Leading the way to a sustainable future

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Vision: To accelerate a fair and sustainable decarbonisation for all.

Mission: Establish an ecosystem delivering information to accelerate decisions by stakeholders to drive decarbonisation for **people** and **places**.

Our Challenge: Decarbonising Our Way of Life

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We need to decarbonise **25 million homes** in England to hit net zero by 2050

The Uk has a significantly diverse housing stock (35% built before the end of WW2)

A '**whole house**' approach is required. Consideration of building fabric and heating system

Fuel poverty is at its highest level. How do we secure **equity for all** in a low carbon transition

- A unique feature of the Research Village is its capability to scale from individual houses to streets and up to regions.

NeRV NET ZERO RESEARCH VILLAGE

NeRV Decarbonisation Ecosystem

Net zero transformation must encompass multiple sectors, including heat, power, communications, water, and transport… **Taking research beyond networks!**

| Generation | Transportation | Storage | Point of use | The way we live |

NeRV **coordinates** and **collaborates** to support the delivery of sustainable decarbonisation

NeRV NET ZERO RESEARCH VILLAGE

NeRV Stakeholders

Policymakers

- Government
- Regulators

Industry

- Network Licensees
- Innovation Community
- Customer Groups

People

- National
- Regional
- Community
- Mrs Babu

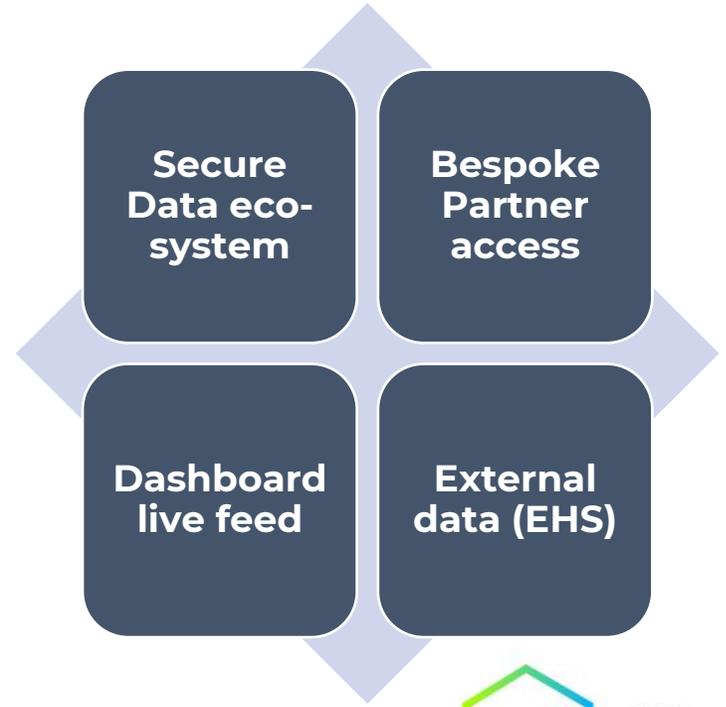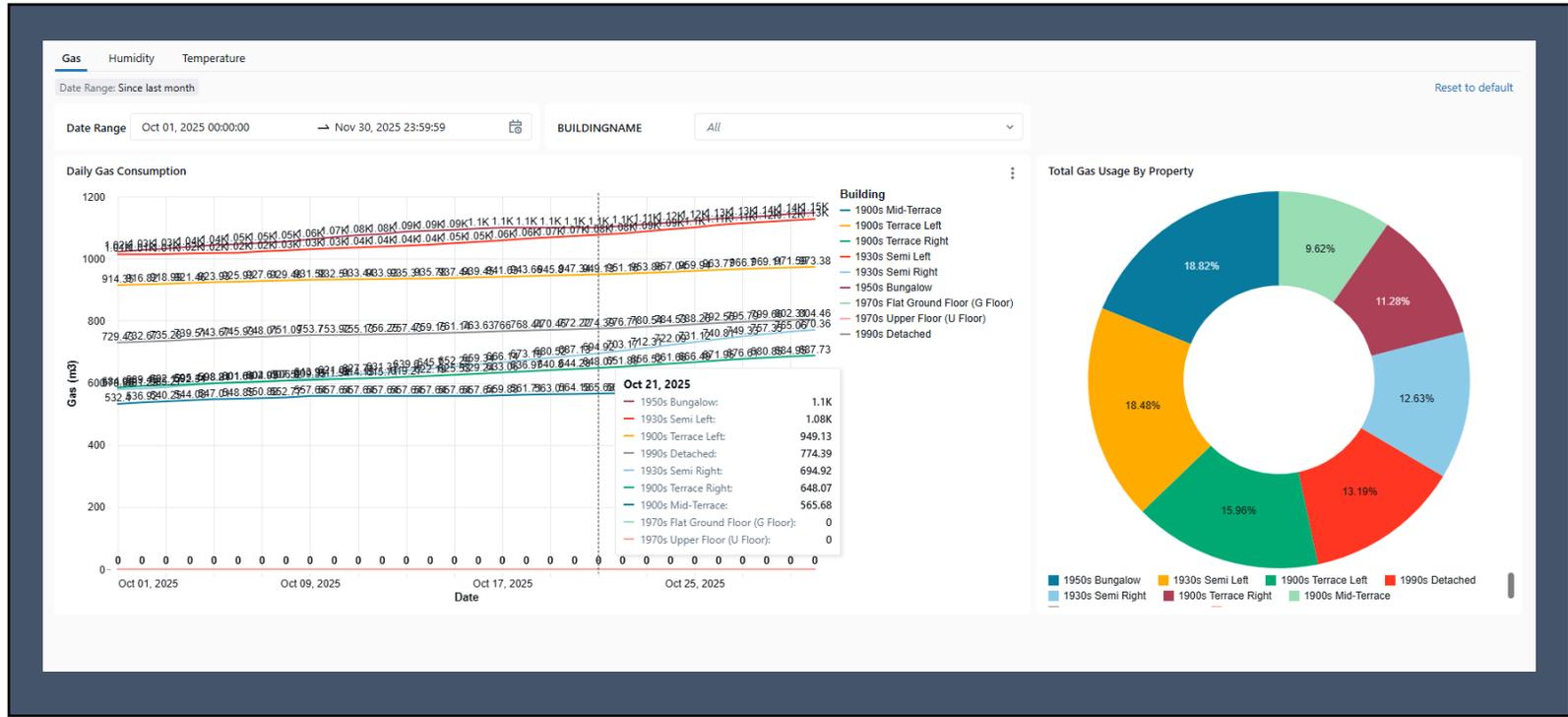# NeRV Decarbonisation Ecosystem

