



HyDeploy

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Cadent
Your Gas Network

Agenda

- **Cadent**
- **Strategy**
- **HyDeploy**
- **HyDeploy₂**
- **HyNet**
- **Questions**

A strategy for decarbonising UK gas supply

Reduce Carbon Intensity of Gas Network

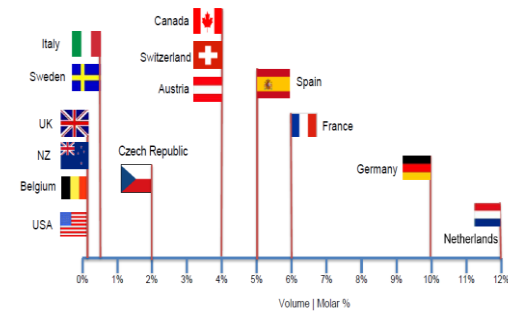
Bio-methane



Bio-SNG



Hydrogen Blend



Progressively supply 100% hydrogen to selected consumers

Industry



transport fuels



Power



New developments



HyDeploy



Project Objective

To demonstrate for the first time that a blend of hydrogen and natural gas can be distributed and utilised safely & efficiently in the UK distribution network without disruptive changes for consumers.

Potential to Deliver

29TWh of low carbon heat per annum equating to saving: CO_{2e} of 120 million tonnes & £8 billion cumulatively by 2050.



*Project Funded under OFGEM's
Network Innovation Programme*

Hydrogen Pathway

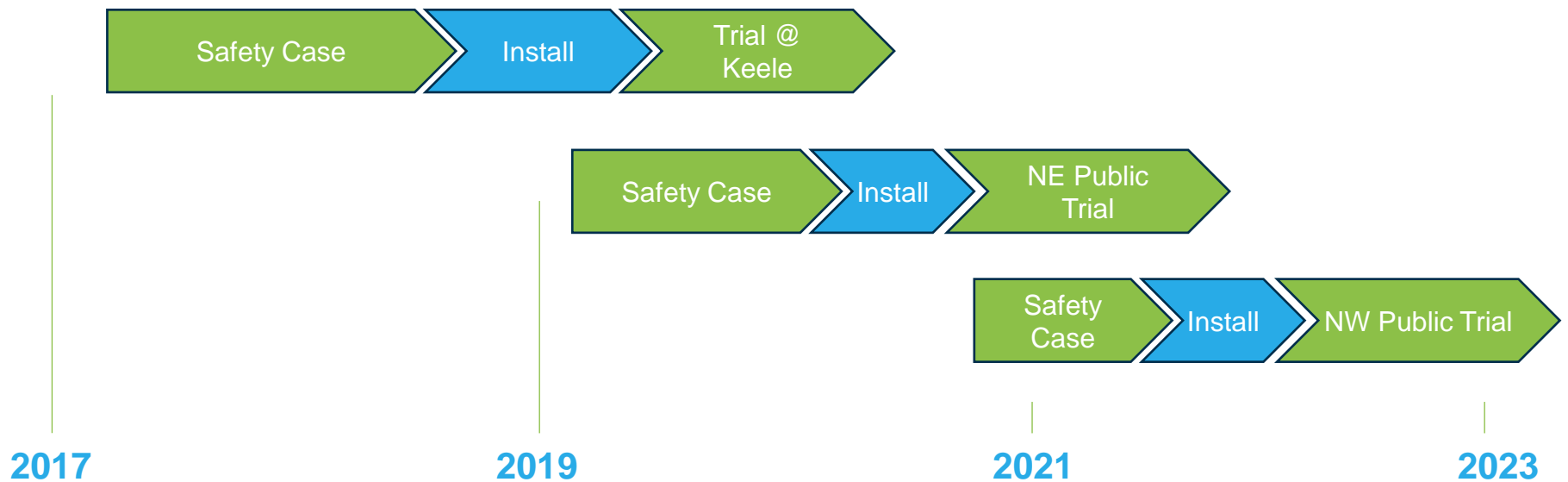
Hydrogen blending means...

