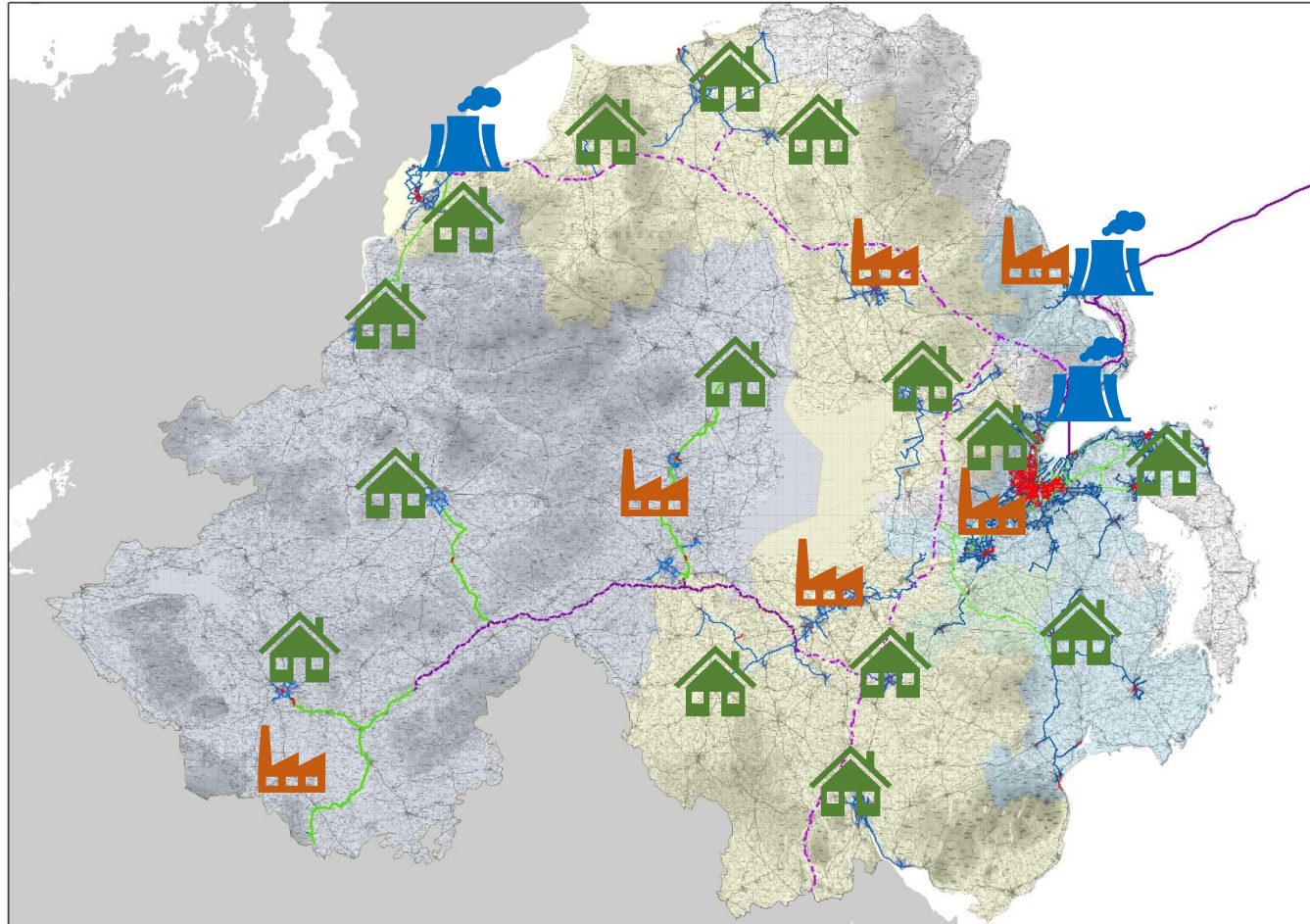
Gas Network Pathway  
to Net-Zero

Energy Institute  
January 2025



### Connecting gas to:

- 3 Power Stations
- 15,000 Businesses
- 320,000 Homes



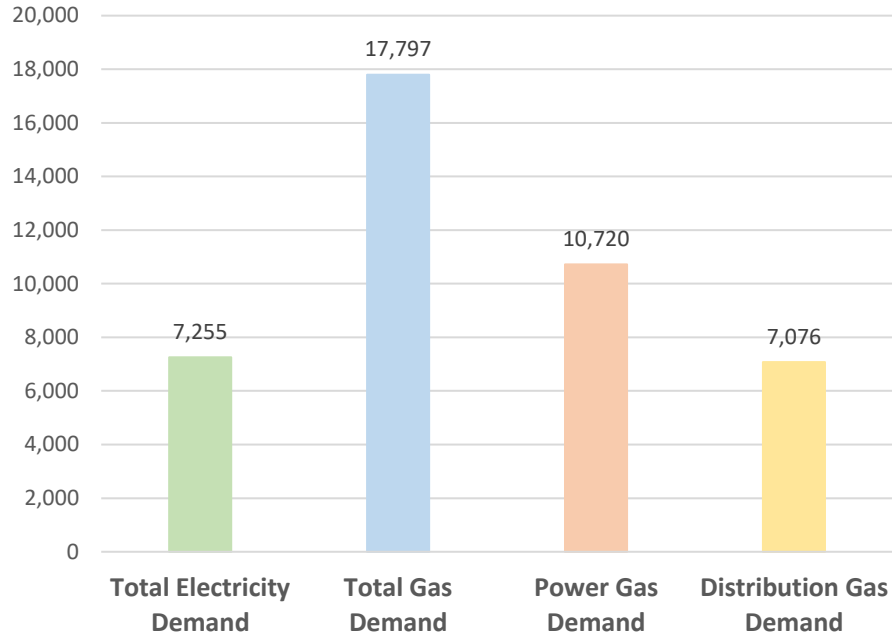
# Gas Utilisation in Northern Ireland GY23-24



## Split of NI Gas Demand:

- 60% Power
- c.22% Industrial/Commercial
- c.18% Domestic

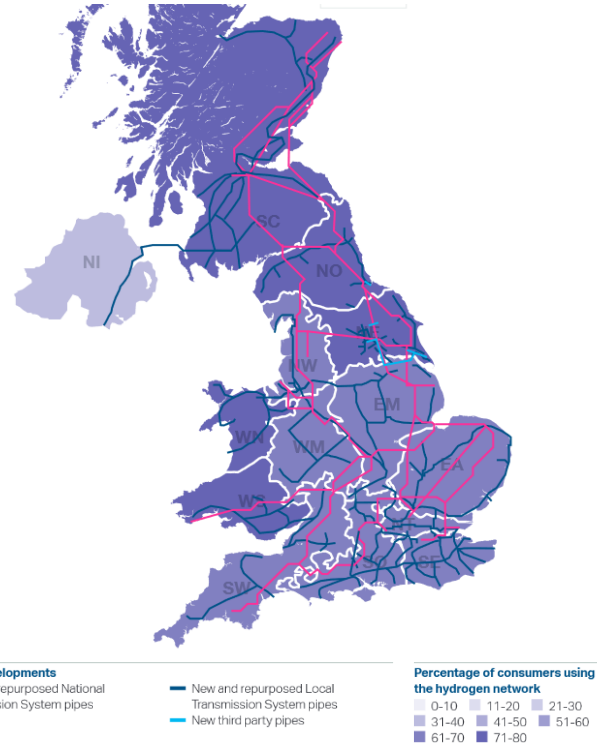
### NI System Demand GY23-24 (GWhs)



# The approach to decarbonisation in GB is dominated by hydrogen

## The ENA projects 354 TWh of hydrogen in the 2050 energy system

- Approximately half of current UK natural gas demand for heating
- 17m homes supplied by hydrogen and 14m by electric alternatives in 2050



# NI Gas Network Pathway to Net-Zero is different



## 1. Maximising available biomethane

- Like-for-like replacement which is ready now
- Supports decarbonisation of agriculture
- Biogenic carbon resource

## 2. Enabling the role of hydrogen

- Exploiting NI's natural advantages in H<sub>2</sub> production, transportation and storage infrastructure
- Supporting e-fuel production with biogenic carbon from AD plants

## 3. Promote Energy Efficiency

- Insulation & Hybrid Heat Pumps
- Reduces gas volumes
- Reduces peak demand on system

## 4. Energy system integration

- Leverage benefits of renewable gas to provide system security
- Utilise smart systems to reduce infrastructure investment

NI GAS  
NETWORK  
PATHWAY  
TO

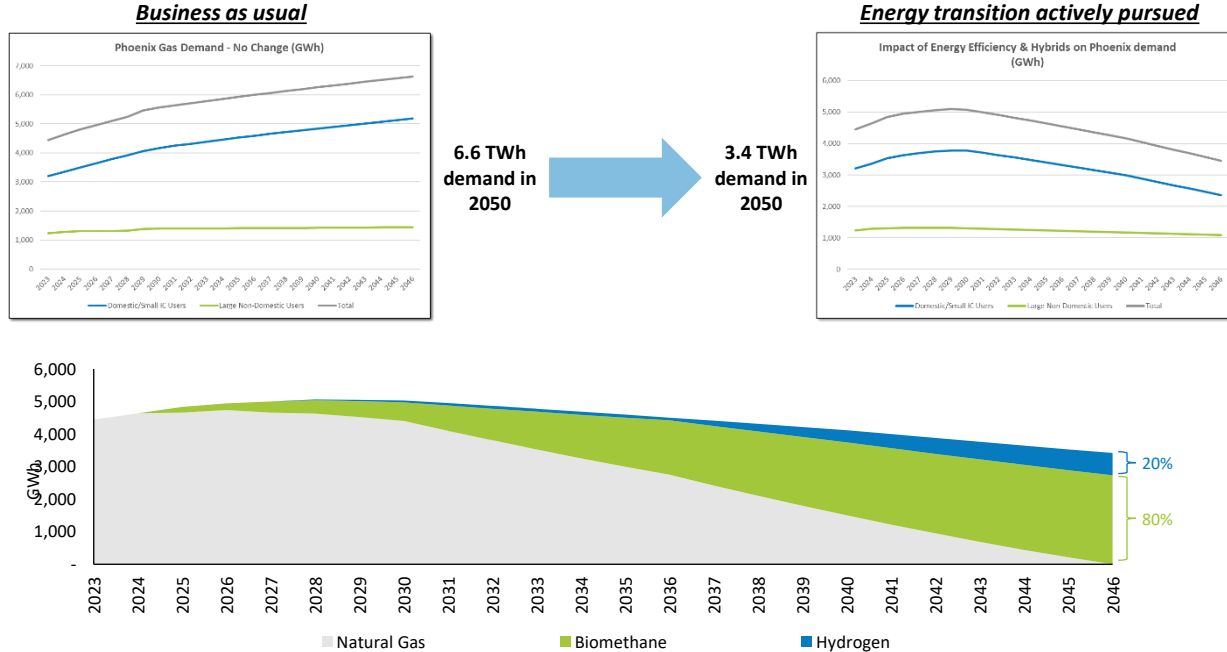
# NET ZERO





# The Phoenix Pathway to Net-Zero

A "successful" gas network transition will see natural gas volumes replaced entirely by renewable gas alternatives as well as an overall reduction in demand due to additional efficiencies



# NI GNO 5 2030 Commitments

NI's GNOs are committed to the full decarbonisation of the regional gas network; at the Renewable Gas Conference hosted by Phoenix in October 2023, we launched 5 near term commitments to support the sustainable introduction of renewable gases in NI

1	<b>Research &amp; Development</b>	<i>Continue to invest in research and demonstration projects to inform the lowest cost transition of NI's gas networks</i>
2	<b>Advance No Regret Outcomes</b>	<i>Alongside growing the gas customer base, become a leader in the championing and facilitation of energy efficiency improvements</i>
3	<b>Acceleration of Biomethane Injection Volumes</b>	<i>Support the development of a sustainable biomethane industry that provides competitive renewable energy solutions to NI Energy users</i>
4	<b>Network ready for a Hydrogen Economy</b>	<i>Facilitate the growth of an indigenous hydrogen economy in NI that can support the decarbonisation of multiple sectors</i>
5	<b>Develop integrated energy system solutions</b>	<i>Advance our pathway in conjunction with other energy system stakeholders to achieve the most optimal decarbonisation pathway for NI consumers</i>





# Biomethane

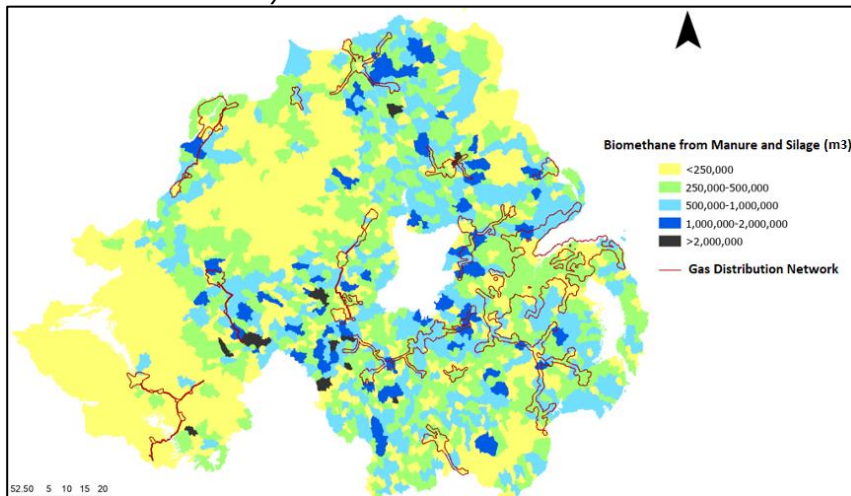
# Biomethane – the opportunity

**2022 QUB-led research calculated that the net potential from NI's (housed) livestock manure plus underutilised silage could produce significant volumes of biomethane - 6,124 GWh**

- Distribution network demand per capita in NI is only half that of Great Britain
- 6,124 GWh of biomethane equates to **90%** of 2022 gas distribution network demand
- The vast majority of this feedstock – 83% - is located within 10km of the NI Gas Distribution Network

Feedstock	Biomethane (10 <sup>6</sup> Nm <sup>3</sup> )
Sewage sludge	10
Municipal organic waste	18
Manure from housed livestock	253
Underutilised silage	500
<b>TOTAL</b>	<b>781</b>

*Biomethane availability in Northern Ireland*



**More recent QUB-led research calculates that NI's total potential biomethane supply is c.8000 GWh**

# Biomethane has been successfully injected into the network



- Biomethane was successfully injected into the NI gas network for the first time on 20 November 2023 at Dungannon
- The successful first injection of biomethane into the NI Gas Network has confirmed the suitability of the regulatory framework and technical approach required to facilitate the injection of biomethane into the gas distribution network





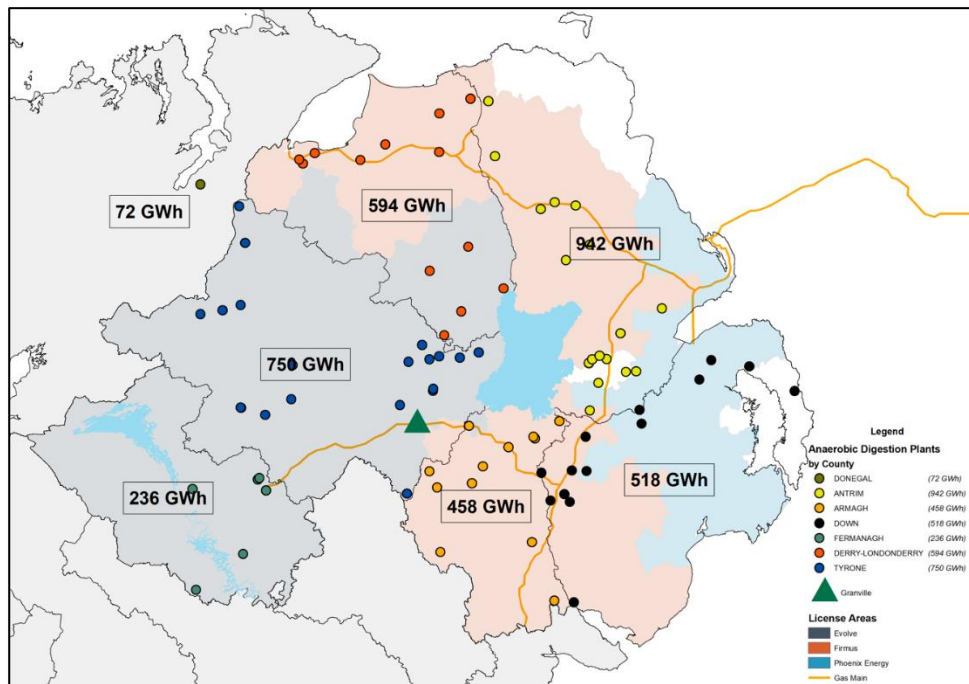
# Biomethane - Early Adopter Potential

Following the first injection of biomethane into the NI Gas network in November 23, the NI's GNOs – supported by both the Department for Economy and Department for Agriculture, Environment and Rural Affairs - issued a Request for Information from biomethane producers.

GNO	Respondents
Firmus	43
Evolve	31
Phoenix	9
Outside NI	1
Injection Hubs	2
<b>Total</b>	<b>86</b>

Over **3.6 TWh** of potential biomethane production identified

Sufficient to meet **90%** of NI's 2023 industrial and commercial gas demand



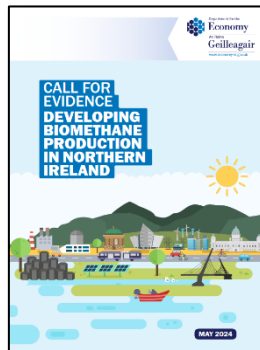
# Biomethane Policy Update

2024 has been characterised by a renewed sense of optimism following the return of the NI Executive in February. Returning ministers have been supportive of progressing renewable gas solutions and this desire has been reflected in recent NI Executive policy.