Digitalisation and consumer behaviour will play pivotal roles, and the transition must be affordable to ensure widespread adoption and equity

A unique feature of the Research Village is its capability to scale from individual **houses,** and the people that live in them to **streets** to **regions**.

- **Houses:** Unique research facilities, delivering the data on the low carbon solutions, different types of home and the people who live there.

- **Street:** Example of real-world settings where 'in home' and 'network innovation' can meet to generate one-of-a-kind insight

- **Region:** Grid scale BESS, electrolyser and generation of green hydrogen powered via a solar farm

NeRV

NET
ZERO
RESEARCH
VILLAGE

Data Ecosystem – A Digital Futures Close

- A highly instrumented research capability, live and historical sensor monitoring and reporting. Remote monitoring and control to simulate events.

- A robust data pipeline framework to support sensor data ingestion and make the data future ready for data-driven studies.
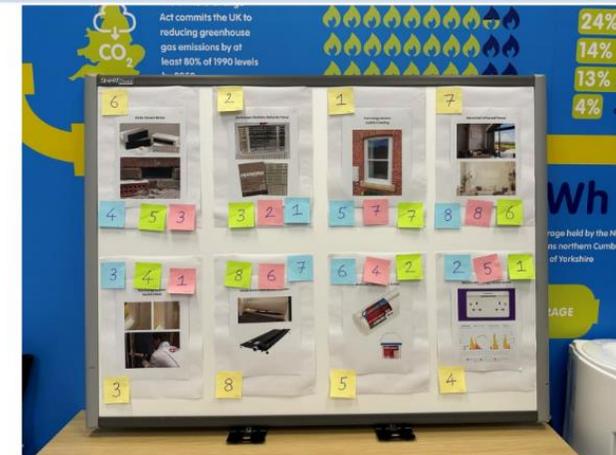