- ✓ No change for consumers
- ✓ Hydrogen supply chain development
- ✓ Carbon savings equivalent to 2.5 million cars off the road
- ✓ Deliverable roadmap for deeper savings



Project Objective & Timeline

To enable bulk deployment of hydrogen blending within the UK gas by demonstrating its safe transportation and use.



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The Keele Campus

A small town on gas

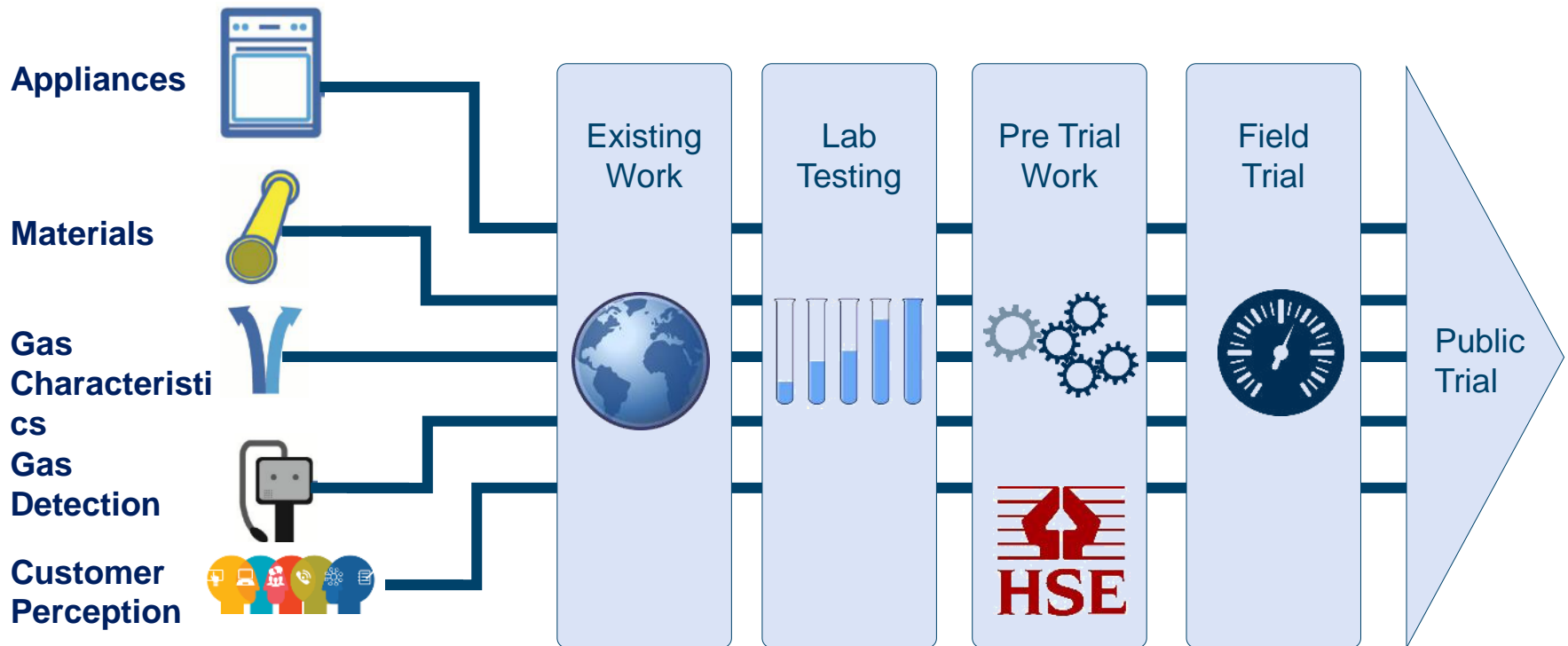
Campus the size of a small town

- 101 residential houses
- 8 multi-residential buildings
- 17 extensive office blocks & laboratories
- 7 recreational & service facilities