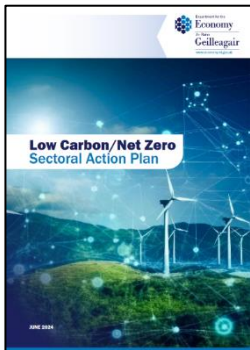
## NI Energy Strategy

*"We also intend to utilise our modern gas infrastructure and the potential to generate and import zero carbon gases. We will continue to engage with gas network operators on replacing natural gas with renewable gas."*



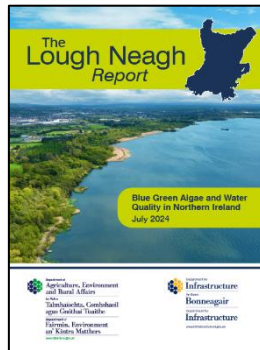
## Biomethane Call for Evidence

*"The challenge is to develop an effective policy framework which could unlock the biomethane economy and help the sector to become economically viable without long-term subsidies."*



## Low Carbon/Net Zero Sectoral Action Plan

*"Biomethane offers a sustainable means of substituting natural gas but also presents a further benefit as a contributing source for e-fuel production."*



## Lough Neagh Report

*"Launch a Small Business Research Initiative (SBRI) Phase 2 project to improve the Sustainable Utilisation of Livestock Slurry (SULS) and develop demonstrator sites to process livestock manures/slurry."*

# Biomethane has several multi-sectoral benefits



Developing a significant indigenous supply of biomethane will reduce reliance on importing energy and provide greater **security of supply**



A regional network of anaerobic digestion plants would support the **central management of nutrients** derived from agricultural waste



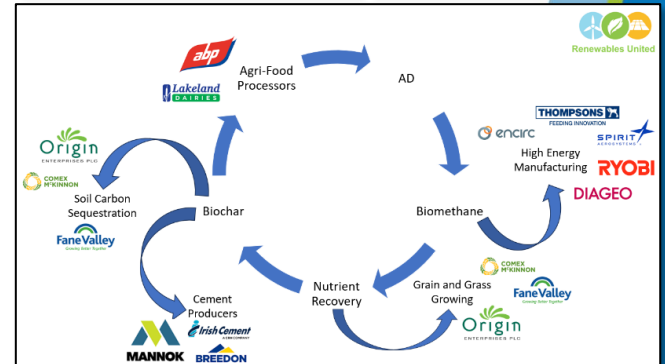
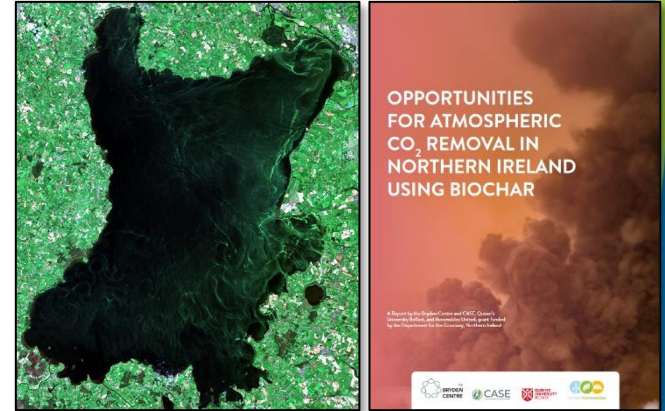
KPMG analysis suggests that 1000 jobs are supported in the **rural economy** for every 1000 GWh of biomethane produced



Biomethane can provide sustainably competitive energy solutions to **Large Energy Users** in the near term to help meet marketplace demands



Biomethane production will be crucial in generating sufficient **negative emissions** for Northern Ireland to achieve 100% net-zero



United Renewables: Circular benefits of NI biomethane production

# Missing piece is a NI Biomethane Support Scheme

In October, the NI GNOs launched *Enabling a Greener Energy Future* at the NI Assembly. This paper called on the NI Executive to progress three key steps to capitalise on biomethane's enormous potential in NI. The launch was attended by over 50 key stakeholders including the DAERA minister.

1

## A Regional Biomethane Target:

Setting an ambitious but achievable goal of 1.5 TWh of biomethane production per annum by 2030 will accelerate Northern Ireland's transition to a greener future.

2

## Clear Market Pathways:

Establishing a capital support 'Pathfinder' scheme is crucial to kickstarting a biomethane economy in Northern Ireland. Additionally, a long-term support mechanism will provide the necessary investment certainty to sustain growth in the sector.

3

## Enabling Regulation and Infrastructure:

A supportive regulatory framework including strategic network investments and streamlined planning processes are fundamental to unlocking the full potential of biomethane.





# Hydrogen



# Hydrogen Blending in NI

The NI Gas Network is slightly different to GB network – more modern, higher pressure – and prior to NI-wide Hydrogen blending GNO's will confirm network suitability for a hydrogen blend



## CASE HySAFER

- Phoenix, MEL & GNI are supporting a HySAFER CASE research project to examine the safety of hydrogen and natural gas blends in the NI Distribution Network.



## Hydrogen Blend Preparedness

- Proposed research project designed to confirm that the NI Gas Distribution Networks and their consumers can accommodate a hydrogen blend in the natural gas supply without issue.



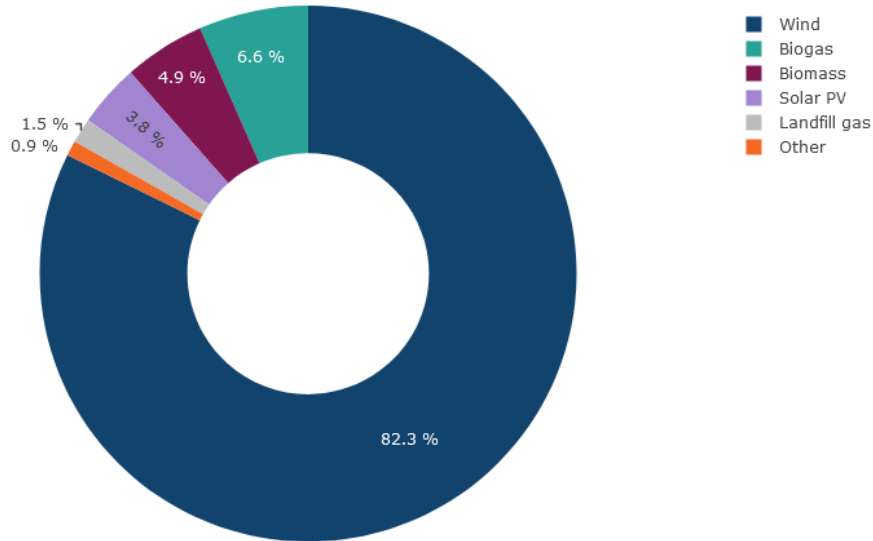
## Ballymena Hydrogen Blend Trial

- firmus energy and partners B9 Energy, Radius Housing, MEABC and NRC are developing a proposal for NI's first hydrogen blending trial at the St. Patrick's Barracks site in central Ballymena.

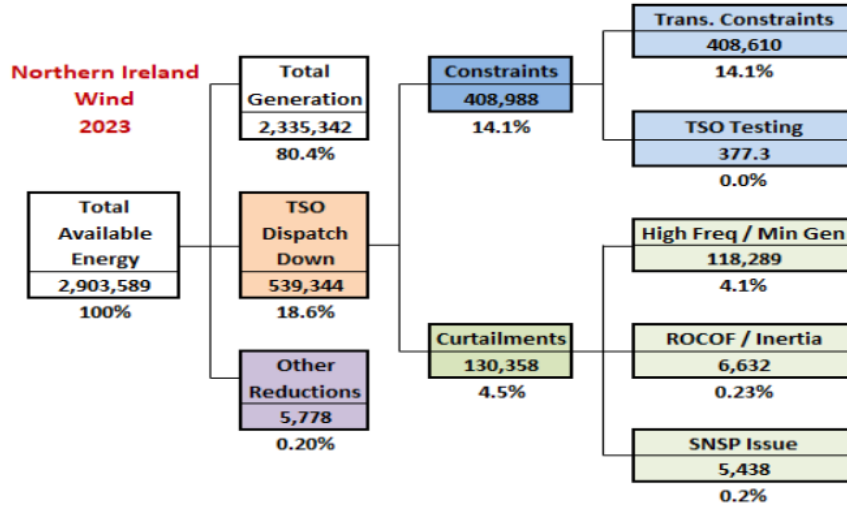


# Renewable Electricity Landscape in NI

- For the 12-month period ending June 2024, 7,244 GWh of electricity was consumed in Northern Ireland
- Over the same period, wind renewable generation was 2,731 GWh, with non-wind renewable generation contributing another 588 GWh giving a total of 3,319 GWh of renewable generation in Northern Ireland – 46% of all electricity consumed
- Percentage contribution by renewable electricity generation type is outlined below

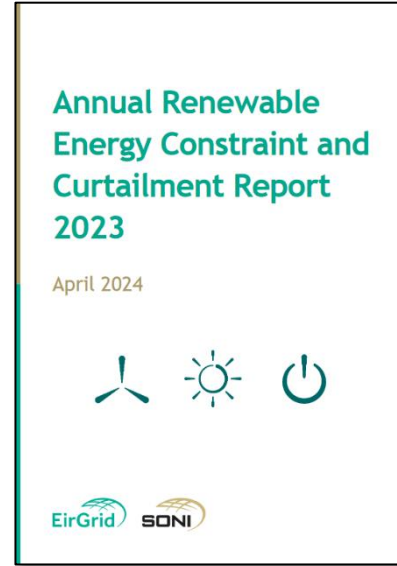


# Integrating our Energy Systems



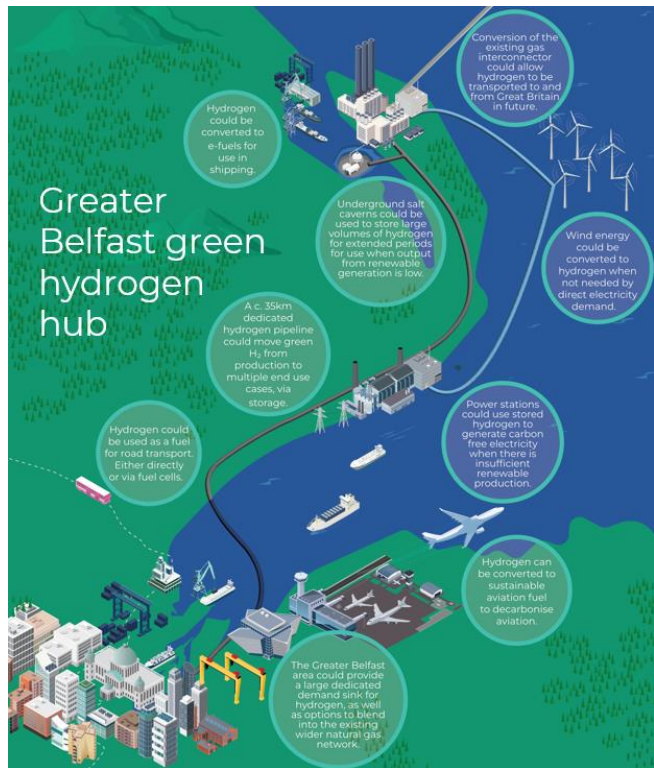
Wind energy breakdowns: Volumes (MWh) and percentages.

Other reductions include DSO constraints, developer outage and developer testing. Certain types of reductions are outside of the control of the TSO and are not logged. Therefore, Available Energy ≠ Generation + TSO Dispatch Down + Other Reductions



**539 GWh of dispatched down electricity could produce 323 GWh of Green Hydrogen (at 60% efficiency) – equivalent to c.8% of Phoenix gas distribution demand**

# Greater Belfast Green Hydrogen Hub



A dedicated 35km pipeline connecting production, storage and demand

Offshore wind is used to produce green hydrogen

Storage opportunities in salt cavern storage in the Ballylumford area

Potential to supply fuel to 2 out of 3 of the large NI power stations

Opportunity for e-fuels for use in transport at Larne/Belfast harbour and the City Airport

Hydrogen blending opportunity into the existing natural gas system



# Hybrid Heating



# Why are Phoenix investing in Hybrid Heating Trials



# How Hybrids work in practice – Castlecoole Case Study

**System spec** – 4kW Heat Pump & 33kW Combi Boiler

**ASHP COP** – 3.54

**House EPC Rating** – C

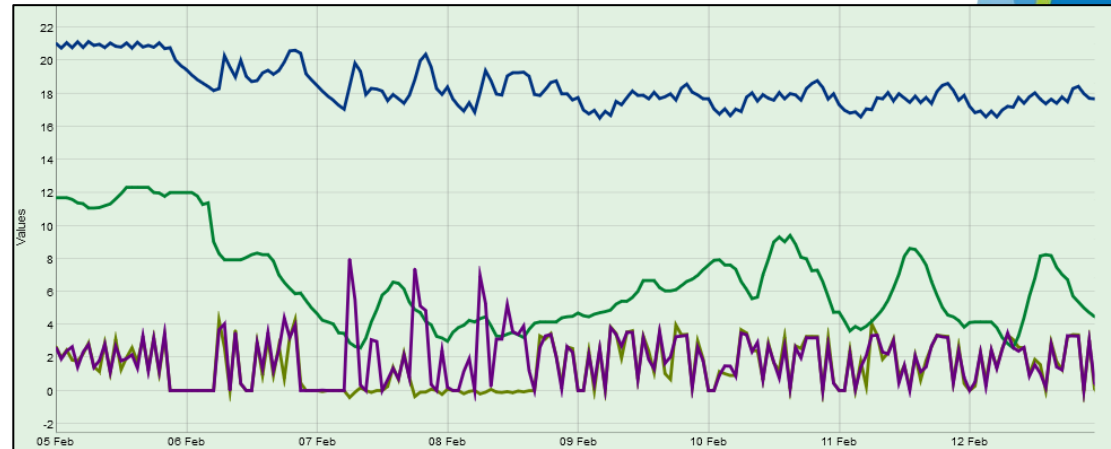
**Insulation** - 300mm roof insulation, rockwool cavity and double glazing

**House status** – tenants entered 23<sup>rd</sup> Feb

**Monitoring system** – Carnego system which monitors heat output, electrical usage, indoor & outdoor temperature

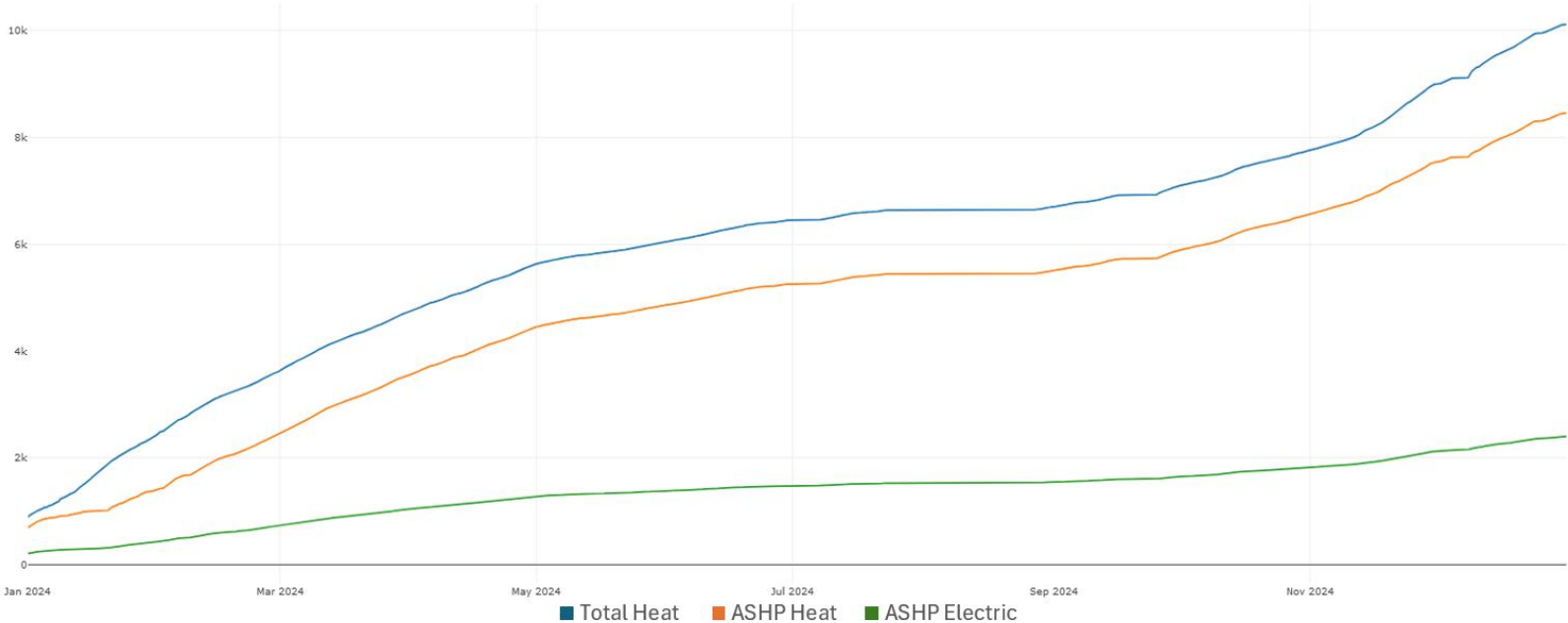
**Monitoring period** – 1 year (at least)

Parameter	Initial Setting	Tenant Settings
<i>Programmed Heating Times</i>	Mon – Sun 0600–0800 Mon – Sun 1800–2100	Mon – Fri 0600–0800 Sat – Sun 0800–1000 Mon – Sun 1800–2100
<i>Heating Temperature</i>	21°C	21°C
<i>Setback Temperature</i>	18°C	18°C
<i>Electricity Cost</i>	£0.34 per kWh	£0.34 per kWh
<i>Gas Cost</i>	£0.115 per kWh	£0.115 per kWh (Jan – Mar) £0.0868 per kWh (April)



# Castlecoole results

Between January – December 2024, the Castlecoole Hybrid provided 10,525 kWh of heat and hot water. The ASHP element provided 74% of total heat energy.



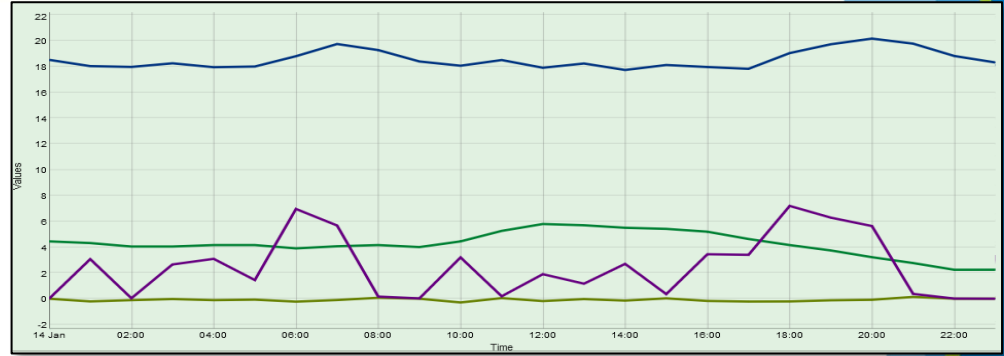
# Hybrid Heating - Energy system benefits

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## **LATEST** | Amber alert on NI's electricity grid as wind doesn't blow and loss of Kilroot slashes margins

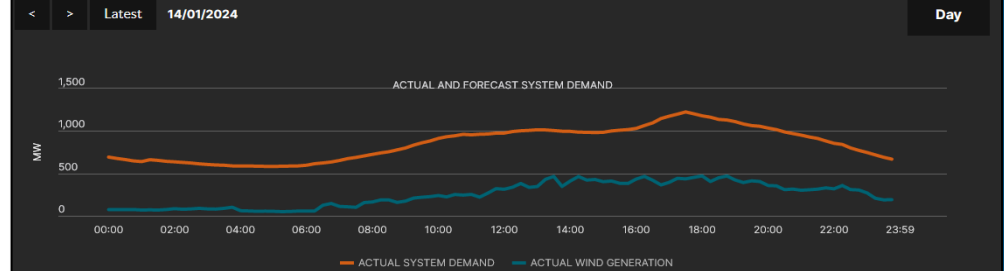
On 14<sup>th</sup> January, the market operator issued a system alert due to tight capacity margins.