500 sensors / 1900 data points

Secure Data eco-system

Bespoke Partner access

Dashboard live feed

External data (EHS)

NeRV — NET ZERO RESEARCH VILLAGE

People led research


Going beyond the fabric:

- Personas deployed within each home
- Based on real use cases from historic research programmes
- Integrated into augmented reality
- Validated by focus groups on site

House - FC Heat Programme

FC Heat programme:

- **Evaluate** the performance of various heating systems, controls and energy efficiency upgrades

- Data will be used to **identify** the best configuration based on archetype / energy performance and simulated occupancy profiles with support from BRE

- **At pace** - deploy gas boilers, enhanced controls, heat pumps including hybrid HPs in each home and monitor their performance
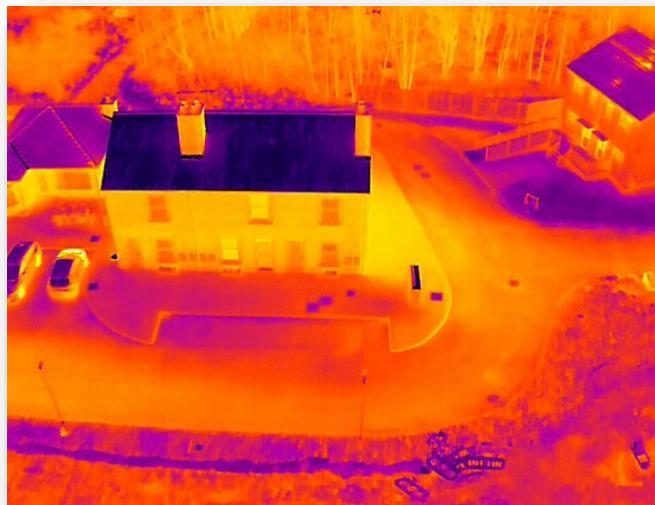
Evaluate against set metrics: installation process / cost-to-run / maintenance costs / carbon consumption / applicability for various consumer types, vulnerable, non-vulnerable / Performance gap tests...

KESTRIX

NeRV NET ZERO RESEARCH VILLAGE

House - HyBreak

Development of an automated solution to monitor home pressures, flow rates, isolate supplies in emergencies, and communicate with customers and gas networks.

It covers natural gas, hydrogen, and hydrogen blends and physical testing taking place at the NeRV facility

The focus is on:

- Integrating new technology for pressure/flow measurement
- Communications
- Integration with flammable gas detection
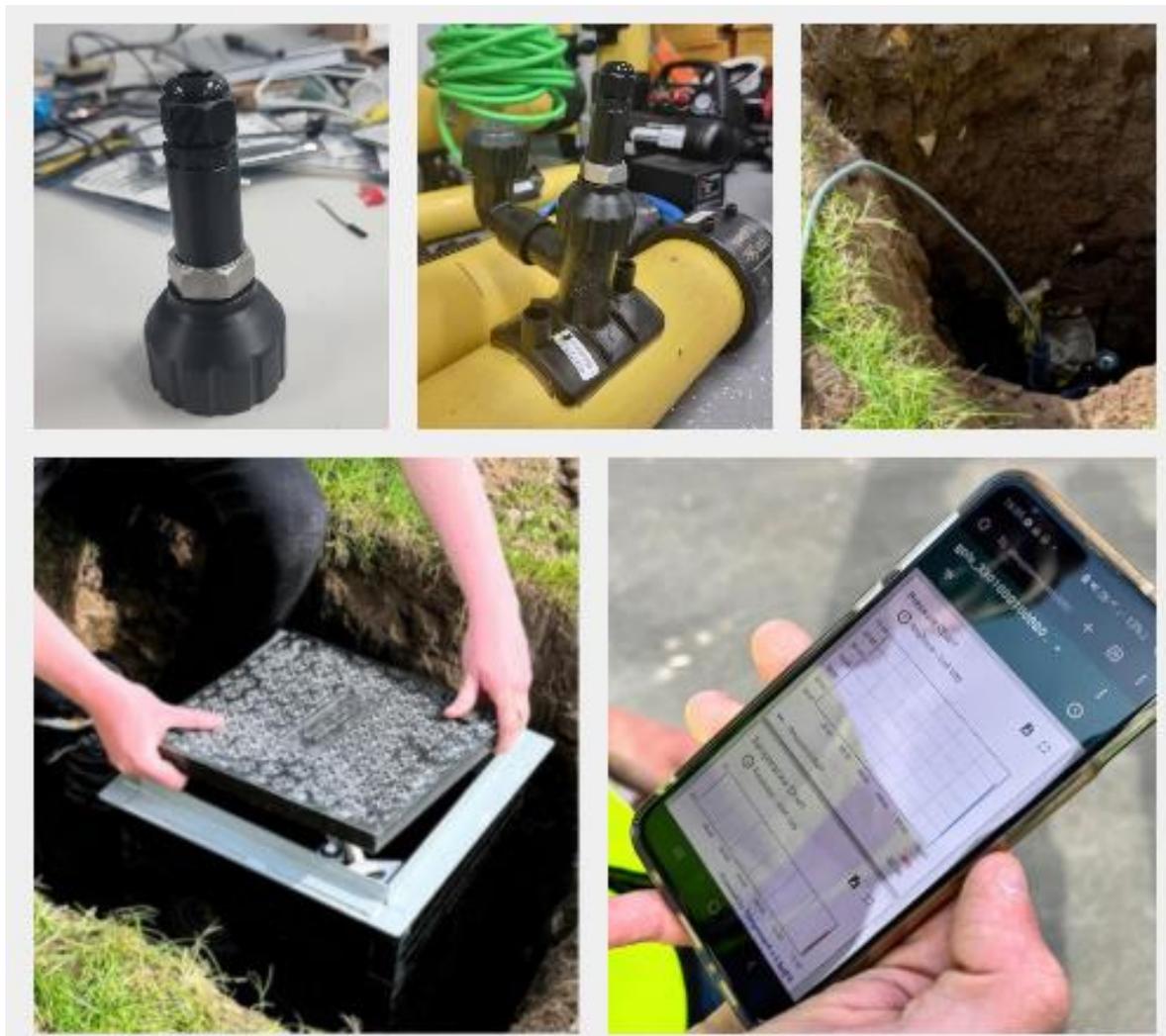- Enhancing insight and emergency response for GDNs
-

Collaboration involves UK and Ireland gas distribution networks (GDNs) and National Gas Metering.

Street – IoT Pressure Sensor

- Enhanced digital solutions are essential for supporting a fair energy transition and the development of a future Smart Gas Grid.

- The project, led by Renda and Northern Gas Networks, leverages industrial IoT, Machine Learning, and AI to improve network management and decision-making.

- Access to real-time data and AI-driven processes will accelerate digital adoption, optimise efficiency, and support low/zero carbon goals.

Region - HyCoRe

HyCoRe is an **integrated energy system** where electricity production from large scale renewables is used to generate green hydrogen; providing low carbon energy for end users in the most cost-effective manner.

Demonstrating how, the hybrid plant (HP), can support energy networks in the transition to net-zero whilst reducing the levelized-cost-of-hydrogen.

The HP is a multi-vector system with renewables, storage, and electrolysis, intersected between gas and electricity networks to **reduce congestion** and **lower emissions**.

A series of demonstrations will show how the HP *can optimise electrolyser deployment and unlock whole system value*

Understanding of customer behaviour, and acceptance

- Creation of a diverse range of customer personas through stakeholder engagement, to support multiple scenario testing with broad representation

- Provide independent, trusted and validated qualified information and education to energy customers, particularly focusing on people in fuel poverty

- Create actionable insight for customers appropriate for their homes and lifestyles

- Create a national eco-system for upgrading energy customers' homes where NeRV is the data centre.

- To accelerate a fair and sustainable decarbonisation for everyone.

Thank you

NeRV website: https://uknerv.com/