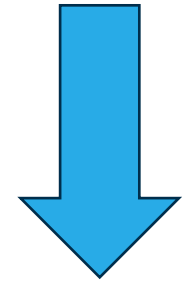
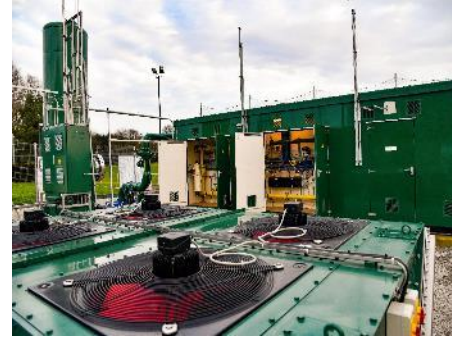
Keele is licensed transporter & supplier.
Engaged with BEIS and HSE to use its energy network as a *‘Living Laboratory’*.



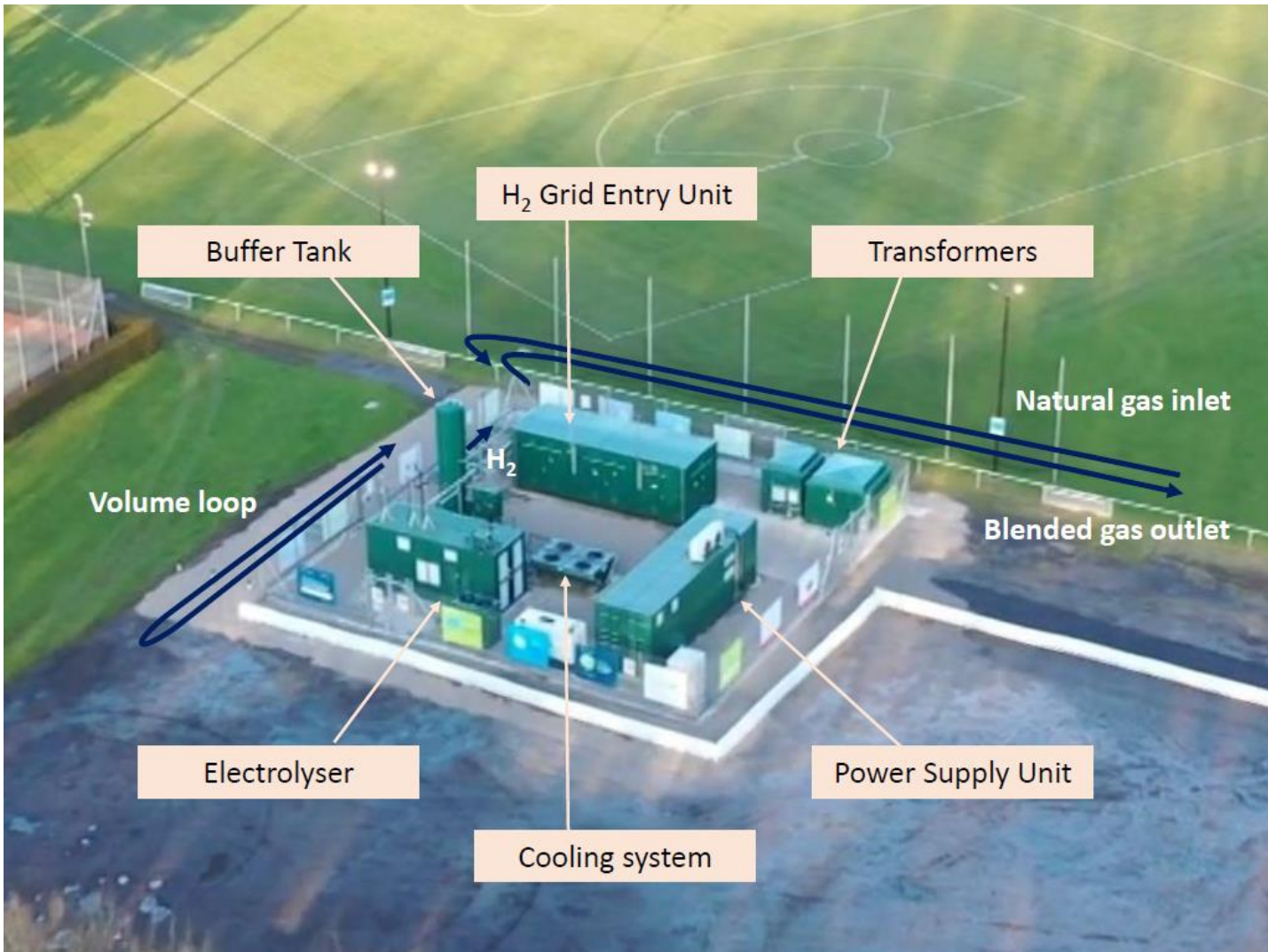
Building the Safety Case



Installation



Hydrogen Facility



Where are we now ?