- Due to the cold weather, the Hybrid was operating in boiler-only mode and not contributing to the system peak
- If every home in NI had a 6 kW Heat Pump, that could equate to additional c.1.6 GW of peak electrical demand – the same as NI's current peak demand.
- Utilising Hybrids as part of a smart electricity system offers another means – along with load shifting and smart EV charging – to provide significant demand flexibility which could potentially lower regional energy system costs



### 14<sup>th</sup> January – Light green line (bottom) shows Heat Pump wasn't contributing to network Actual and Forecast System Demand

System Demand represents the electricity production required to meet national consumption. Actual and forecast System Demand are shown in 15 minute intervals.



## Contact Us



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# Regulatory Enablement

Roisin McLaughlin, Utility Regulator NI



# Regulatory Enablement

Energy Institute Annual Symposium, 29<sup>th</sup> January 2025

Roisin McLaughlin, Head of Energy Futures, Utility Regulator



# Who we are



Protecting Consumers on the way to Net Zero, this is our Corporate Strategy 2024-2029.

## ABOUT US

We are an independent non-ministerial government department, with statutory responsibility for Northern Ireland's electricity, gas, water, and sewerage industries. We are governed by a publicly appointed Board.

Our work is based on our statutory duties which include:



### ELECTRICITY

To protect the interests of electricity consumers in regards to price and quality of service, by promoting effective competition where appropriate.



### GAS

To promote the development and maintenance of an efficient, economic, and coordinated gas industry.

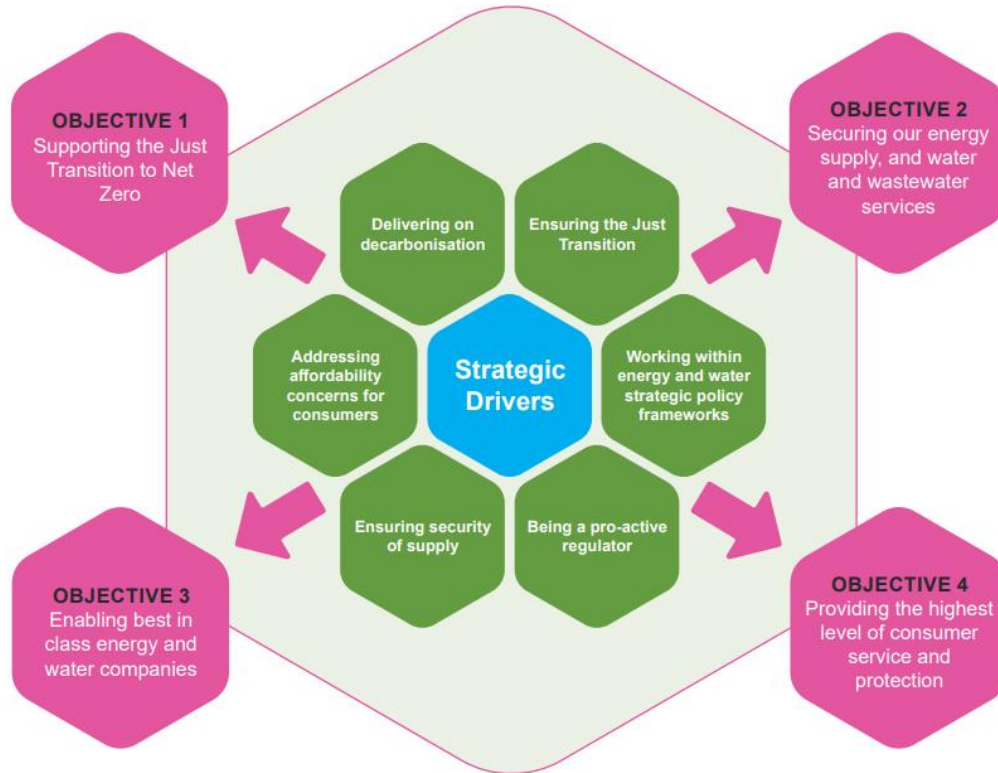


### WATER

To protect the interests of water and sewerage consumers by promoting an efficient industry which delivers high quality services.



# Our strategic drivers and corporate objectives



## Our Forward Work Programme

- Consultation launched on the 19<sup>th</sup> December, closing date for responses 26<sup>th</sup> February
- Welcome views on
  - are we prioritising the right projects?
  - do you have any objections to our proposed projects?
  - have we missed any key areas?



# Context for regulatory intervention

Net zero  
targets

Just  
transition  
and  
affordability

Security of  
supply





## Some key energy transition work streams

Completion of the RP7 Price Control that will see an additional £2.3bn being invested to upgrade the Electricity Network

- ✓ Support the decarbonization of the power sector and enable the network to accommodate 300,000 electric vehicles (EVs) and 120,000 heat pumps by 2030

Development of Future Arrangements for System Services

- ✓ Delivered in partnership with the System Operators and CRU
- ✓ Will enable 95% of demand to be provided by renewables in 2030 (75% today)

Connection of Offshore Renewables

- ✓ Working with DfE to establish optimal regime to connect offshore renewables to the onshore electricity network

Supporting DfE to deliver the future RESS CfD scheme.





# UR/GNO biomethane project

**Initial purpose:** To enable readiness for biomethane injection into the gas network in a manner that does not pre-empt future policy development

- Least regrets approach in light of ongoing development of energy strategy/policy.
- Initial focus on distribution injections
- Alignment with existing framework where reasonable:  
→ trade off between timely implementation and functionality.

**Achieved:** Biomethane injection at Distribution level is now possible and the first biomethane entry connection became operational in Nov 2023.

**Our current focus:** To evolve the framework in line with the developing energy policy and emerging interest in biomethane injection. We will together seek to address any limitations & increase the robustness of the existing arrangements.

**Projects wishing to inject large volumes bring a different set of challenges**



# Future biomethane policy is key

Energy strategy and policy for biomethane

(incl. CfE on developing biomethane production in NI)

Whole system approach

Biomethane support?

- What role will biomethane play in the energy transition
  - Across power, heat, transport, agriculture etc.
- **How much biomethane, for what, and by when?**
- Joint working across government departments.
- UR help where we can – policy certainty important to next gas price controls.
- Support mechanisms to incentivise biomethane injection subject to DfE policy.



## Key regulatory work in 2025 - biomethane

- Framework for injection of biomethane into the gas transmission network.
- Outworkings of GNO projects to support biomethane injections, e.g. options to overcome network constraints.
- An NI hybrid heat pump trial.
- Licensed Area extensions to facilitate connection of biomethane sites.
- Strategic network planning (for gas and across gas and electricity).
- Outworkings of DfE's Call for Evidence, e.g. Cost treatment for connections.
- Facilitating transport of hydrogen is a longer term issue.




**Thank you**

Contact details:  
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# Cross Sectoral Drivers for an Anaerobic Digester Sector

Jonathan McFerran - DAERA



# “Cross Sectoral Drivers for an Anaerobic Digester Sector”

**NI Energy Institute**

29 January 2025

Jonathan McFerran

Deputy Director, DAERA

Today we act.  
Tomorrow  
we thrive.



Northern Ireland  
Executive





## Content:

- DAERA context and Green Growth Strategy
- Importance of Agriculture in NI
- Cross Sectoral Drivers for an AD Sector
- Potential part solution to stimulate the AD and Biomethane sectors
  - SULS - Sustainable Utilisation of Livestock Slurry Project



Today we act.  
Tomorrow  
we thrive.



Northern Ireland  
Executive



DAERA Business Plan  
**2024-25**

Department of  
**Agriculture, Environment  
and Rural Affairs**  
[www.daera-ni.gov.uk](http://www.daera-ni.gov.uk)

An Roinn  
**Talmhaíochta, Comhshaoil  
agus Gnóthaí Tuaithe**

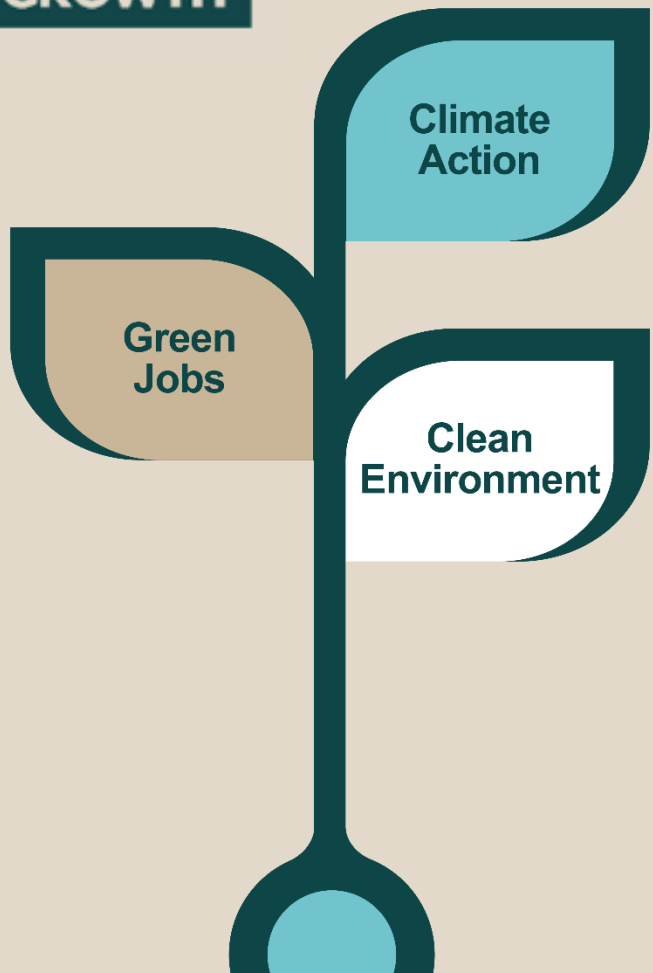
Department of  
**Fairmin, Environment  
an' Kintra Matthers**

*Sustainability at the heart of a  
living, working, active landscape  
valued by everyone.*

# DAERA's Key Priorities

- Tackling climate change together;
- Protecting our natural environment;
- Supporting a sustainable, resilient and productive agri-food sector; and,
- Building strong, sustainable and diverse rural communities





## Climate Action

Reduce greenhouse gas emissions through adaptation and mitigation measures.

## Green Jobs

Develop a low carbon, inclusive, skilled workforce and a strong circular economy.

## Clean Environment

Quality built environment, clean air and water, more sustainable land use, improved habitat and greater biodiversity.

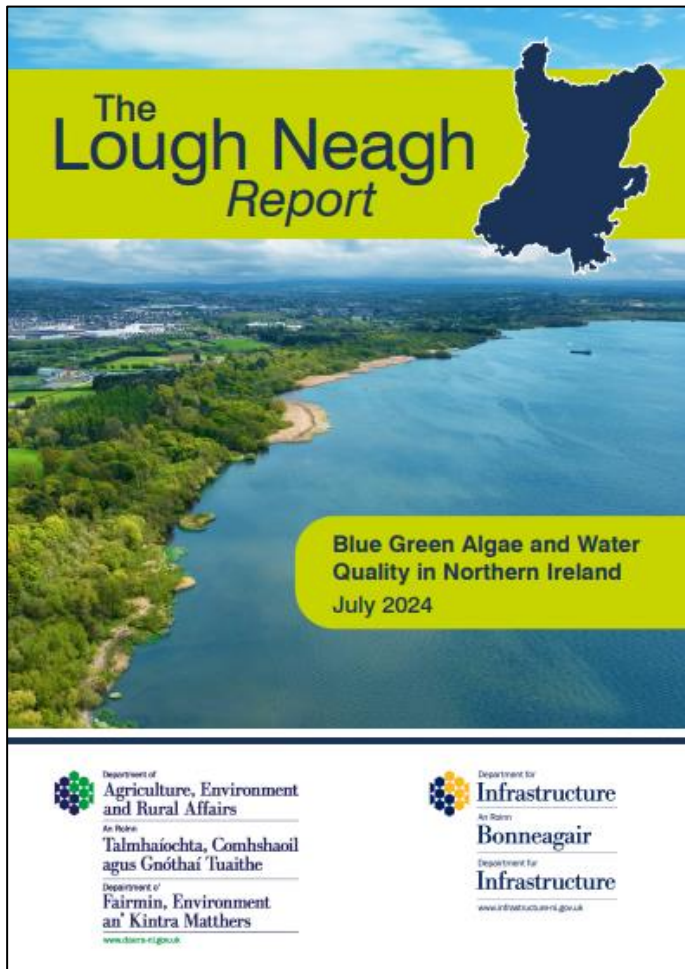




# Lough Neagh







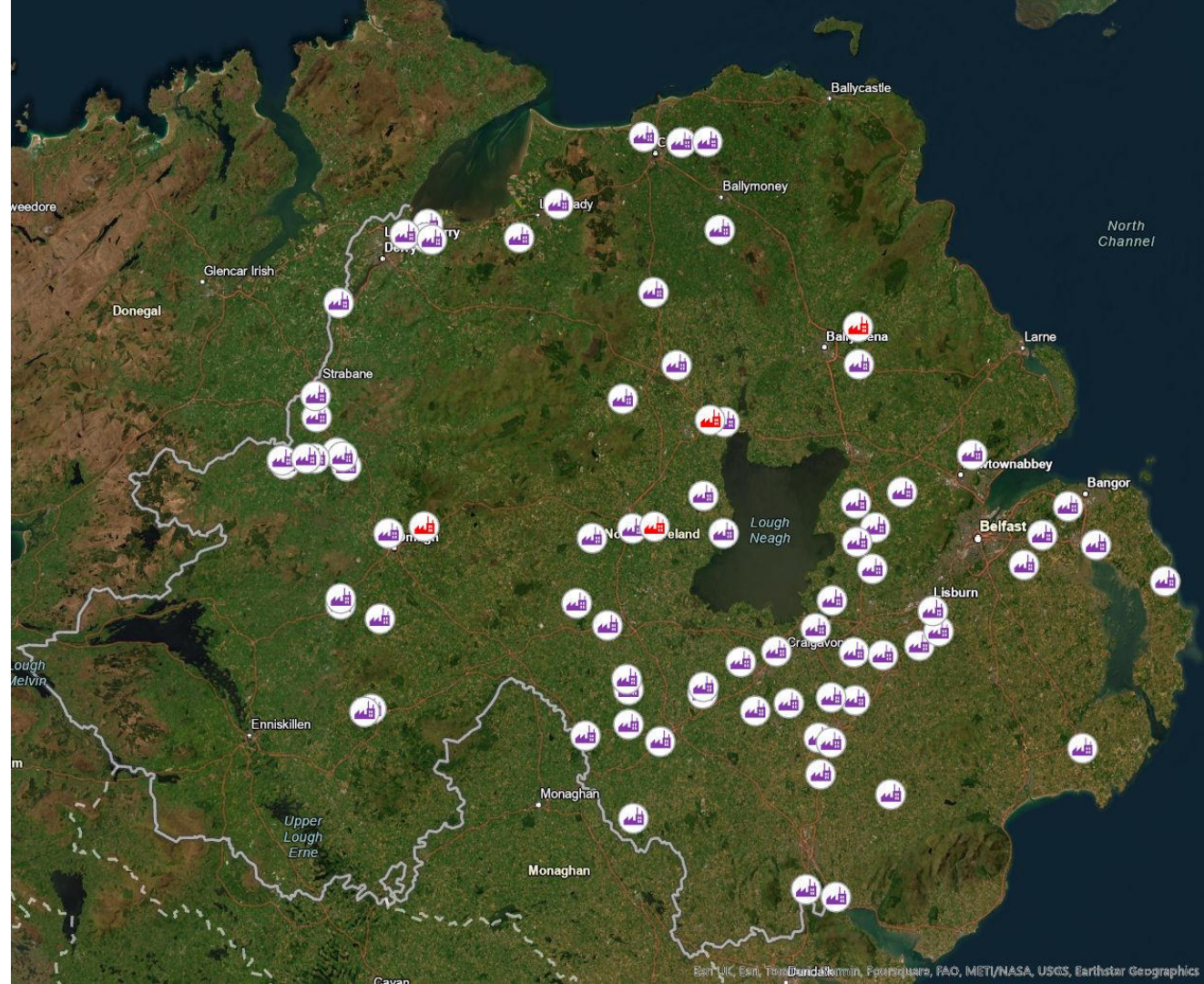
## Lough Neagh Report and Action Plan

- Education/Investment/Regulation/Enforcement
- 2 key actions
  - Launch of SBRI - Sustainable Utilisation of Livestock Slurry - Phase 2 Programme
  - Engage and fully consult with stakeholders regarding a new regulatory framework for the processing of slurry to reduce land spreading of excess phosphorus, resulting in renewable energy production and recycling/reuse of organic nutrients.