Hydrogen Compound



Boiler House experiment



Summary to Date

Outcomes so far...

- ✓ No issues reported with appliances
- ✓ No issues reported with the network
- ✓ Gas demand much more variable than expected
(unknown during design)
- ✓ Lots of learning on physical equipment and blend controls given project is FOAK
- ✓ First UK customer engagement on hydrogen in a real gas network

HyDeploy2

Cadent

Northern
Gas Networks

Keele
UNIVERSITY

**HEALTH & SAFETY
LABORATORY**

ITM POWER
Energy Storage | Clean Fuel

Progressive energy

Project Objective

To Build on the work at Keele University, to demonstrate that a blend of hydrogen and natural gas can be distributed and utilised safely & efficiently in the UK distribution network without disruptive changes for consumers.

Outcome

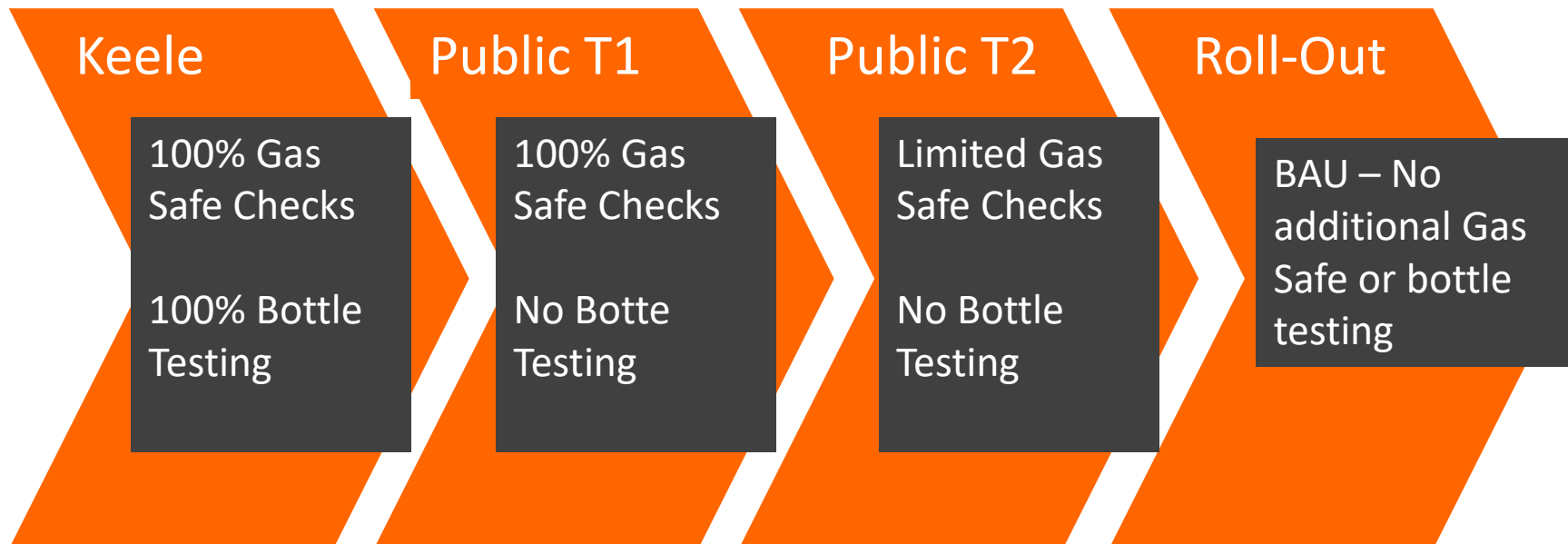
That a supplier is able to apply and inject hydrogen into a gas distribution network, just as bio-methane producers can today



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HyDeploy 2

Trial Principle: Incrementally reduce additional mitigations as technical evidence allows to risk manage roll-out justification.