# AD plants in NI



# Renewable companies in NI awarded £600,000



Charlotte Morrey

May 26, 2023 3:20 pm



*Dr. Gary Lyons, AFBI with separated slurry at AFBI Hillsborough*

## SBRI SULS Phase 1

### Sustainable Utilisation of Livestock Slurry

- £100,000 each to 6 NI companies.
- Companies had to produce proof of concepts to deal with excess nutrients (particularly phosphorus) from livestock slurry in NI.
- All proposals involved the use of separated slurry as a feedstock for Anaerobic Digestion to produce renewable electricity/biomethane





# SBRI SULS Phase 2

## Sustainable Utilisation of Livestock Slurry

- Key details:
  - £12m – 3-year programme
  - Demonstration sites
  - Reduce surplus phosphorus within NI agriculture – 1000t/year
  - Ensure efficient recycling of organic nutrients
  - Production of exportable products

## First SULTS Phase 2 Supplier appointed:

## Blakiston Houston Estate Ltd “Farm2Export” Project



**BBC** For you Home News Sport Weather iPlayer Sounds

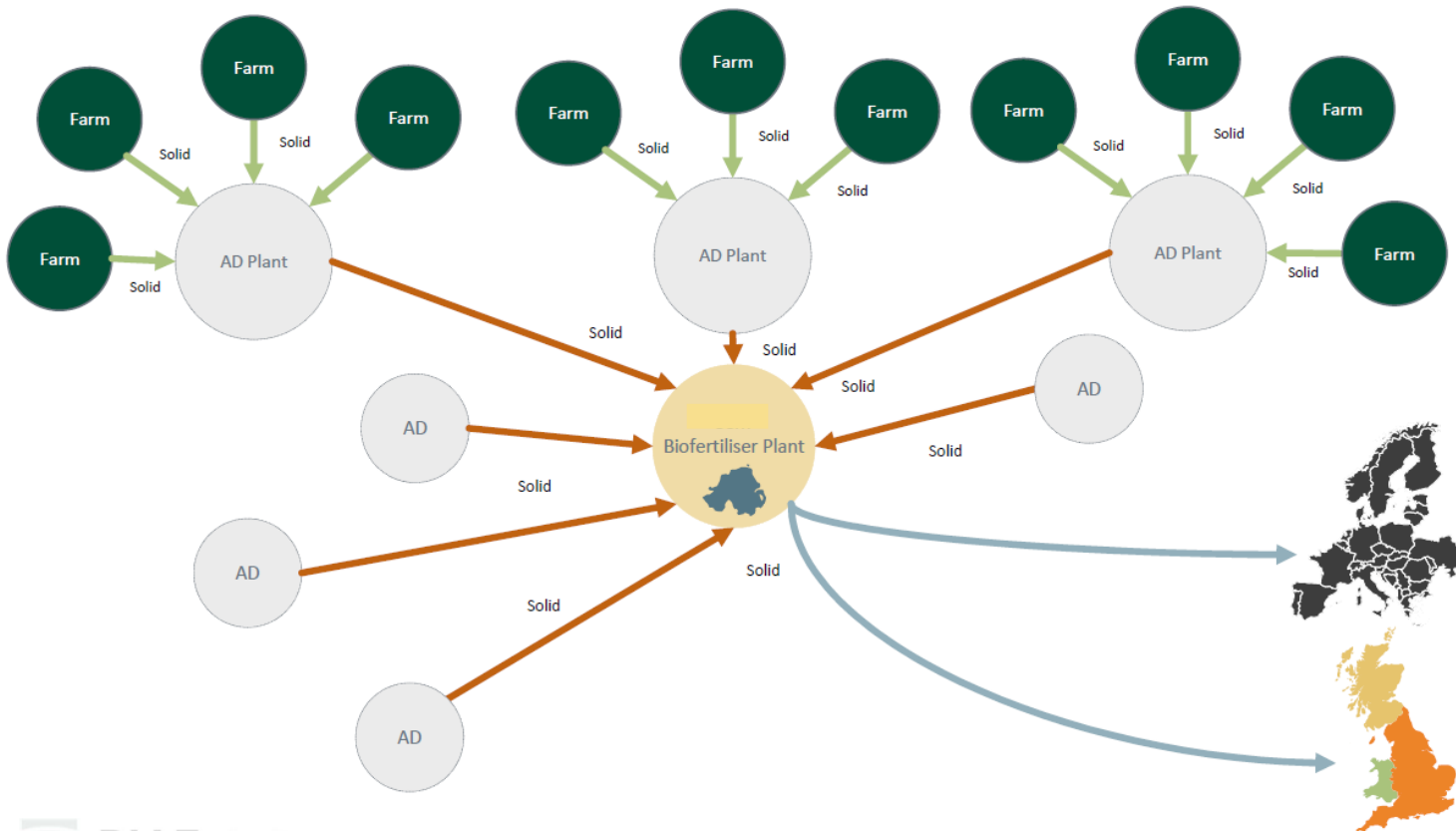
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## Slurry project a 'significant milestone', says minister







# Second SULS Phase 2 Supplier appointed October 2024:

# Centre for Competitiveness “sLurry Utilisation for the Creation and Exploitation Recoverable Nutrients and Energy” (LUCERNE)

A screenshot of a website article from the Department of Agriculture, Environment and Rural Affairs (DAERA). The article is titled 'DAERA awards £4m to Mid Ulster based successful Sustainable Utilisation of Livestock Slurry SBRI Phase 2 company'. The article is dated 28 October 2024. The text states that the Centre for Competitiveness (C for C) has been awarded £4million to help Northern Ireland's agriculture sector reduce excess phosphorus from livestock slurry, as part of the further roll out of Lough Neagh Action Plan. The award is part of the Department of Agriculture, Environment and Rural Affairs' (DAERA) Small Business Research Initiative (SBRI) Phase 2 project under the Sustainable Utilisation of Livestock Slurry (SULS) programme. The consortium of...  

Department of Agriculture, Environment and Rural Affairs  
Tábhachtas, Coimisiún agus Gaibhéal Tuisle  
Department of Agriculture, Environment and Rural Affairs

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## DAERA awards £4m to Mid Ulster based successful Sustainable Utilisation of Livestock Slurry SBRI Phase 2 company

Date published: 28 October 2024

The Centre for Competitiveness (C for C) has been awarded £4million to help Northern Ireland's agriculture sector reduce excess phosphorus from livestock slurry, as part of the further roll out of Lough Neagh Action Plan.

The award has been made as part of the Department of Agriculture, Environment and Rural Affairs' (DAERA) Small Business Research Initiative (SBRI) Phase 2 project under the Sustainable Utilisation of Livestock Slurry (SULS) programme. The consortium of

### Latest news

- DAERA awards £4m to Mid Ulster based successful Sustainable Utilisation of Livestock Slurry SBRI Phase 2 company  
28 October 2024
- Northern Ireland local authority collected municipal waste management statistics released  
24 October 2024
- Everyone has a part to play in protecting rural landscapes - Muir  
24 October 2024
- Equine Awards Day at Enniskillen



# What's the outcome?

- Improving the environment
- Increasing renewable energy production
- Improving nutrient management
- A sustainable agriculture sector



Today we act.  
Tomorrow  
we thrive.



Northern Ireland  
Executive



# “Cross Sectoral Drivers for an Anaerobic Digester Sector”

**NI Energy Institute**

29 January 2025

Jonathan McFerran

Deputy Director, DAERA

Today we act.  
Tomorrow  
we thrive.



Northern Ireland  
Executive

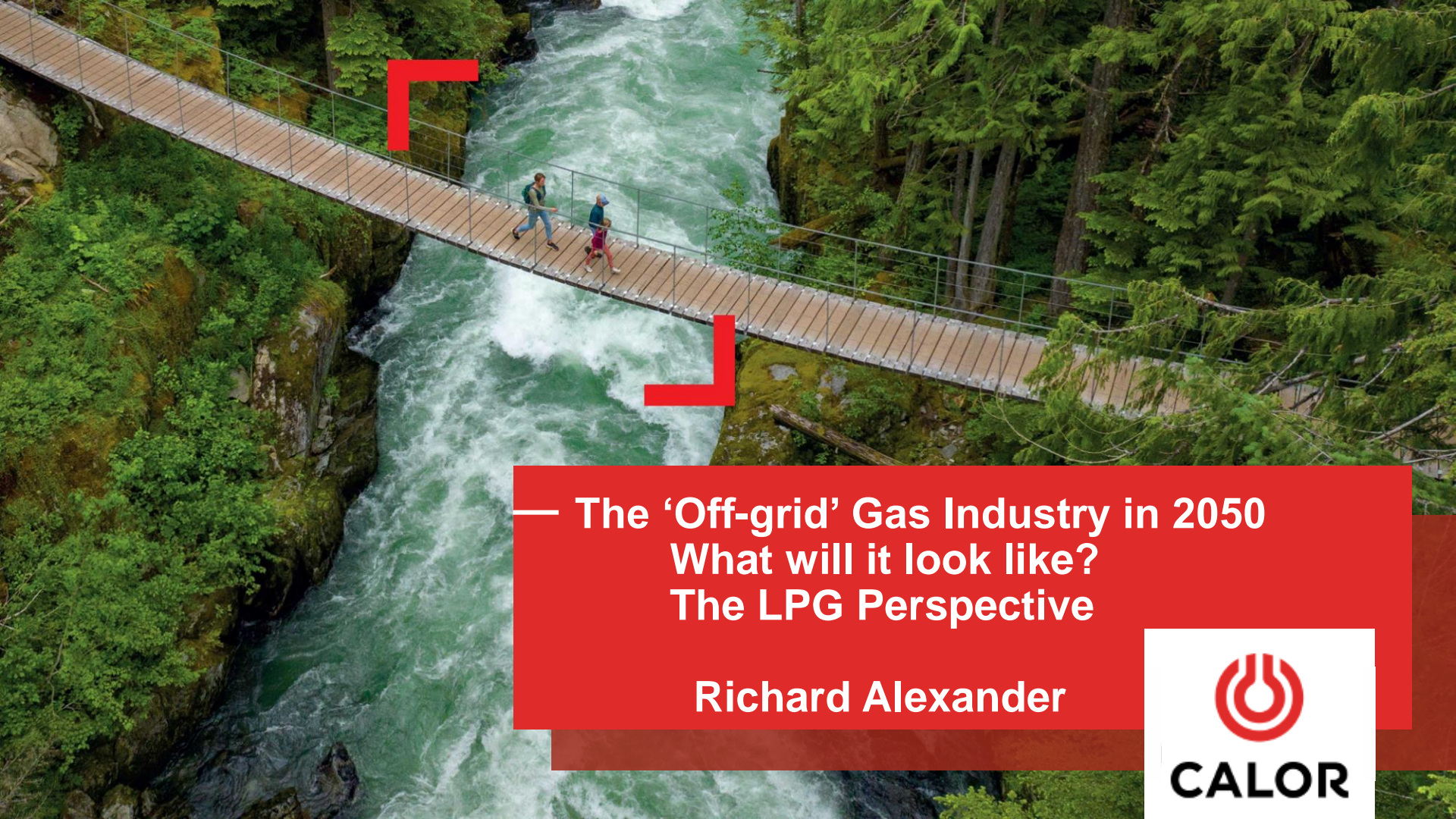


**Tea / Coffee Break  
10 minutes**

# An LPG perspective

Richard Alexander – Calor Gas





— The ‘Off-grid’ Gas Industry in 2050  
What will it look like?  
The LPG Perspective

Richard Alexander



**CALOR**



# — Perceptions of the 'off-grid' LPG industry?

Whistling kettle



Camping stove



Indoor Cabinet Heater



Holiday Caravan



BBQ



Outdoor Patio Heater





# — Cylinder LPG



Propane ( $C_3H_8$ )  
Butane ( $C_4H_{10}$ )

# Bulk LPG Propane ( $C_3H_8$ )



# Bulk LNG (Cryogenic) Methane ( $CH_4$ )



# Logistics

Forklift Trucks



# Agriculture

Grain Drying



# Industry

Pharmaceuticals



Autogas



Poultry Rearing



Asphalt Production



# Agri Food

Dairy  
Processing



# Beverage

Breweries /  
Distilleries



# Government

Hospitals / Nursing  
Care



Meat / Fish Processing



Coffee  
Roasting



Schools & Colleges

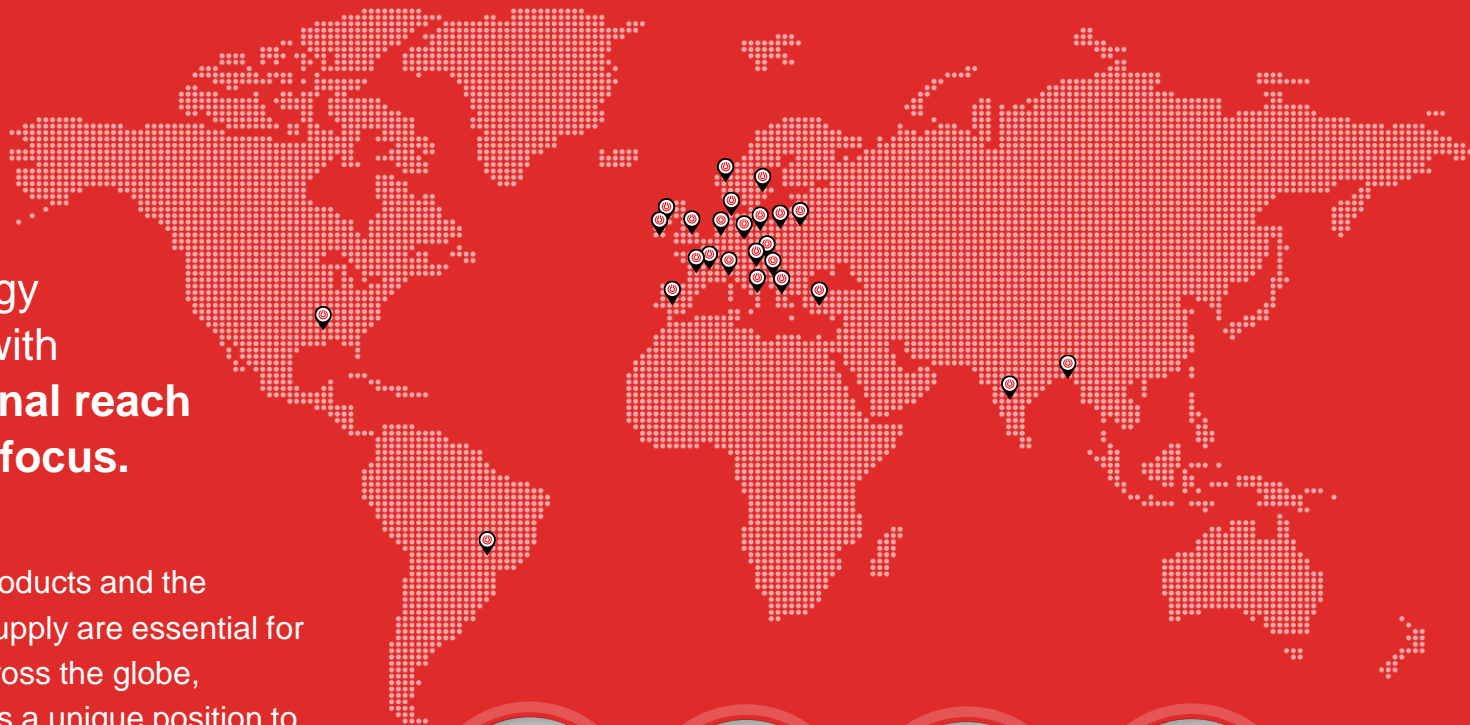




# — Customer Centric LPG Distribution

SHV Energy operates with **international reach and local focus.**

Our energy products and the services we supply are essential for customers across the globe, which offers us a unique position to support with their transition to sustainable, cleaner energy solutions.



**25**  
countries

**12,100**  
employees

**>10**  
Million  
mT/annum

**30**  
Million  
customers



# — Customer Centric LPG Distribution



# A business unit dedicated to Sustainable Fuels

A woman with dark hair in a ponytail, wearing glasses, a white lab coat, and blue nitrile gloves, is focused on using a pipette in a laboratory. She is standing at a lab bench with various equipment and containers. The background is bright and slightly blurred, suggesting a clean, professional environment. Two large red L-shaped graphic elements are placed on the left and bottom-right sides of the image area.

**Futura Fuels looks after SHV Energy existing and future sustainable offerings, focusing solely on products, services and solutions that assist with the energy transition.**

We strive to be the off-grid energy expert and innovate ahead of the market. We deliver flexible choices so that our customers can become more sustainable on their own terms.

We have been the first in the world to pioneer BioLPG and continue to invest into new energy solutions and technology to advance energy together.



# — Futuria Fuels - We're 'all-in' on sustainable fuels for off-grid

## **Dedicated to a sustainable future.**

At Futuria Fuels, it's our goal to enhance sustainable fuels through innovation – and do this for the many, not just the few.

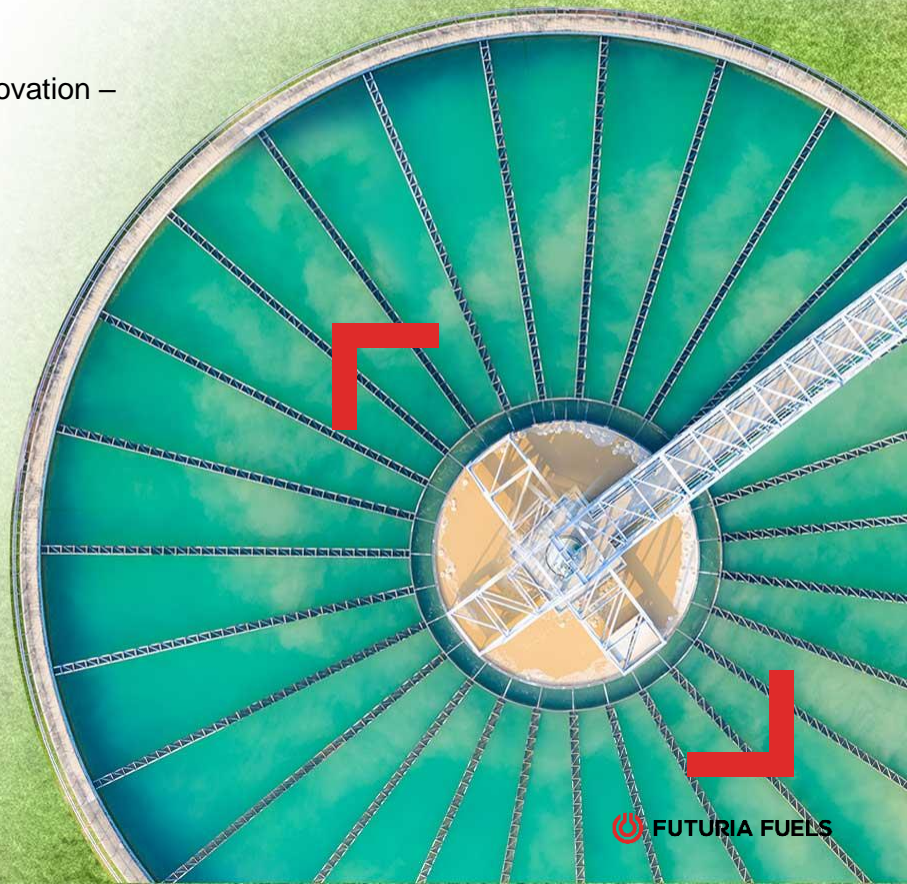
## **Progress needs partnership.**

We're proud of what we can contribute to this work, and this becomes even stronger when the whole industry is making strides together.

## **Small wins create big change.**

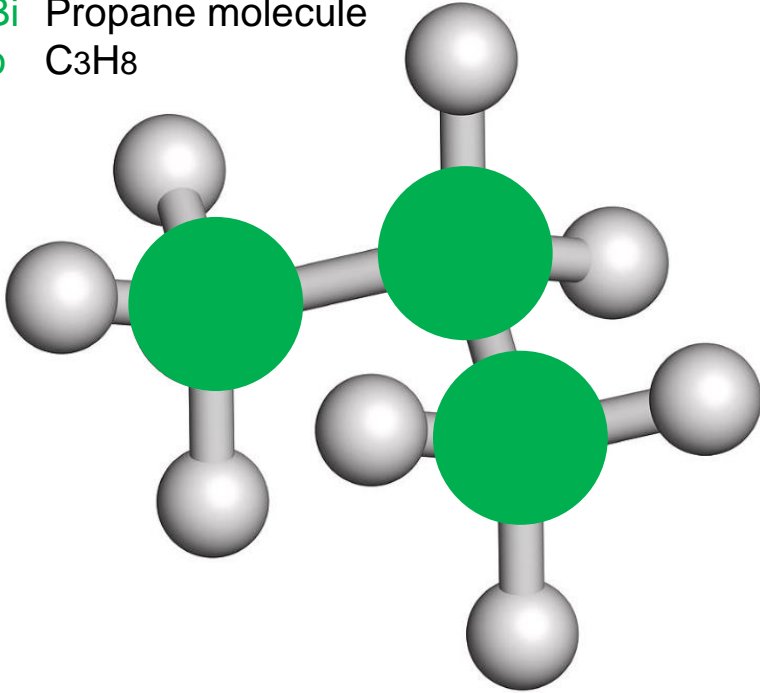
Progress towards sustainability is never as simple as A to B – but that's never stopped us from making change happen.