Public Trial Location

Public trial location

Winlaton To Host Pioneering Hydrogen Energy Pilot HyDeploy
November 11, 2019



GAS customers in Winlaton, Gateshead, will become the first on a public UK gas network to use blended hydrogen for heating and cooking, as the country's gas distributors demonstrate ways to cut climate-changing carbon dioxide (CO₂) emissions.

Isolated network for injection
669 properties

NGNs Low Thornley Site for
Electrolyser and injection
installation

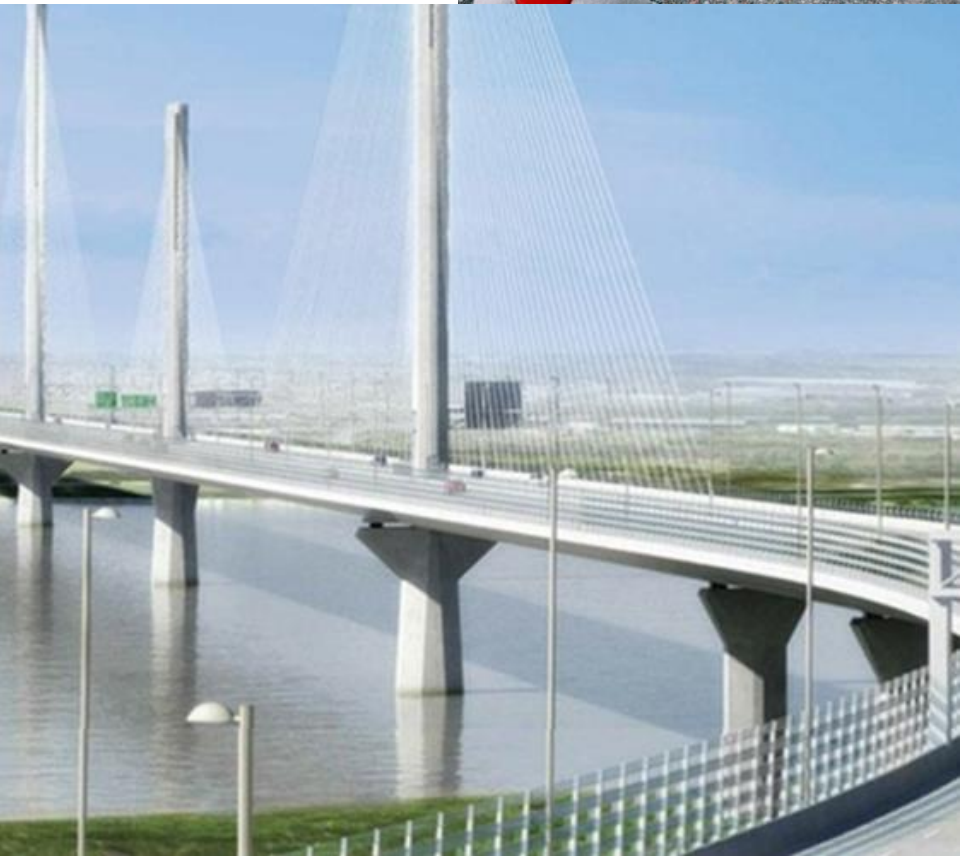


Current Status

- Exemption application under review .
- Compound in design stage.
- Embodying learning from HyDeploy within trial strategy.
- Working on closing the evidence gap to Roll out



Hydrogen production at central plant between Runcorn and Ellesmere Port.
 New **hydrogen pipeline** to supply **industrial gas users** & enable network injection for blend
Hydrogen 'blended' into distribution network to supply households.
 Use of existing pipeline and offshore rig infrastructure for CO2 storage, creating extendable **CCS infrastructure**.
 Pipeline spurs from hydrogen pipeline to gas network, **power generation and vehicle refuelling hubs**.



Thank You

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