## **Developing on-purpose processes to produce renewable liquid gases.**



# — The journey from fossil to renewable fuel

Bi Propane molecule  
o C<sub>3</sub>H<sub>8</sub>



Rather than fossil propane indicated as black carbon atoms it's the 'renewable' feedstocks that effectively make it 'Bio', so becomes C<sub>3</sub>H<sub>8</sub>.

Under the Renewable Energy Directive (RED) the EU approves specific feedstocks for input into the production process

- Waste and Residues
- Vegetable Oils

BioLPG is 100% drop-in for fossil LPG

— Proud to Pioneer Renewable Propane  
First load Neste Biorefinery  
Rotterdam March 2018





# NESTE Biorefinery, Rotterdam



## ABOUT NESTE

### Providing tomorrow's solutions today

Neste creates solutions for combating climate change and accelerating a shift to a circular economy. We refine waste, residues and other innovative raw materials into renewable diesel, sustainable aviation fuel and more sustainable feedstocks for polymers and chemicals.



## INNOVATION

### Innovation is in Neste's DNA

Neste creates solutions for combating climate change and accelerating a shift to a circular economy. We continuously develop our existing solutions, while also exploring new business opportunities around scalable future raw materials and related technologies.



## SUSTAINABILITY

### Sustainability is deeply embedded in Neste's everyday business

Neste's renewable and circular solutions contribute to running societies more sustainably and reducing dependency on fossil raw materials. Setting high standards for sustainability enables our growth and purpose: creating a healthier planet for our children.

# — Supporting research and development

**We want to encourage fresh perspectives on:**

- On-purpose sustainable fuel production
- Novel or repurposed fuel production processes
- Increased yield efficiency
- Carbon emission reduction across the fuel's life cycle





# — How will we achieve our goals?

Securing supply, funding open innovation challenges & research, investing in joint ventures, co-financing projects



Leading (directly and indirectly) complex stakeholder project development projects ...

- ✓ *Global Biofuels Alliance*
- ✓ *BioFutures Campaign*
- ✓ *Clean Energy Ministerial*

- ✓ *World LPG Association*
- ✓ *Liquid Gas Europe*
- ✓ *World Biogas Association*

- ✓ *European Biogas Association*
- ✓ *International DME Association*
- ✓ *Hydrogen Council*

# >25 R&D Partners

## Around the World



- GTI Energy**  
Ethanol to LPG Scale-up
- LanzaTech**  
Novel Pathways to LPG

- Illinois Institute of Technology**  
Electrochemical conversion of CO<sub>2</sub> and H<sub>2</sub> to propane
- Penn State University**  
Non-thermal plasma conversion of CO<sub>2</sub> and H<sub>2</sub> to propane
- University of Bahia**  
Biomass dewatering with DME
- Universidade Federal de Minas Gerais**  
Conversion of agricultural residues to propane
- Propeq**  
Negative carbon intensity ethanol optimization
- University of Santa Caterina**  
Butyric Acid to Propane
- Universidade Federal Rio de Janeiro**  
LPG from plastics
- Universidade Federal Fluminense**  
Ethanol to LPG
- SA/DE consortium**  
Syngas to LPG
- Queens University**  
LPG from Volatile Fatty Acids
- Thermax**  
rDME in India

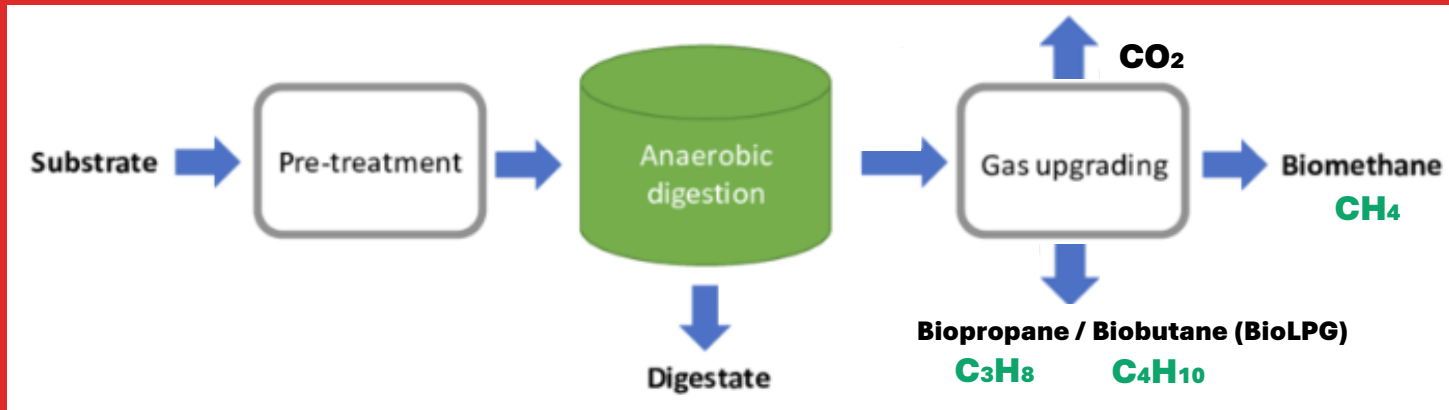
 = Broad Programme R&D Partner

 = R&D Partner

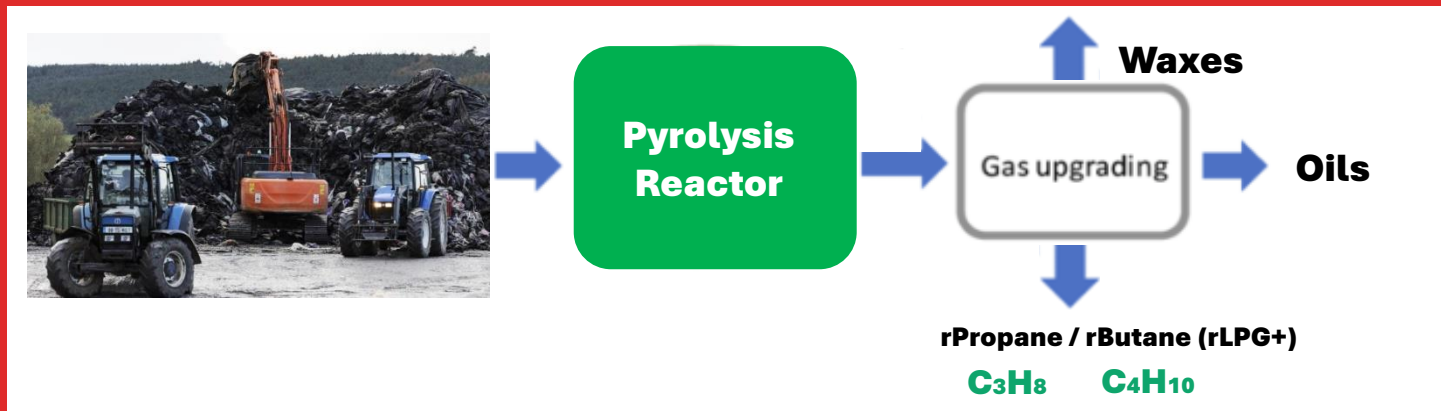
- University of York**  
Trans-methylation of ethylene
- University of Ulster**  
Microbial Production of Propane
- University of Manchester**  
Catalytic cracking of plastic wastes to LPG
- Aston University**  
Butyric Acid to Propane
- Drochaid Research**  
Various
- University of Amsterdam**  
CO<sub>2</sub> + H<sub>2</sub> to LPG
- University of Brescia**  
Syngas to LPG
- Mumbai Institute of Chemical Technology**  
Aqueous Phase Reforming of Sewage Sludge to BioLPG
- National Institute of Technology Calicut**  
BioLPG from Rice Straw
- EnzymeTree**  
Microbial production of propane
- Furukawa Electric/Astomos**  
Propane from biogas

*...and more on the way...*

# — Anaerobic Digestion ..... however if we change the bacteria



# — Pyrolysis ... heat waste plastic to 500-750 °C



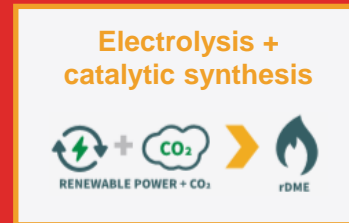
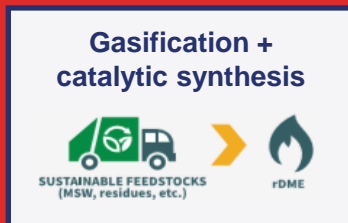
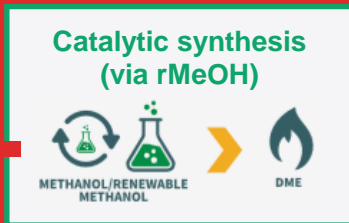


# Gasification

## ... to produce Dimethyl Ether



## ... similar properties to LPG



Dimethyl-ether is a single molecule that can be produced from a wide range of renewable feedstocks.



including non-organic fraction of municipal waste, non recyclable plastic, tyres



H<sub>2</sub> + CO<sub>2</sub> captured from industrial or biogenic processes,  **FUTURIA FUELS** or from the atmosphere



# What is rDME and why is it important for the LPG industry?



01.



## A simple product

Dimethyl-ether is a **single molecule** that can be produced from a **wide range of renewable feedstocks**.

02.



## Easy to handle

DME is **chemically similar to propane and butane**, and is a gas at room temperature and pressure. Like LPG it is easily transported as a liquid in pressurised cylinders and tanks.

03.



## Safe, clean and green

rDME can reduce **GHG emissions** by up to 85% compared to diesel and heating oil, and emits no harmful particulates.

04.

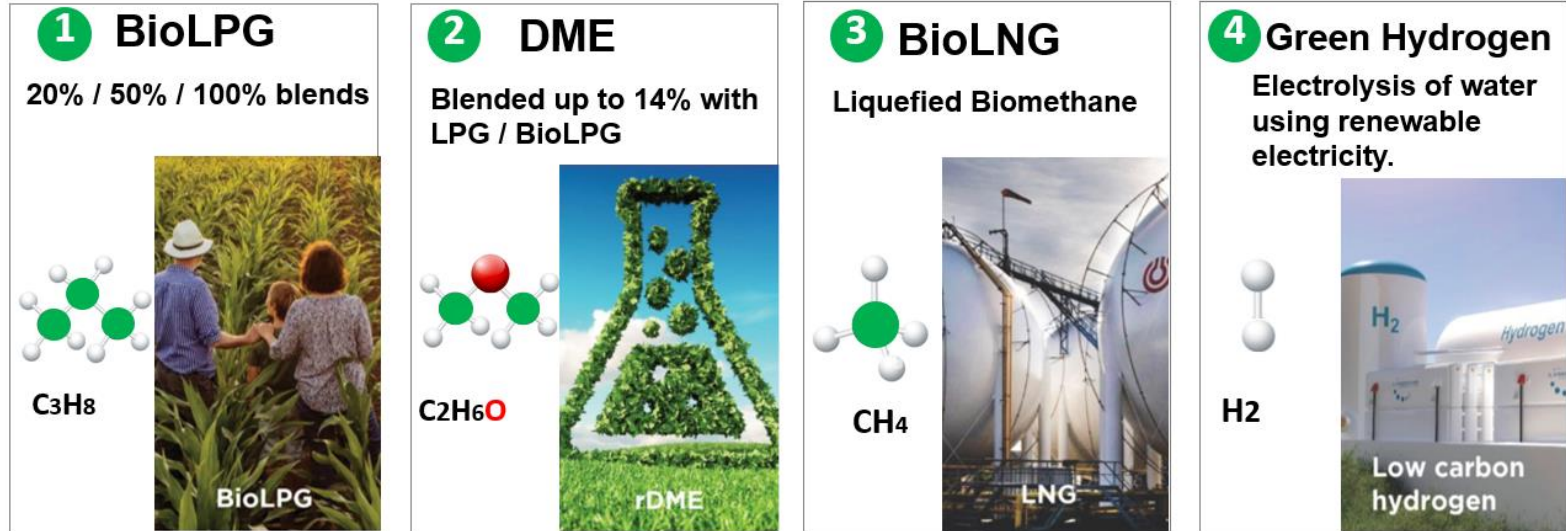


## Versatile Fuel

DME has been used for over **50 years in the chemicals sector** as an aerosol propellant. It can also be used in the transport sector, for cooking, as well as domestic and industrial heating.

# Calor's Pathway to Sustainability

Our strategy is to ensure that the source and supply of our products becomes increasingly renewable and sustainable.

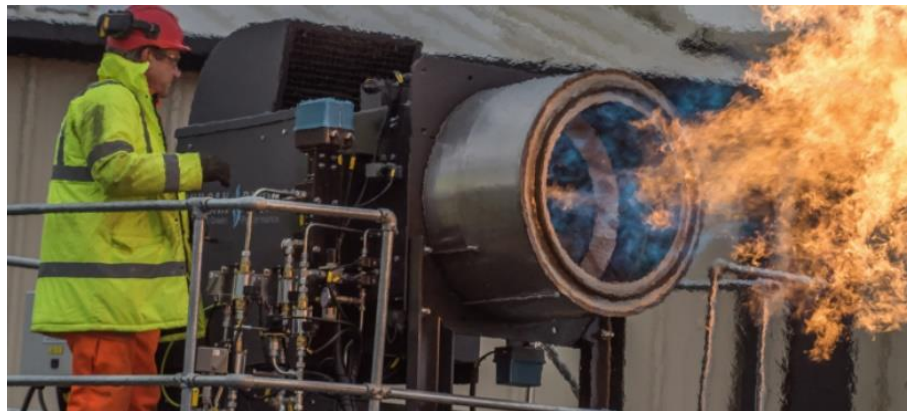


Transition to Net Zero Carbon

# Hydrogen trials in the Asphalt Sector

**VULCAN BURNERS**  
Efficient Green Performance

  
**CALOR**



# H2 for asphalt production - demo



H2 only



H2 & (Bio)Propane blend



Temperature



NOx emissions





An aerial photograph of rolling green hills at sunset. The sun is low on the horizon, casting a warm glow over the landscape. The hills are covered in lush green vegetation, with some fields showing distinct rows of crops. A small cluster of white buildings is visible on one of the hills. The sky is a mix of light blue and orange from the setting sun.

**Thank You**

[sustainablefuels@calorgas.ie](mailto:sustainablefuels@calorgas.ie)



# Importance of Regional Integrated Solutions

Shane Rafferty – Gas Networks Ireland



Gas  
Networks  
Ireland

# Importance of regional integrated solutions

Shane Rafferty  
Northern Ireland Energy Transition Manager

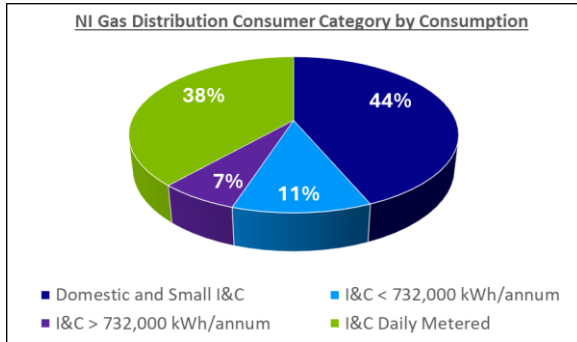
Energy Institute Northern Ireland Gas Symposium  
January 2025



# The role of the NI gas network today

- **17 TWh demand in 2024**

- 10.1 TWh power generation
- 7 TWh distribution



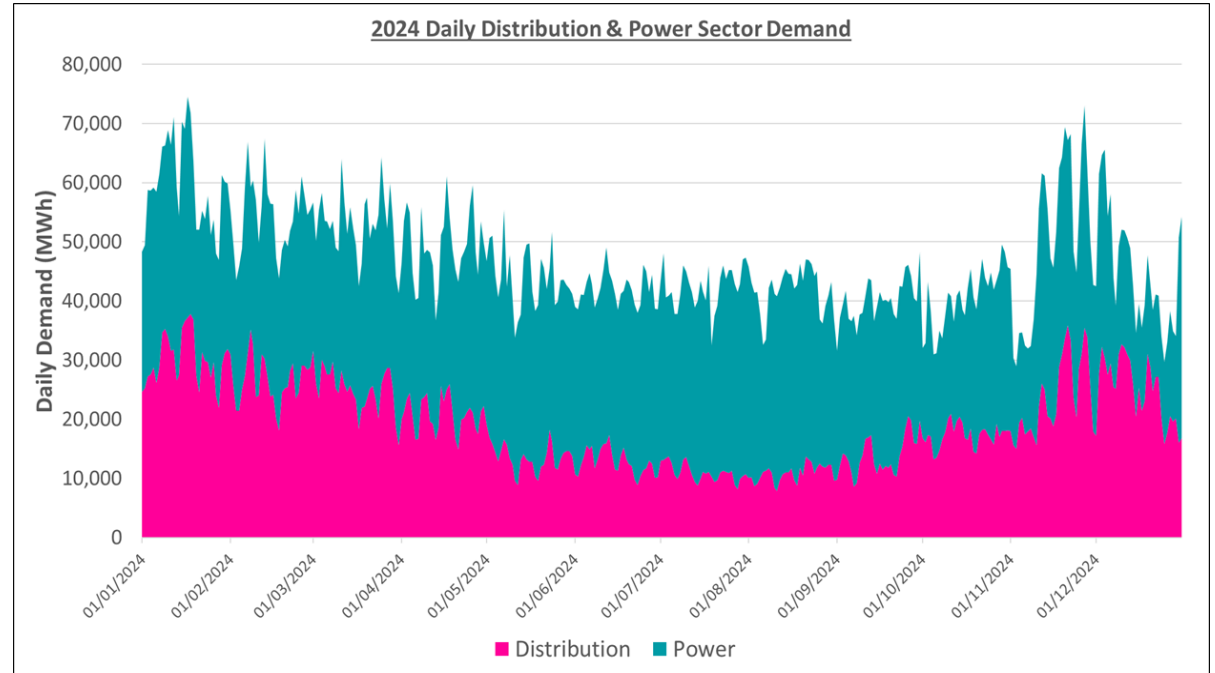
- **Diurnal & seasonal flexibility**

- **Capacity for peak demand**

- ~4.7 GW maximum in 2024

- **Much lower minimum demand**

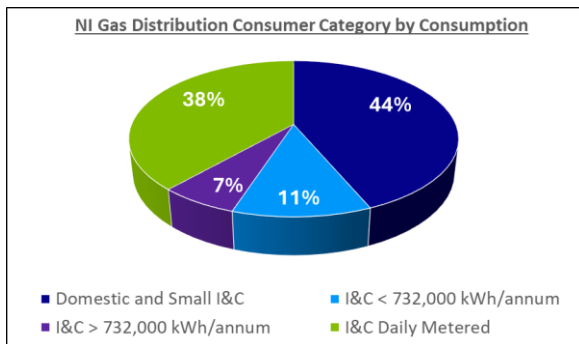
- challenge for distributed renewable gas injection



# The role of the NI gas network today

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- 7 TWh distribution



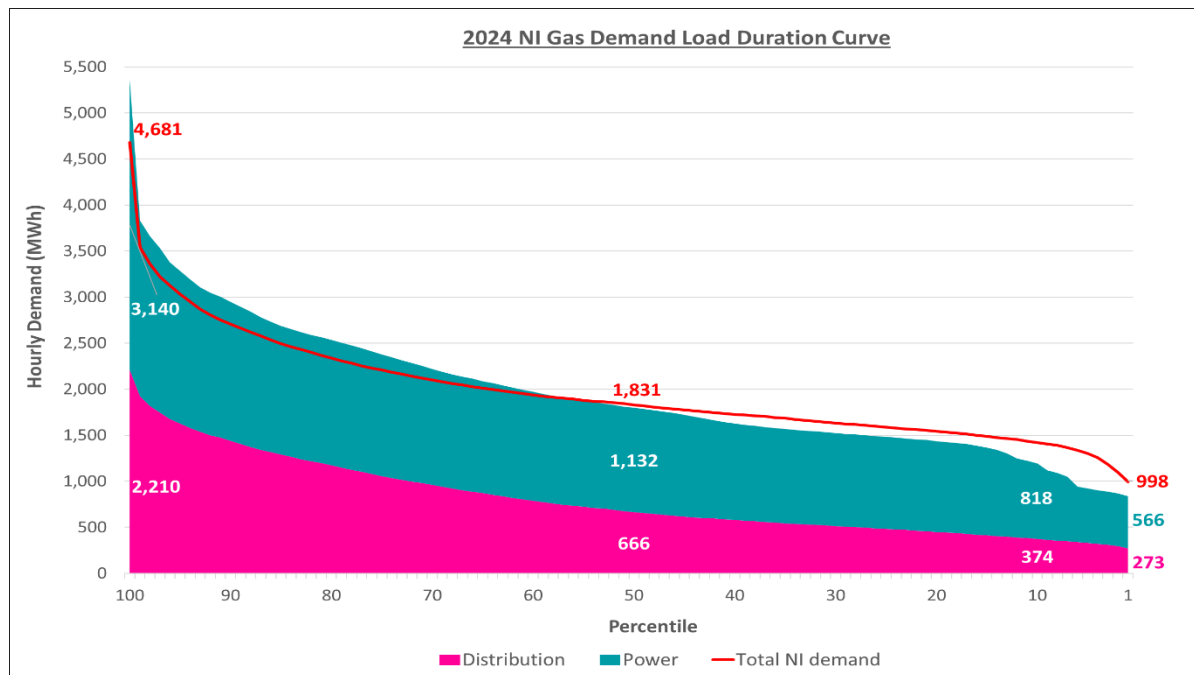
- **Diurnal & seasonal flexibility**

- **Capacity for peak demand**

- ~4.7 GW maximum in 2024

- **Much lower minimum demand**

- challenge for distributed renewable gas injection



# Gas Hybrid Heating

## • Reduced emissions

- COP < 2.75 results in higher system-level emissions when supplied by OCGT, as with gas boiler
  - trials prove higher COP challenging at low temperatures
- improved cost-effectiveness for government support
  - greater deployment levels due to reduced upfront cost
  - robust to sensitivity analysis on power decarbonisation, reduced heat pump cost, etc.

## • Reduced system costs (designing for peak heat demand)

- Gas transmission capacity
  - Electricity generation capacity
    - ~£250m/year SEM Capacity Market cost for 3kW per dwelling
- ‘After Diversity Maximum Demand’ for NI’s ~821k households

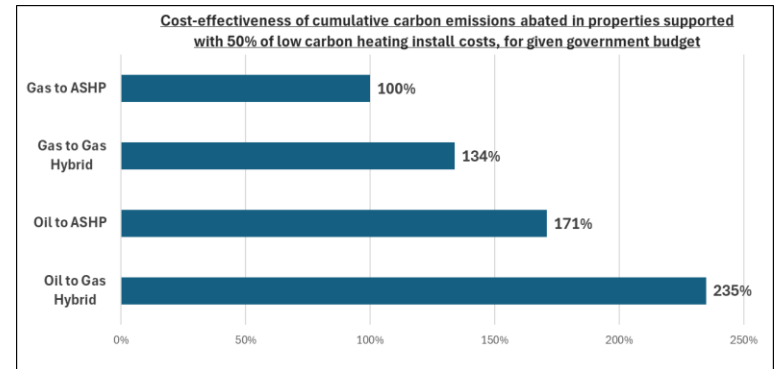
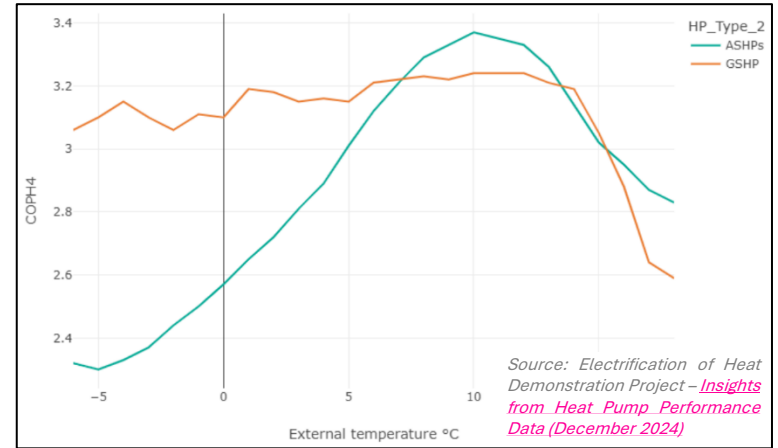
## • Consumer acceptance

- not contingent on prior thermal efficiency retrofit measures
- familiarity, avoiding negative experiences risking market growth

## • Readily feasible to fully decarbonise in NI

- [Biomethane Request for Information results report](#)

– ~3.6 TWh/annum of projects identified

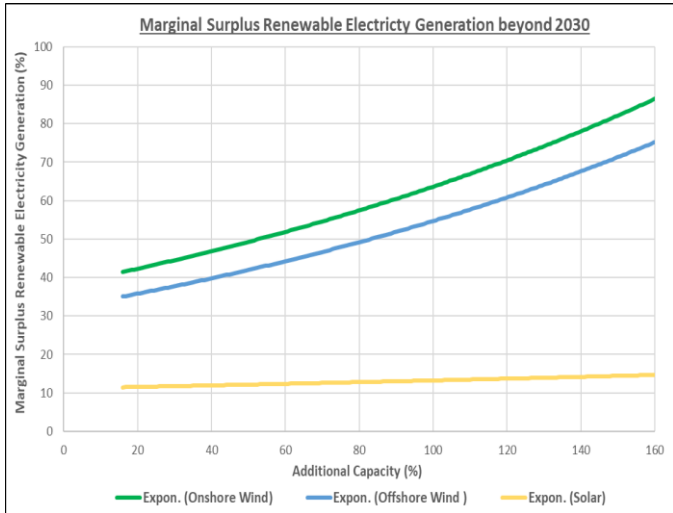




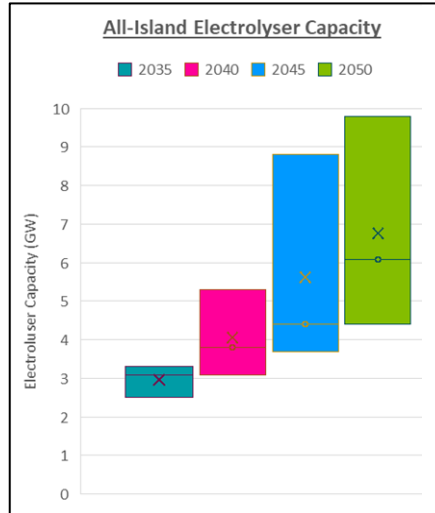
# Electrolytic hydrogen supporting renewable integration

- ‘Surplus’ renewable generation exponential

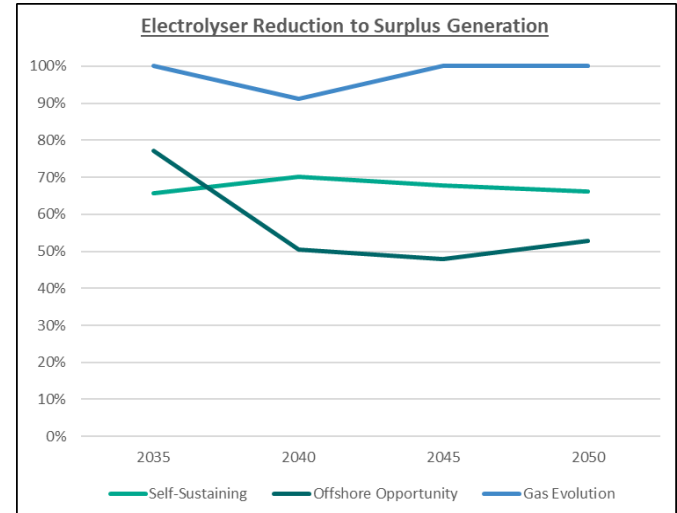
- needs a flexible demand solution to support economical / societal case for further deployment



Developed from basis of Figures 27 & 28 in SONI / EirGrid *Shaping Our Electricity Future Roadmap: Version 1.1*



Source: SONI / EirGrid *Tomorrow's Energy Scenarios 2023* – data in *TES 2023 Databook*




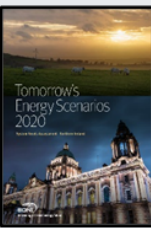



- Need to develop at-scale demand and enabling infrastructure (networks & storage)

- gas interconnection repurposing / new development an option

- need to keep pace with GB and Rol network in any case (incl. blending)

# Integrated Transmission System Planning Framework

	10-Year	2050
Market	<p><b>Gas Adequacy Statement</b></p> <p>Coordinated with SONI's "All-Island Resource Adequacy Statement" (which will replace their "Generation Capacity Statement")</p> 	<p><b>Energy Horizons</b></p> <p>Coordinated with SONI's "Tomorrows Energy Scenarios" ("TES").</p> 
Infrastructure	<p>and "Ten Year Transmission Forecast Statement".</p> 	<p><b>Gas Network Vision</b></p> <p>Coordinated with SONI's "TES System Needs Assessment".</p> 
	<p><b>Ten Year Network Development Plan</b></p> <p>Coordinated with SONI's "Transmission Development Plan".</p>	

- **Enhanced TSO framework**
  - 10-year & 2050 outlook
  - integrated working with SONI
  - first Gas Adequacy Statement deliverable by end 2025
    - stakeholder engagement and consultation opportunities
- **Further framework development required for long-term infrastructure planning**
  - modelling first step, considering scope in parallel
  - policy, legislative & regulatory enablers needed
    - e.g. economic regulation of hydrogen

# Pathway to a Net Zero Carbon Network

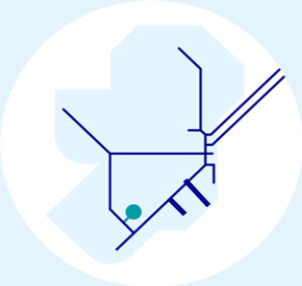
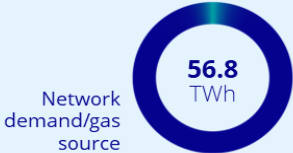
- repurposed, resized, and fully decarbonised network by 2045

- with regards NI assets, “stakeholders in Northern Ireland will determine the transition pathway and its timing”

## Net zero carbon network by 2045

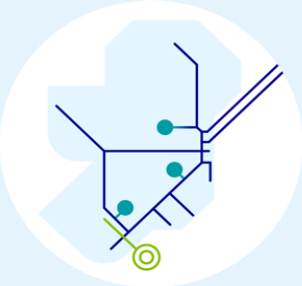
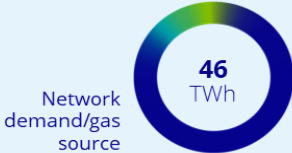
### Foundation

Now – end 2027



### Development

2028 – 2032



### Repositioning

2033 - 2040

Phase 1  
2033 - 2036  
Network demand/gas source



Phase 2  
2037 - 2040  
Network demand/gas source



### Conversion

2041 – 2045

Parallel H<sub>2</sub> and biomethane networks



By end-2027

By end-2032

By end-2036

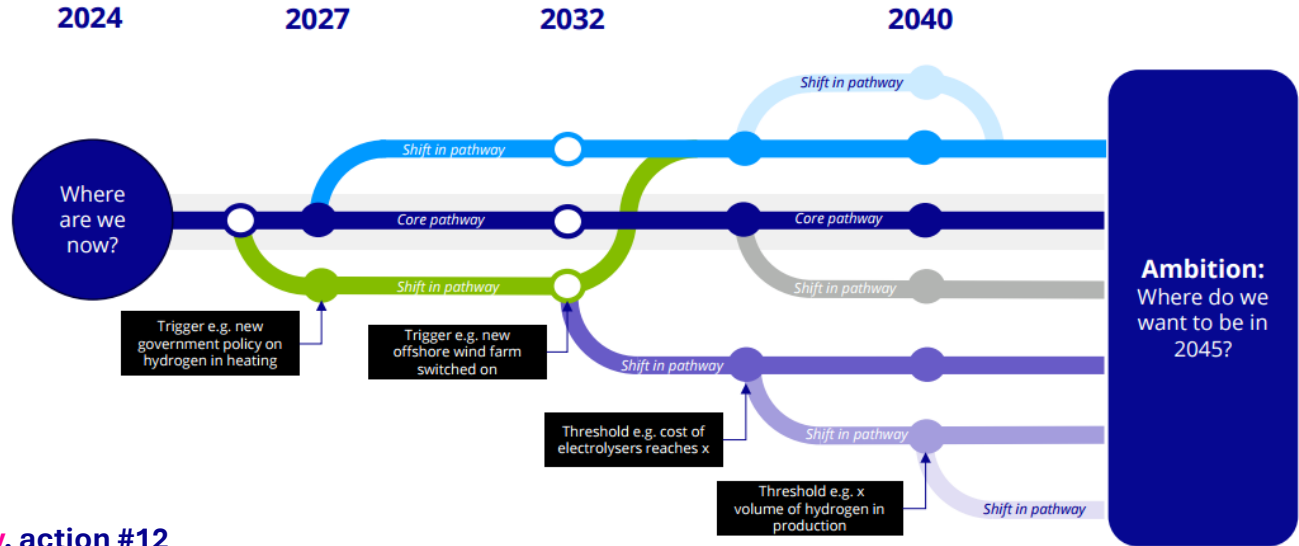
By end-2040

By end-2045

# ROI infrastructure planning initiatives

## • ‘Core Flexibility Report’

- price control incentive / requirement
- adaptive planning
  - trigger / decision points
- system needs assessment
  - central plan of low regrets investments
- stakeholder engagement



## • Network Transition Plan

- **National Hydrogen Strategy, action #12**
  - “identify where the network can be repurposed, or where new pipelines may be required and provide detailed costings and a programme of works”.
- **Energy Security Package Actions, action #16**
  - “long-term planning, usage and investment requirements in view of our energy system in line with our sectoral emissions ceilings”.

- **Gas plays a key role today, and will in a net zero future**
  - use in power, heat and transport demand
  - supply transitioning to biomethane and hydrogen
- **Integrated planning needed to optimise NI's energy transition**
  - recognising NI's distinctions & benefits of links with other jurisdictions
  - informing policy and regulatory decision-making, and supporting achieving energy and climate objectives
- **GNI (UK) committed to working with all to deliver**
  - new collaborative deliverables & stakeholder engagement activity
  - further development of planning framework will be required in future





Gas  
Networks  
Ireland

**Thank you**

[shane.rafferty@gasnetworks.ie](mailto:shane.rafferty@gasnetworks.ie)



# Hybrid Heating Solutions

Dan Wilden – Alpha Boilers

*Alpha*

# HYBRID HEAT PUMPS

- A PRACTICAL TRANSITION TO RENEWABLE TECHNOLOGY.

Speaker: Dan Wilden

# OBJECTIVES.

## *Alpha*

- WHO ARE ALPHA.
- WHAT IS A HYBRID HEAT PUMP SYSTEM.
- WHY WE BELIEVE HYBRIDS ARE KEY TO DECARBONISATION.
- HOW HYBRIDS ARE ALREADY BEING USED IN EUROPE.
- THE ALPHA E-TEC HYBRID.
- WHAT WE HAVE DONE SO FAR IN NORTHERN IRELAND.

# WHO ARE ALPHA.



EXPLORE OUR RANGE

FOR ALL YOUR  
**TOMORROWS**  
*there's* **Alpha**

- TRUSTED BRAND FOR OVER 55 YEARS, COVERING DOMESTIC AND COMMERCIAL HEATING SOLUTIONS.
- WE ARE KEEN ON LEADING THE SPACE WITH HYBRID HEAT PUMP TECHNOLOGY.
- ALWAYS BEEN KNOWN FOR INTRODUCING SMART INNOVATIVE HEATING SYSTEMS.
- DIRECT SUPPLY CHAIN FROM OUR PARENT COMPANY IMMERGAS WHO ARE BASED IN NORTHERN ITALY.





- ESTABLISHED IN 1964
- IN-HOUSE R&D, PRODUCTION, QUALITY, SALES - ALL APPLIANCES ARE DESIGNED IN ITALY
- PRODUCED OVER 9 MILLION BOILERS
- BRESCELLO FACTORY OVER 60,000 M<sup>2</sup>, POWERED BY OVER 4000PV PANELS
- SINCE 2000 IMMERGAS HAS INVESTED IN PHOTOVOLTAIC, SOLAR THERMAL, HEAT PUMPS AND HYBRID SYSTEMS
- 2018 2,500M<sup>2</sup> LABORATORIUM R&D FACILITY OPENS WITH 60 EXPERTS AND ENGINEERS, 20KM OF CABLE AND 30KM PIPES





**We export our equipment to more than 50 countries**

# WHAT IS A HYBRID HEAT PUMP.

GENERALLY, A HYBRID IS A HEAT PUMP AND A FOSSIL FUEL BOILER.

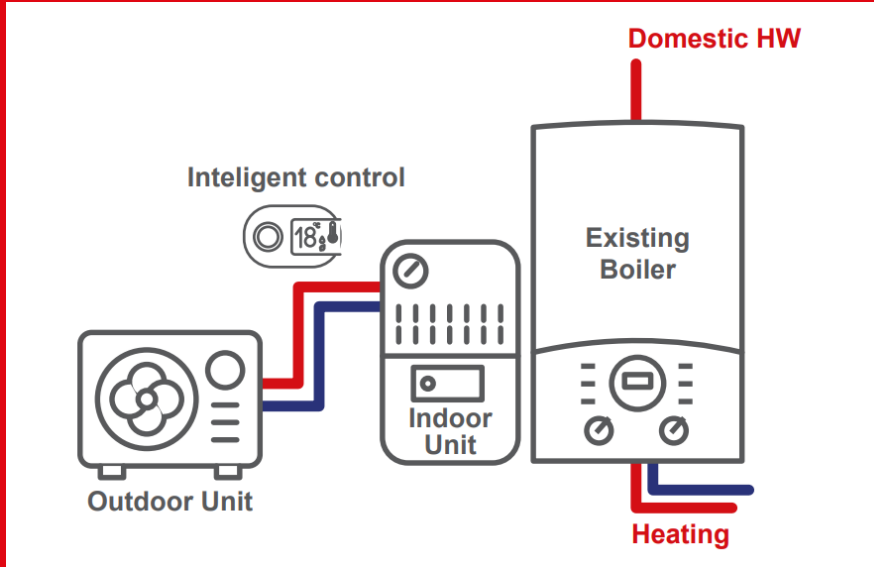
WE ARE ALL USED TO THE CONCEPT OF HYBRID CARS:

RANGE ANXIETY.

WHERE CAN I CHARGE IT.

COST OF ELECTRICITY.

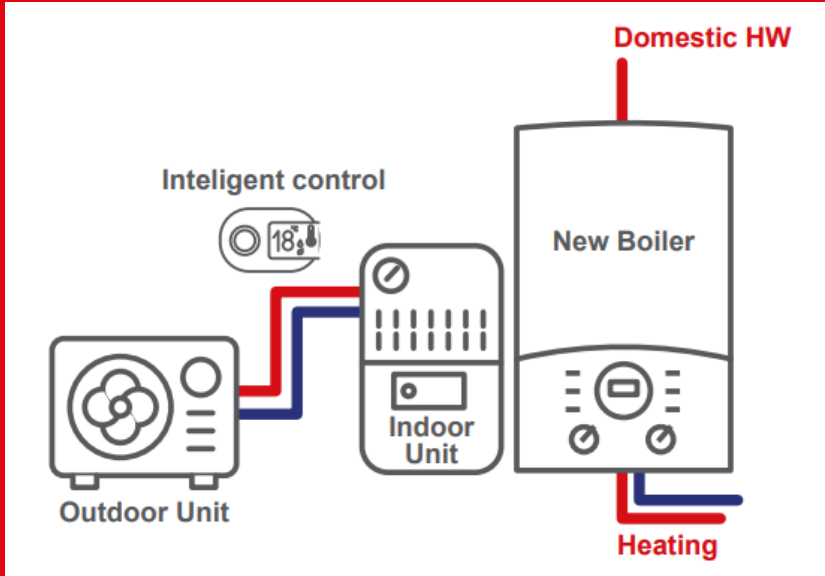
# TYPES OF HYBRIDS.



## RETROFIT HYBRID.

- A heat pump added to an existing boiler.
- Requires a good condition boiler.
- Low cost option.
- If using a regular/system boiler the cylinder needs upgrading.
- Warranty is spread across two manufacturers.

# TYPES OF HYBRIDS.

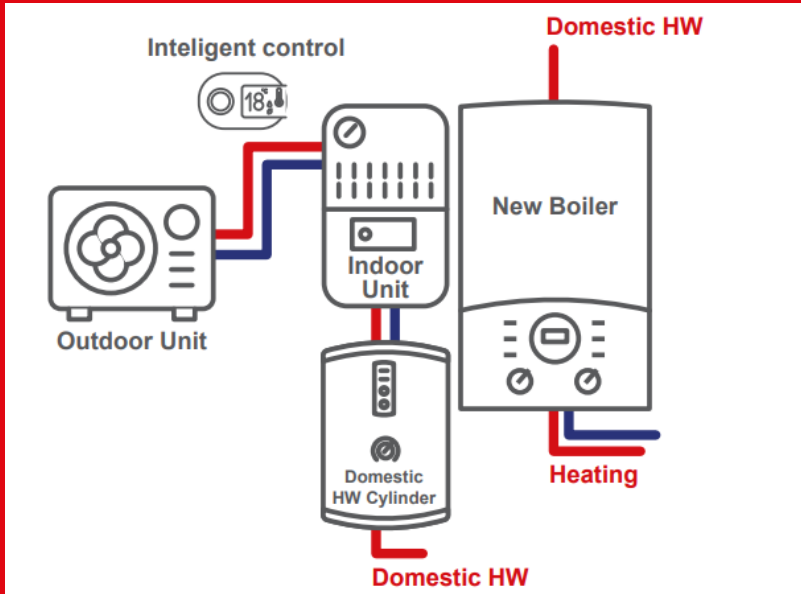


## COMBINATION HYBRID.

- A heat pump fitted with a new combination boiler.
- Instantaneous hot water.
- Minimal space within a property.
- Ideal retrofit solution.
- Usually needs a detailed design and connection.



# TYPES OF HYBRIDS.



## HYBRID WITH STORED HW.

- A boiler, heat pump & heat pump cylinder.
- Smart controls, utilising the best technology.
- Requires a new HP cylinder with a larger coil.
- High upfront cost but future proof.

# WHY WE BELIEVE HYBRIDS ARE THE FUTURE FOR OUR HEATING.

OUR HOUSING STOCK.

DISTRESS PURCHASE MARKET.

COST OF FULL HEAT PUMP INSTALLATIONS.

ENERGY INFRASTRUCTURE.

CUSTOMER MINDSET & FAMILIARITY.

HYBRIDS ARE A TRANSITIONAL PRODUCT.



# HOUSING STOCK.

- BUILDING FABRIC.
- AIRING CUPBOARD/CYLINDER SPACE.
- EXTERNAL SPACE



# Alpha

## DISTRESS PURCHASE MARKET.

- 60% OF HOMES HAVE A GAS COMBINATION BOILER.
- 80% OF NEW BOILERS ARE DISTRESS PURCHASES.
- AN AVERAGE HEAT PUMP INSTALL TAKES 5 DAYS TO COMPLETE.
- AN AVERAGE HEAT PUMP INSTALL HAS TO WAIT 2-3 WEEKS FROM SURVEY DATE TO INSTALLATION.



# COST OF A FULL HEAT PUMP INSTALL.

# Alpha

- UPGRADE THE EXISTING HEATING CIRCUIT AND EMITTERS.
- APPLY FOR ELECTRICAL CONNECTION UPGRADE
- FIT HEAT PUMP CYLINDER AND CONNECT



RANGE FROM: **£8000 - £18,000**

HYBRID: **£6000 - £7000**



# Energy Infrastructure.

The E-Tec Hybrid maximum draw is 10.3amps.

Hair dryer uses 10amps

Kettle 13amps

2kW fan Heater 13amps

Electric Shower 40amps



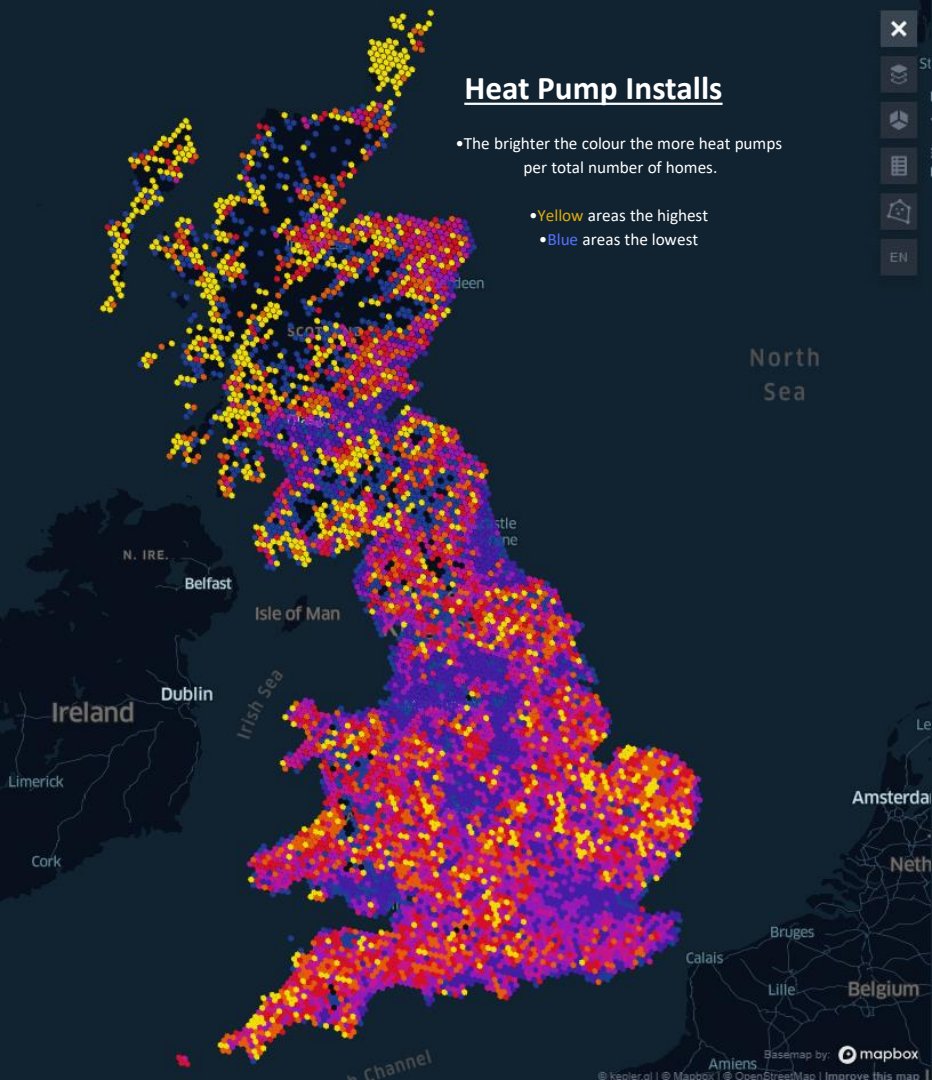
Outdoor Unit	Nominal Values		Field of Tolerable Voltage		Maximum absorbed current (MAC) in normal operation	Supply fuse/MCB required (a) 100mA RCD	Power supply cable
	Hz	V	V	V	A	A	
E-Tec external heat pump	50	220-240	198	264	10.3	16	2.5 mm <sup>2</sup> , 3 core

For the connection between outdoor and indoor units use H07RN-F or H05RN-F class cables to power the indoor unit.

## Heat Pump Installs

•The brighter the colour the more heat pumps per total number of homes.

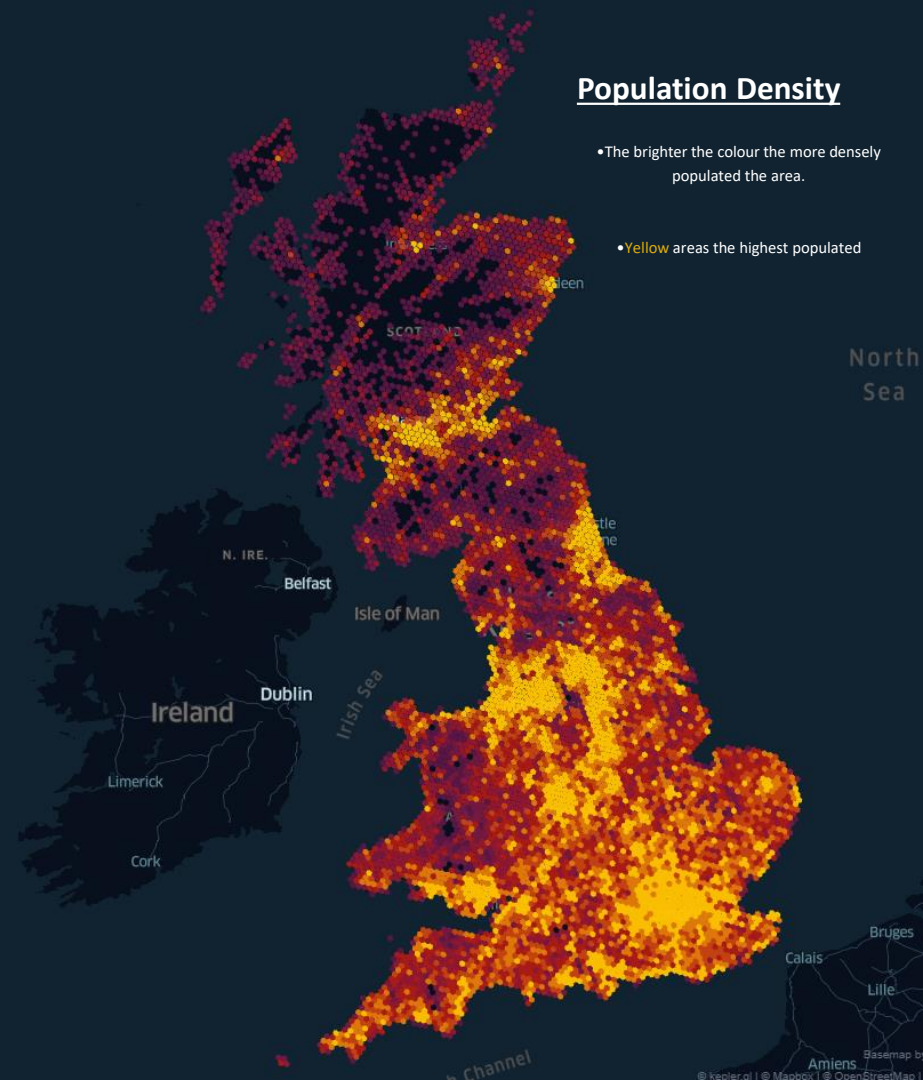
- Yellow areas the highest
- Blue areas the lowest



## Population Density

•The brighter the colour the more densely populated the area.

- Yellow areas the highest populated



***Alpha***

WHAT'S HAPPENING IN EUROPE.

# Alpha



Rijkdienst voor Ondernemend  
Nederland

## Dutch hybrid heat pump action plan

Randall Hanegraaf  
Dutch Enterprise Agency

CA-RES  
Madrid  
29 sept 2023

- NETHERLANDS - NO REPLACEMENT GAS BOILERS FROM 2026

CAN ONLY INSTALL A HYBRID HEATING SYSTEM.  
30% GOVERNMENT SUBSIDY

## SUPERBONUS 110%

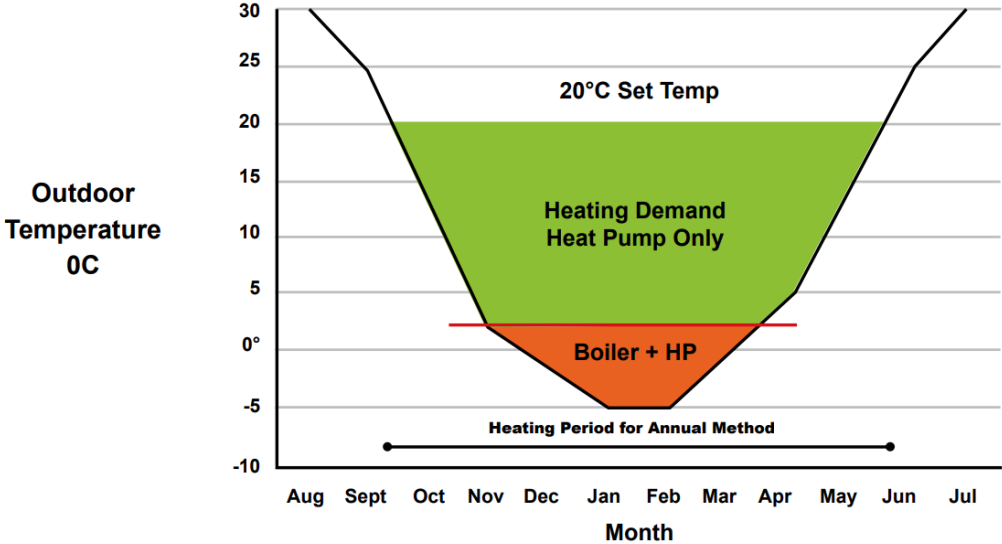


- ITALIAN SUPERBONUS SCHEME

ALLOWS FOR 110% GRANT FOR INSTALLATION OF  
A HYBRID HEAT PUMP.

60-80% reduction in gas usage.

Figure 4. Example Hybrid Heat Pump Load Profile (Alpha Heating Innovation)





# Alpha

## E-TEC HYBRID

PACKAGED HEAT PUMP SOLUTION

Together it uses energy prices and temperature to choose the most efficient combination to heat the home.

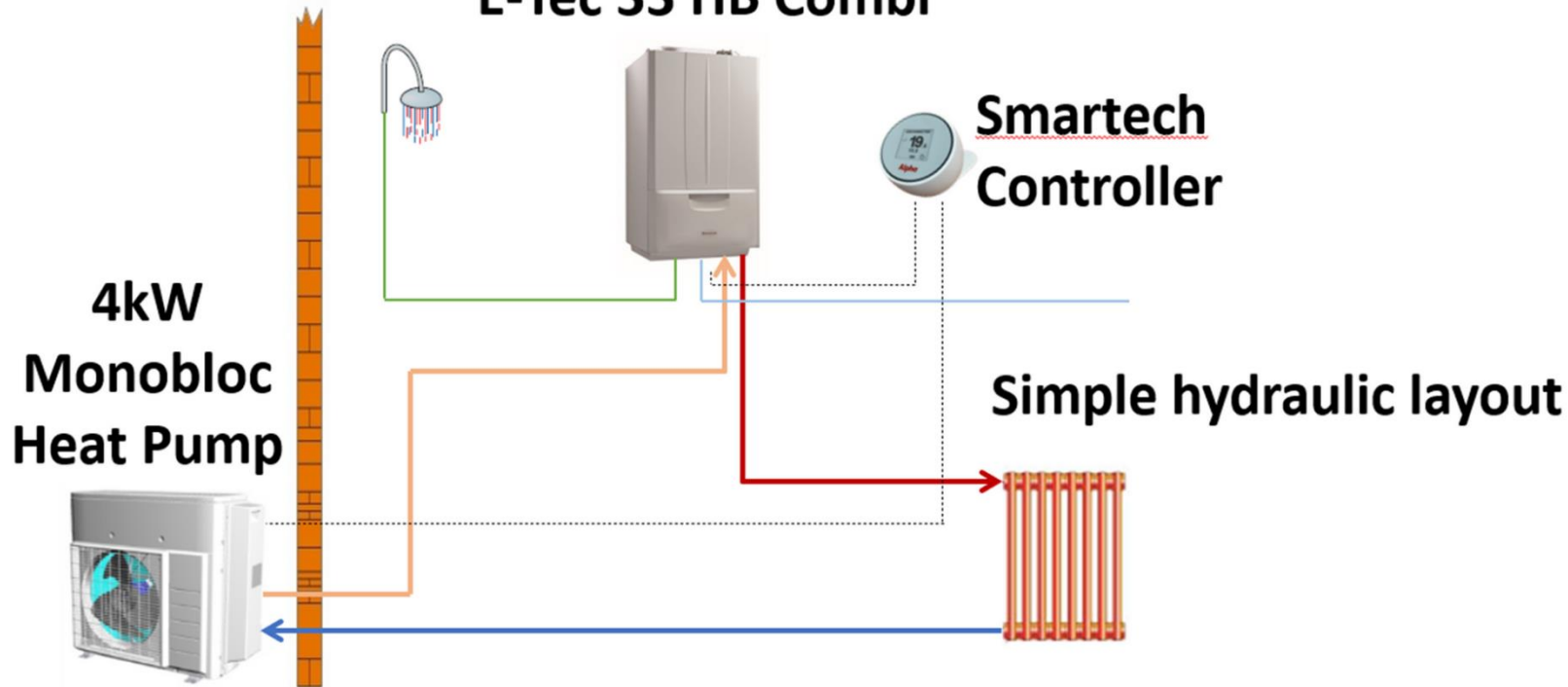
- Instantaneous hot water on demand at 14.1 l/m, no need for stored hot water.
- Hydrogen blend compatible – capable of running on a blend of up to 20% hydrogen.
- Anti-Freeze protection without the need of glycol.
- Always chooses the cheapest fuel source based on current energy tariff.
- Simple hydronic layout, very easy to install.
- No need to upgrade existing heating system, minimising install cost.
- No need for MCS accreditation only Gas Safe registration required.
- This product is listed with the Energy Networks Association (ENA) and is 'Connect and notify' approved (HP\_4014).



# E-TEC HYBRID

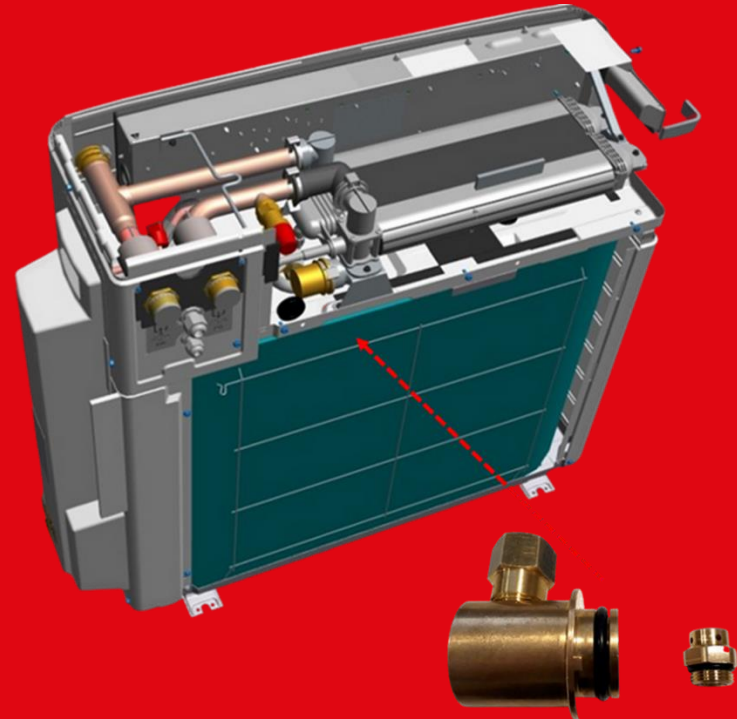
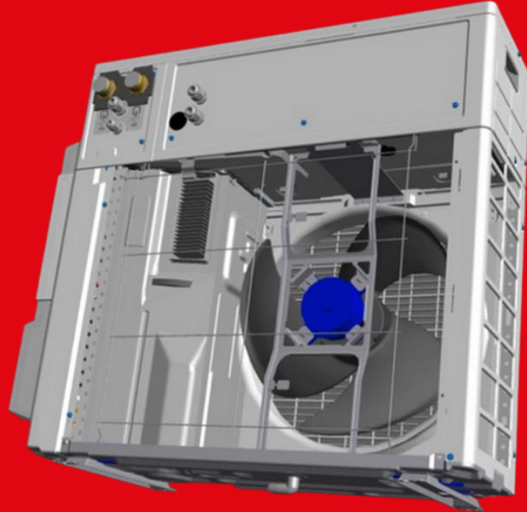
PACKAGED HEAT PUMP SOLUTION

## E-Tec 33 HB Combi



## ANTI-FREEZE VALVE AS STANDARD.

- OPENS AT 3 / 4 ° C, TO DISCHARGE WATER BEFORE FREEZING.
- It operates only if no electrical supply is present.
- Avoids the use of glycol in the system.



# *Alpha*

WHAT'S HAPPENING IN NORTHERN IRELAND.

# Domestic Hybrid Heat Pump Installed In NI- A Sustainable Solution For Heating Homes

by Refresh NI | Dec 5, 2023 | 0 comments



*Kailash Chada, CEO at Phoenix Energy, Josh Rowe, Technical Director at Refresh NI and Bill Cherry, Managing Director at Refresh NI.*

**Refresh Property Solutions in collaboration with Phoenix Energy is excited to announce the installation of a domestic hybrid heat pump at a home in the Belfast area.**



# HYBRID HEATING TRIAL



## CASTLECOOLE CASE STUDY

### Location

20 Castlecoole Park, Belfast, BT8 7BE

### Building Type

Domestic mid-terrace house - EPC Rating D

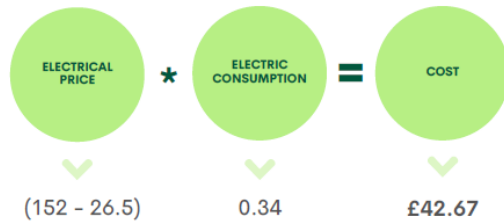


## COST & CARBON SAVINGS

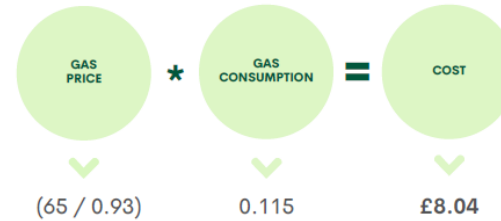
### AVERAGE HYBRID RUNNING COSTS

As part of the study we compared readings for electricity and gas consumption before and after to effectively calculate energy usage and costs. Heat energy costs for December 16th - 28th totaled £50.71.

*Electric Cost Calculation*



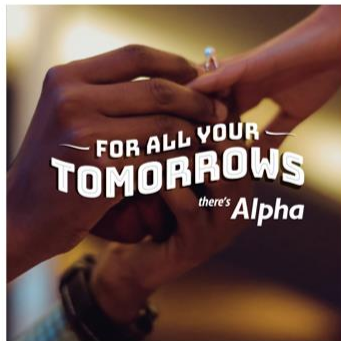
*Gas Cost Calculation*



During this trial the average daily running cost for heating was **£3.90** per day. If the same amount of heat was provided by a gas only system, fuel costs would have amounted to **£61.70** over the course of the trial period (using the same calculation formula). This means, daily costs for a gas only system would be **£4.75**, making the **hybrid system £0.85 cheaper per day**.

# FOR ALL YOUR TOMORROWS

there's **Alpha**



# Hydrogen Blending in Great Britain

Tim Harwood – Northern Gas Networks (Virtual)



# Hydrogen Blending in GB

Tim Harwood, Energy Futures Director

January 2025



# Summary

- 1) UK Government Policy
- 2) HyDeploy
- 3) HSE safety evidence review
- 4) Legislation
- 5) Market frameworks
- 6) Gas Transporter Safety Case
- 7) Operational Readiness
- 8) Timeline





# UK Government Policy

- In December 2023, DESNZ made a strategic policy decision to support blending <20vol% hydrogen into the GB gas distribution network.
- Government will review safety evidence and consider any implications on the feasibility and economic case for blending.

## Hydrogen Blending into GB Gas Distribution Networks

A Strategic Policy Decision

# HyDeploy – blending trials

## Keele University

- Private gas network
- 100 homes and 30 university buildings
- 18 month trial
- Testing on appliances post blend

## Winlaton

- Public gas network with mixed materials
- Almost 700 homes, a primary school and some small businesses
- 10 month trial
- Research demonstrated safety and customer acceptance

## Industrial trials

- Campden BRI – baked products
- Lucideon – kiln for ceramics
- Pilkington - glass manufacture

2017 - 2020 Keele University



2019 - 2021 Winlaton



2022 Industrial Trials



2022 Full safety Base

# HSE safety evidence review

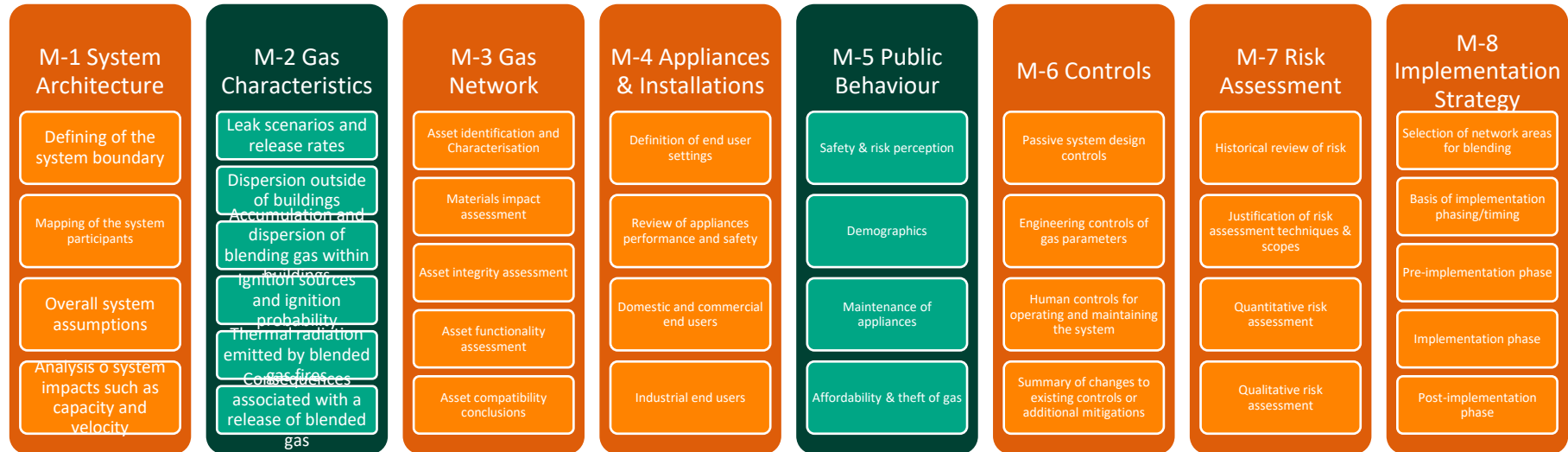
HSE and DESNZ have been notified that the evidence for 20% blending in the distribution networks is available

Currently no contract in place between HSE & DESNZ to conduct the evidence review.

Resource constraints due to Hydrogen for Heat Programme evidence review

DESNZ has indicated the HSE may start reviewing HyDeploy evidence from April 2025

**8 main reports** Totals 135 reports, 6879 pages



# Legislation

DESNZ preference is for the extent of blending to be limited in the initial stages to avoid any changes to primary legislation i.e. to expedite its implementation.

HSE HyDeploy evidence review will allow for recommendation for change process to schedule 3 of **GSMR** to allow 20% hydrogen in gas.

Ca. 5% blending limit expected initially for blending due to CV capping issues associated with **The Gas (Calculation of Thermal Energy) Regulations**

Provisions of HASAWA, GSIUR, Gas Transporter Safety Case, etc. will still apply.

# Market Frameworks

- Changes will be required to legislation, licences, networks codes, and other agreements – the market frameworks.
- This includes for modifications to the Uniform Network Code (UNC) to facilitate and optimise gas market trading arrangements to support hydrogen blending.

## Modifications Include:

- allocating blend capacity, new connections process , and Trading and Balancing procedures.
- processes relating to gas quality and system operations, inc. specifications for hydrogen entry points and requirements for additional monitoring capability.
- processes to optimise connection and capacity offers and improved demand forecasting and monitoring.



# Gas Transporter Safety Case

The scope of the HyDeploy Safety evidence is to provide the level of evidence to be sufficient for a change to GSMR.

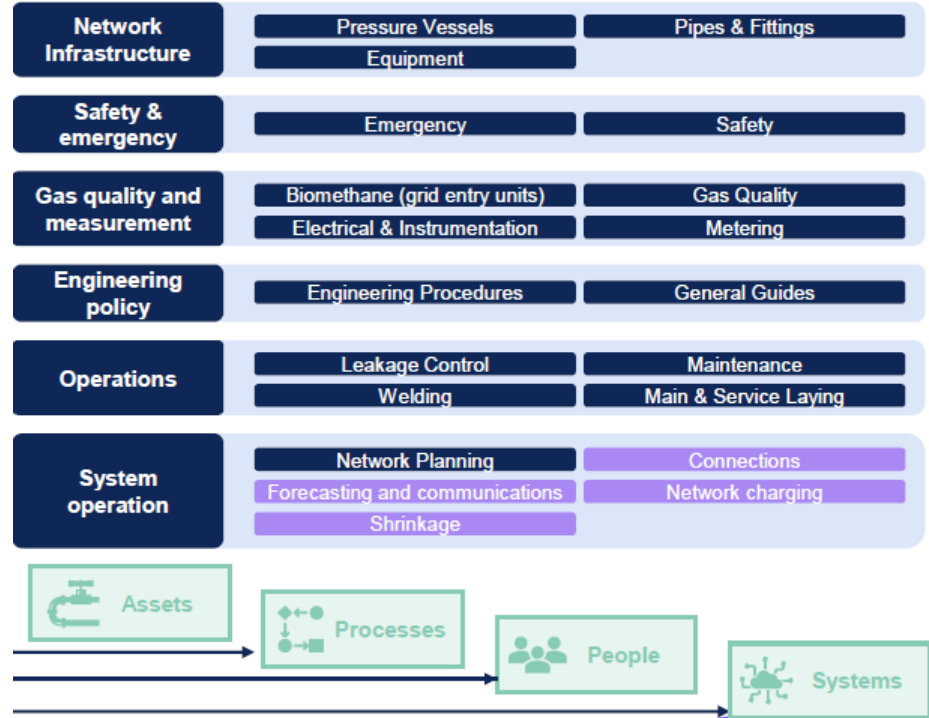
The HyDeploy evidence is not necessarily of sufficient detail to satisfy the requirements of a material change to the Safety Case.

## For example:

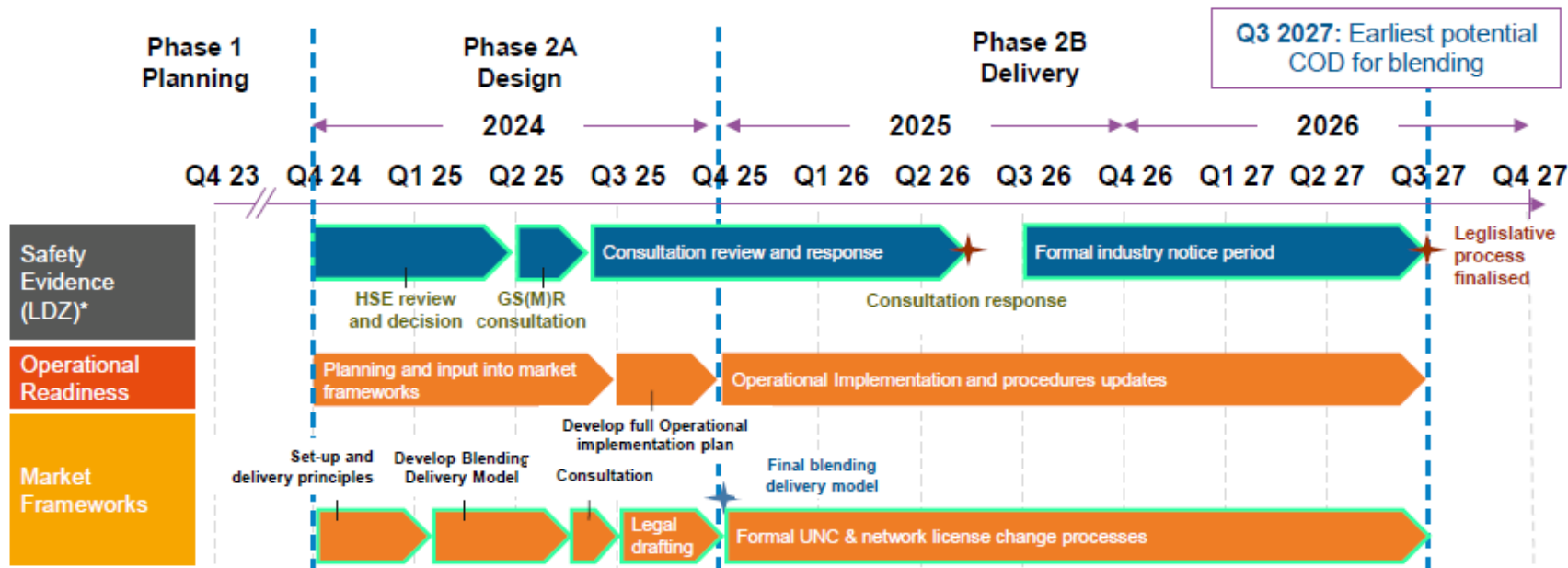
- HyDeploy has shown that existing network assets can transport a hydrogen blend subject to mitigations. For a GSMR decision this is deemed to be sufficient.
- For a safety case material change, GDNs need to close the gaps on the mitigations
- For example - Steel Pipe pre-1972: Inspection of welds needed to quantify flaw sizes present; Welding residual stress measurements on sample welds needed to derive allowable axial stress limits; Probabilistic assessment method needed for high stress pipelines

# Operational Readiness

- The introduction of hydrogen blends will require some changes to the physical operation of the gas network.
- The delivery of the necessary asset and system upgrades, process modifications, training and equipment requires planning.
- An Operational Readiness Plan detailing the cost and resource requirements for changes to Assets, Processes, Systems, and People is being progressed.



# Timeline



# Thank-you

# Panel Discussion

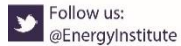




**Thank you.**

**Questions?**

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